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Characteristics Associated with the Financial Performance of Private Chiropractic Practices in Aotearoa New Zealand and Australia

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Abstract

This thesis examines the owner, practice, and operational characteristics associated with the financial performance of private chiropractic practices in Aotearoa New Zealand and Australia. Although most chiropractors work in privately owned practices and commonly report gaps in their business preparedness, little empirical evidence was found that identifies the characteristics associated with differences in practice financial outcomes. Financial performance was assessed using three related but distinct outcomes: net profit, revenue, and operating expenses. Data were collected through an anonymous cross-sectional online survey of chiropractic practice owners between January and April 2026. Sequential ordered logistic regression models were estimated separately for each outcome, with ordinary least squares models used as a supplementary consistency check. Analytical samples ranged from 68 to 74 practices.

Operational and practice-scale characteristics showed the most consistent associations with financial performance. Greater regular visit volume and clinical capacity were associated with higher revenue and operating expenses, while regular visit price and Patient Visit Average were positively associated with revenue. Staff administrative hours were positively associated with both revenue and net profit. Marketing spend was associated with higher operating expenses and lower net profit, while its association with revenue was not statistically significant once operational characteristics were included. Contrary to the study hypotheses, formal business education was negatively associated with net profit, self-rated business acumen was negatively associated with revenue, and coaching showed no statistically significant associations. Practices aged 11 years or more had higher operating expenses, while New Zealand practices had lower operating expenses than Australian practices in some specifications.

The findings suggest that how patient demand is converted into delivered and priced services, and how administrative capacity supports that process, is more consistently associated with financial performance than the owner capability measures examined. Based on the literature reviewed, this study appears to provide the first multivariable analysis of net profit, revenue, and operating expenses among chiropractic practices in Australasia and identifies priorities for future research.

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Chapter 1: Introduction

Chiropractors in Aotearoa New Zealand and Australia are tertiary-trained, registered health professionals, and most work in privately owned practices whose ongoing viability depends on sustainable financial performance. Practice owners must often combine patient care with responsibility for organising clinical and administrative staff, managing operating costs, and generating sufficient financial returns (Greatbanks et al., 2017; Llewellyn, 2001). Graduates and practitioners report gaps in their business preparedness, although the nature and extent of these gaps vary across studies. Graduates also describe feeling better prepared for clinical work than for practice ownership and management (Ciolfi & Kasen, 2017; Henson et al., 2008; Sikorski et al., 2021). Because the profession relies heavily on owner-operated businesses, understanding what distinguishes practices with stronger financial performance matters not only to individual owners but also to the educators and professional bodies responsible for preparing and supporting them.

Despite this practical importance, limited empirical evidence identifies which owner, practice, and operational characteristics are associated with differences in financial performance. This thesis addresses that gap by examining the associations between selected characteristics and three related but distinct measures of financial performance: net profit, revenue, and operating expenses. This chapter develops the background and rationale for the study before setting out the research problem, aim, objectives, research questions, methodology overview, significance, limitations, assumptions, and overall thesis structure.

1.1 Background

Chiropractic is a regulated, primary-contact health profession concerned with the diagnosis, management, and prevention of neuromusculoskeletal conditions and their effects on general health (World Health Organization, 2005), with a particular focus on the spine (World Federation of Chiropractic, 2001). Contemporary research also identifies a focus on the detection and management of vertebral column joint dysfunction (Haavik et al., 2021), termed vertebral subluxation by some of the profession (Glucina et al., 2023), and its influence on neuromuscular function. Because the profession is predominantly organised around privately owned practices, financial performance is relevant not only to current and prospective practice owners, but also to educators and professional bodies concerned with the long-term sustainability of the profession (Himelfarb et al., 2025; Meyer et al., 2025; New Zealand College of Chiropractic [NZCC], 2022).

Chiropractic practices in Aotearoa New Zealand and Australia range from solo operations to multiple-chiropractor and multidisciplinary practices that include other health professionals. Workforce studies indicate that private practice is the prevailing organisational model in both countries, although the sectors differ in size, funding, and market context. The chiropractic profession in Aotearoa New Zealand is smaller than that in Australia, and care is funded through a combination of patient payments and ACC contributions for eligible injury-related care (Hill et al., 2023; NZCC, 2019, 2022). In Australia, care is funded primarily through out-of-pocket payments and private health insurance rebates, with more limited contributions from Medicare and compensation schemes (Adams et al., 2017; Engel et al., 2014). These differences may influence financial performance by affecting demand, revenue per visit, competition, and input costs. They also limit the extent to which findings from one country can be assumed to apply directly to the other. The study therefore includes practices from both countries and accounts for country in the multivariable analysis.

A full picture of financial performance in a private health practice cannot be drawn from any single figure. Revenue shows the income generated from services and products. It does not show how much remains after the costs of operating the practice are paid. Operating expenses identify the cost base, but higher expenses may reflect either inefficiency or deliberate investment in a practice's capability and capacity to grow. Net profit provides a closer indication of the financial return generated by the practice, although its interpretation depends on how owners are remunerated. For this reason, this thesis analyses net profit, revenue, and operating expenses as related but distinct measures of financial performance. Examining them separately is important because characteristics associated with higher revenue may also increase operating costs without improving net profit.

1.2 Research Problem and Knowledge Gap

Despite the practical importance of financially sustainable chiropractic practices, the evidence base is limited. Existing workforce and professional surveys describe practitioner demographics, practice arrangements, fees, patient volumes, and perceived business preparedness, but they generally do not explain why financial performance differs between practices. Official benchmark data provide useful sector-level context, although chiropractic is often combined with osteopathy or broader service categories, and aggregated figures cannot identify which owner, practice, or operational characteristics are associated with variation between individual practices (Stats NZ, 2024).

The closest direct multivariable precedent identified in the chiropractic literature is Mior and Waalen's (2008) analysis of the personal, practice, and treatment characteristics associated with the gross income of Ontario chiropractors. However, it used Canadian data collected in a different regulatory and funding environment and examined gross income rather than practice-level revenue, operating expenses, and net profit as separate outcomes. Related studies in dentistry, general practice, allied health, and small healthcare businesses provide useful concepts and methods, but they cannot substitute for contemporary chiropractic evidence from Aotearoa New Zealand and Australia.

The literature also indicates that chiropractors and recent graduates commonly perceive gaps in their business preparedness, particularly in financial management, marketing, strategic management, and other practice-management functions, although the specific domains identified vary across studies (Ciolfi et al., 2021; Ciolfi & Kasen, 2017; Haworth et al., 2022; Henson et al., 2008; Sikorski et al., 2021). Whether these perceived gaps are associated with measurable differences in financial performance has not been established in the literature reviewed.

The research problem addressed by this thesis is that the owner, practice, and operational characteristics associated with differences in financial performance in private chiropractic practices in Aotearoa New Zealand and Australia are not well understood. This limits the evidence available to practice owners, educators, and professional organisations to make informed decisions.

1.3 Research Aim, Objectives, and Questions

The overall aim of this study is to examine the associations between owner, practice, and operational characteristics and financial performance in private chiropractic practices in Aotearoa New Zealand and Australia. Financial performance is assessed using the three distinct outcomes of net profit, revenue, and operating expenses.

The study has three objectives:

1. To describe the owner, practice, operational, and financial characteristics of participating chiropractic practices.
2. To examine the associations between selected owner, practice, and operational characteristics and net profit, revenue, and operating expenses, including whether

these associations remain after relevant characteristics are considered together in multivariable models.

3. To test the study hypotheses and exploratory variables, interpret the findings, and identify their implications for chiropractic practice management, business education, and future research.

The primary research question is: What owner, practice, and operational characteristics are associated with financial performance in private chiropractic practices in Aotearoa New Zealand and Australia?

This question is addressed through four subquestions:

SQ1: Which owner characteristics are associated with financial performance?

SQ2: Which practice characteristics are associated with financial performance?

SQ3: Which operational characteristics are associated with financial performance?

SQ4: Which associations remain after multiple owner, practice, and operational characteristics are considered together?

1.4 Overview of the Methodology

This study used a quantitative, cross-sectional, and correlational design. This design was appropriate for the research question because it allowed multiple owner, practice, and operational characteristics to be measured across a sample of practices and examined together in relation to financial performance. Data were collected through an anonymous online survey of chiropractic practice owners in Aotearoa New Zealand and Australia. Descriptive analyses were used to summarise the sample, while bivariate analyses examined initial associations between variables. Sequential ordered logistic regression models were used to examine associations with ordinal categories of net profit, revenue, and operating expenses. Ordinary least squares models were used as a supplementary consistency check on the findings. The methodology is described in detail in Chapter 3.

1.5 Significance and Contribution of the Study

The study makes four main academic contributions: empirical, methodological, contextual, and theoretical. Each is introduced briefly below and developed further in Chapters 2 and 5. The study also offers practical contributions for practice owners, educators, and professional organisations.

Empirically, the study examines practice-level financial performance in an area where direct evidence appears limited. Based on the literature reviewed in Chapter 2, no previous study was identified that modelled net profit, revenue, and operating expenses as separate outcomes in private chiropractic practices in Aotearoa New Zealand and Australia.

Methodologically, it moves beyond descriptive workforce data, sector averages, and practitioner income. It uses owner-reported practice data and multivariable regression analysis to examine owner, practice, and operational characteristics together in relation to financial performance in chiropractic practice.

The study also makes a contextual contribution by generating evidence from within Aotearoa New Zealand and Australia, whose regulatory, funding, geographic, and professional environments differ from the jurisdictions in which most business-related chiropractic evidence has been produced. Findings grounded in these settings are more directly applicable to Australasian practice owners, educators, and professional organisations than evidence drawn from other jurisdictions.

Theoretically, the study integrates four complementary perspectives to explain how owner, practice, and operational characteristics may be associated with financial performance. Professional service firm theory focuses attention on knowledge-intensive labour and the clinical capacity it provides. The resource-based view provides a basis for examining owner capability, business education, and access to external advice. The clinician-owner literature highlights the competing clinical and managerial responsibilities of practice owners. The input-throughput-output framework links practice resources and patient inputs to the processes through which care is delivered and financial outcomes are produced. Together, these perspectives address different but connected aspects of the same problem: the labour that generates revenue, the capabilities that shape how resources are deployed, the dual responsibilities of the owner, and the processes through which inputs are converted into financial outcomes.

A practical contribution lies in providing evidence that can inform decision-making. Practice owners and prospective owners may use the findings to evaluate assumptions and make evidence-informed decisions about their own development and how they structure and operate their practices. Chiropractic educators and professional organisations may use the results to review business-related curricula and continuing professional development.

1.6 Limitations and Assumptions

Participants were recruited through professional associations, social media groups, and snowball sampling. The study therefore used a non-probability sample, and the findings may not generalise to all chiropractic practices in Aotearoa New Zealand and Australia.

The financial outcomes are self-reported and were constructed from exact, approximate, and bracketed responses. The study did not access tax returns, bank records, or accounting systems. It also did not evaluate clinical quality.

Because the design is cross-sectional and correlational, it identifies statistical associations only. Causal direction cannot be established, and reverse causation remains possible. For example, coaching or business education may improve performance, but owners may also seek coaching or education because their practices are performing poorly. Country was included in the primary models, while specifications using detailed regional controls were examined but were not retained because the number of observations within individual regions was too small to support stable estimation. The study was not designed to isolate every regulatory, funding, geographic, or market mechanism that differs between Aotearoa New Zealand and Australia.

The study assumes that respondents had sufficient knowledge of their practice finances and operations to provide reasonably accurate information. It also assumes that exact figures, approximate figures, and bracketed responses could be meaningfully combined into ordinal financial categories. A further assumption is that respondents interpreted and followed the survey definitions consistently when reporting financial information, including the instruction to add back shareholder salary when reporting net profit.

These limitations and assumptions shape how the findings should be interpreted. The results identify characteristics associated with financial performance within this sample rather than causal effects or estimates that can be generalised to the wider population. The conclusions drawn in later chapters are framed accordingly. A fuller evaluation of the study's strengths and limitations is provided in Chapter 5.

1.7 Structure of the Thesis

The thesis comprises six chapters and supporting appendices. Chapter 1 introduced the study, established the research problem, stated the aim, objectives, and research questions, and outlined the methodology, significance, limitations, and assumptions. Chapter 2 develops the

theoretical foundation, reviews the relevant empirical literature, identifies the principal research gaps, presents the study hypotheses, and develops a conceptual framework. Chapter 3 explains the research design, sampling, data collection, variable construction, and analysis strategy. Chapter 4 presents the descriptive, bivariate, and multivariable results. Chapter 5 interprets the findings, assesses the study hypotheses, considers practical implications, and evaluates the study's strengths and limitations. Chapter 6 concludes the thesis by answering the research question, summarising the contribution, and identifying priorities for future research. The appendices contain the survey instrument, ethics documentation, and detailed variable descriptions.

Chapter 2: Literature Review

2.1 Introduction

Private chiropractic practices operate simultaneously as healthcare providers and small businesses (Adebiaye & Conner, 2015). Their owners must organise professional labour, attract and retain patients, manage staff and operating costs, and generate sufficient financial returns to sustain the practice (Greatbanks et al., 2017). These responsibilities make financial performance relevant not only to practice owners but also to educators and professional bodies concerned with the long-term sustainability of the profession (Himelfarb et al., 2025; Meyer et al., 2025; NZCC, 2022). Despite this practical importance, limited empirical evidence identifies which owner, practice, and operational characteristics are associated with differences in financial performance, particularly in Aotearoa New Zealand and Australia.

The purpose of this chapter is to establish the theoretical and empirical foundation for examining the associations between owner, practice and operational characteristics and financial performance in private chiropractic practices in Aotearoa New Zealand and Australia. Financial performance is operationalised as net profit, revenue, and operating expenses. Revenue represents the income generated by a practice, while operating expenses reflect the costs incurred in producing that income. Net profit is the financial return remaining after operating expenses are deducted from revenue. It is important to note that higher revenue is not necessarily equivalent to stronger financial performance when it is accompanied by equivalent or higher costs.

The review draws together four theoretical perspectives, each providing a distinct but complementary lens. Professional service firm theory characterises firms whose core services are delivered personally by trained professionals as knowledge intensive, low in capital intensity, and dependent on a professionalised workforce (von Nordenflycht, 2010). Applied to chiropractic practice, this perspective suggests that revenue-generating capacity is constrained by the professional labour available and by how fully that capacity is used. The resource-based view explains why practices with comparable labour inputs may nevertheless differ in performance by directing attention to owner capability and other internal resources (Barney, 1991; Wernerfelt, 1984). The clinician-owner literature highlights the potential tension involved in allocating effort between clinical and managerial responsibilities (Llewellyn, 2001; Noordegraaf, 2007). The open-systems input-throughput-output model provides an organising structure for examining how practice resources and activities are

converted into financial outcomes (Katz & Kahn, 1966; Scott, 2003). Together, these perspectives guide the selection and interpretation of the owner, practice, and operational characteristics examined in the empirical literature. The review also synthesises evidence from chiropractic, allied health, dentistry, general medical practice, and small-business research. Government and professional reports are used where peer-reviewed chiropractic evidence is unavailable or where jurisdiction-specific context is required.

The chapter next examines private chiropractic practice within the Aotearoa New Zealand and Australian contexts before reviewing the empirical literature across three themes: owner, practice, and operational characteristics. It then identifies the empirical, methodological, contextual, and theoretical gaps arising from this review. The chapter concludes by presenting the research questions, hypotheses, conceptual framework, and a summary of the chapter.

2.2 Conceptual and Theoretical Foundation

A single theoretical perspective is unlikely to fully explain differences in the financial performance of private chiropractic practices. The four perspectives used in this study are therefore treated as complementary rather than competing explanations. Together, they connect the labour-dependent structure of professional practice, differences in owner and practice capabilities, the competing clinical and managerial demands placed on clinician-owners, and the processes through which these resources and activities are converted into financial outcomes. This integrated theoretical foundation informs the selection and organisation of the characteristics examined in the empirical review.

2.2.1 Defining Financial Performance in Private Practice

In professional practices, financial performance may be represented by revenue growth, owner income, net profit, cash flow, or business value. These measures answer different questions and should not be treated as interchangeable. Gross or total revenue captures the value of services sold, but does not show how much income remains after operating costs such as rent, staff costs, marketing, and other costs. Operating expenses reveal the cost base of the practice, yet high expenses can arise from either inefficiency or deliberate investment in greater capacity. Net profit may provide a better indication of financial performance because it reflects the return remaining after operating expenses and is therefore more closely connected to practice viability than revenue or operating expenses alone. However, it is sensitive to how owner remuneration is recorded, as an owner salary may be treated as an

operating expense and reduce reported net profit, whereas drawings or dividends are not treated as operating expenses.

This distinction exposes a limitation in the chiropractic literature. Much of the available evidence reports practitioner earnings or gross income rather than practice-level revenue, operating expenses, or net profit. Mior and Waalen (2008), for example, modelled the annual gross income of Ontario chiropractors using personal, practice, and treatment characteristics, with their full model explaining approximately two-thirds of the variation in income. Waalen and Mior (2005) described the practice patterns within the same underlying dataset using a slightly different sample. Together, these studies remain among the most substantial chiropractic-specific analyses of practitioner and practice characteristics. However, practitioner gross income does not show the financial return generated by the practice, and a practice with high income may still produce low net profit if its operating expenses are also high. Published sector benchmarks provide useful descriptive context, but they often combine chiropractic with osteopathy or report aggregated figures that cannot explain variation between individual practices (Stats NZ, 2024).

2.2.2 Chiropractic Practices as Professional Service Firms

Chiropractic practices share the defining characteristics of professional service firms. Von Nordenflycht (2010) describes professional service firms as knowledge-intensive organisations with low capital intensity and a professionalised workforce, and distinguishes four firm types according to the intensity of these features. Chiropractic practices sit closest to the classic professional service firm because they combine all three characteristics. Unlike professional campuses such as hospitals, they generally do not require substantial capital infrastructure, and unlike neo-professional or technology-based firms, they rely on a formally regulated professional workforce. The service depends on the specific knowledge of registered chiropractors, the cost structure is dominated by labour rather than fixed assets, and practices typically operate from leased premises with modest equipment investment. The workforce is professionalised, registered under chiropractic regulators in many jurisdictions, and generally bound by professional codes and continuing professional development requirements. The application of professional service firm theory to chiropractic nevertheless has limits. The literature from which the theory developed has focused predominantly on law, accounting, and consulting firms, and organisational features observed in these settings may not transfer directly to small, owner-operated chiropractic practices (von Nordenflycht, 2010). Chiropractic practices typically serve individual patients and may have less scope than larger

professional firms to expand capacity through hierarchies of junior professionals. The perspective is therefore used here to identify relevant mechanisms rather than as a fully transferable model.

The professional service firm perspective has several implications for the research question. Revenue-generating capacity is constrained by the number of practitioners, their available clinical hours, and the number of billable visits completed. Growth may depend on leverage, meaning the extent to which the owner can use other professionals and administrative staff to expand capacity beyond the owner's own labour. The firm's resources include not only tangible inputs but also practitioner knowledge, reputation, patient relationships, systems, and routines. These implications justify examining practitioner numbers, clinical hours, administrative support, patient volume, practice type, and owner capability as potential factors associated with financial performance.

2.2.3 Resource-Based View and Owner Capability

The resource-based view proposes that differences in firm performance can arise from differences in the resources and capabilities held within firms (Barney, 1991; Wernerfelt, 1984). Its dynamic capabilities extension also emphasises a firm's ability to reconfigure those resources as its operating environment changes (Teece et al., 1997). In chiropractic practice, such changes may include regulatory developments, technology adoption, and changes in funding pathways. Potentially relevant internal resources include professional expertise, managerial knowledge, reputation, patient relationships, staff capability, and systems for marketing, scheduling, financial management, and service delivery.

Healthcare and small-business research provides support for examining how these resources are coordinated and deployed. Kash et al. (2014), in a comparative case study of two United States health systems, emphasised the importance of management resources, personnel, talent, and organisational capabilities in healthcare strategy implementation. Evidence from Aotearoa New Zealand also supports examining owner-level capabilities. Walley (2007) found that owner planning orientation was directly associated with financial performance among small and medium enterprises, while Omisakin and Adegoke (2022) found that entrepreneurial orientation was positively associated with self-reported growth in a convenience sample of Auckland family businesses.

The present study does not directly test whether resources satisfy the full resource-based criteria of value, rarity, inimitability, and non-substitutability, nor can a cross-sectional design

establish sustained competitive advantage. The resource-based view is instead used as a lens for selecting and interpreting owner-level capability variables. In this study, business acumen is treated as an owner-level capability because it generally develops through experience, can vary across clinically trained owners and shape how other practice resources, including clinical labour, staff, and systems, are allocated and used. Business education represents an investment in managerial knowledge, while external coaching represents access to advisory knowledge, accountability, and practice-management systems. If these capabilities improve the allocation and use of practice resources, they should be associated with stronger revenue and profit outcomes. A competing alternative explanation is that owners may seek education or coaching in response to weaker practice performance in an effort to improve financial performance and long-term sustainability. Cross-sectional associations must therefore be interpreted cautiously.

2.2.4 The Clinician-Owner Dual Role

Private practice ownership combines two roles that may not always align. The owner is both a clinician responsible for patient care and a manager responsible for the commercial viability of the practice. Research on hybrid managers shows that professionals can experience tension when managerial priorities are perceived to conflict with professional identity, autonomy, or patient-centred values. Llewellyn (2001) used the metaphor of "two-way windows" to describe how clinician-managers translate between clinical and managerial perspectives. The study found that clinicians could occupy this mediating role relatively readily, although limited financial-management expertise could weaken their effectiveness in it. Noordegraaf (2007) extended this by arguing that clinician professionalism is reshaped rather than displaced by managerialism, producing a hybrid professionalism in which clinical autonomy and managerial accountability often coexist in tension. In chiropractic, this tension may be especially visible in decisions about marketing, recommended care frequency, pricing, staff performance, and the allocation of time between clinical and managerial work.

The dual role also carries a well-being dimension. Torrès and Thurik (2019) describe both pathogenic effects of small business ownership, including stress and isolation, and salutogenic effects such as higher work satisfaction. How the owner divides time between clinical care and practice management is therefore a resource-allocation decision with potential financial and well-being consequences. This provides the rationale for examining owner clinical and administrative hours as indicators of how owners allocate their time between the two roles. As

the existing literature does not establish which allocation is associated with stronger financial performance, these variables are examined as exploratory predictors.

2.2.5 Input-Throughput-Output

Open-systems theory offers a model of how a private practice converts resources into financial results through a sequence of input, throughput, and output (Katz & Kahn, 1966; Scott, 2003). The inputs are the resources entering the practice, such as practitioner and staff time, new patients, marketing activity, and capital. Throughput refers to the internal processes that convert these resources into delivered care, such as clinical work, administrative support, visit patterns, and owner decision-making. The output is the financial result produced by this process. Total revenue is the income generated by the delivered services, and net profit is what remains once operating expenses are deducted from that revenue.

The model is useful because it avoids the assumption that inputs translate directly into financial returns. For example, a practice may report more chiropractor clinical hours and attract more new patients, yet generate fewer regular visits if patients attend less frequently because their cases require fewer visits, their care patterns are shorter, or they seek subsequent care elsewhere. Conversely, a practice with fewer clinical hours and new patients may generate more regular visits if patients attend more frequently because of greater case complexity, different care patterns, or return visits for new issues. Differences in pricing, administrative support, and other practice processes may further alter the revenue and costs generated from that activity.

Patient Visit Average (PVA) is a metric often promoted within chiropractic practice-management and coaching circles as an indicator of visit patterns and, more cautiously, patient retention, although the prevalence of its use does not appear to have been formally documented (Stringer, 2016). Stringer (2016) calculates PVA as total office visits divided by new patients. This study calculates PVA as regular or follow-up visits divided by the number of new patients during the same period. PVA sits within the throughput layer because it reflects how new-patient input is converted into subsequent visit activity at the practice level.

In combination with the preceding perspectives, the framework directly informs the selection and organisation of the study variables. Inputs are represented by clinical and administrative labour, new patients, and marketing spend; throughput by visit volume, Patient Visit Average, pricing, and owner time allocation; and outputs by the three financial outcomes.

No single perspective adequately accounts for financial performance on its own. Professional service firm theory draws attention to the labour constraints affecting revenue generation but provides limited explanation of why comparably resourced practices differ. The resource-based view directs attention to owner capability and other internal resources but does not describe the service-delivery process. The clinician-owner literature highlights why managerial capability may not be fully applied, while the input-throughput-output model supplies the organising structure that connects resources, practice processes, and financial outcomes. Used together, the four perspectives address the resources a practice holds, how its owner deploys them, and the processes through which they are converted into financial outcomes. This combination informs the variable selection and interpretation used throughout the remainder of the thesis.

2.3 Private Chiropractic Practice and the Australasian Context

2.3.1 Structure of Private Chiropractic Practice

International workforce research characterises chiropractic as a predominantly private-practice profession organised around solo practitioners and small groups. National surveys document variation in practice type, practitioner demographics, patient mix, and integration with other health professionals, while cross-country analyses describe the size, distribution, and regulatory status of the profession (Adams et al., 2017; NZCC, 2019, 2022; Stochkendahl et al., 2019). In the United States, Himelfarb et al. (2025) reported that approximately half of chiropractors practised solo, with others working in multi-doctor, multidisciplinary, or integrated settings. French workforce research similarly found that private practice predominated and that women constituted a majority of survey respondents, although the authors noted possible overrepresentation (Meyer et al., 2025). These studies establish the organisational context of chiropractic practice but remain largely descriptive. They support the inclusion of variables such as practice type, owner demographics, and the number and mix of practitioners, while leaving unresolved whether these characteristics are associated with differences in financial performance.

2.3.2 Aotearoa New Zealand and Australia

Aotearoa New Zealand and Australia provide related but distinct practice environments. Both countries regulate chiropractic as a registered health profession and rely substantially on private practice. The Aotearoa New Zealand evidence base is thin but growing. Holt et al. (2009) documented the practice characteristics of New Zealand chiropractors, including

practice arrangements, time allocation, patient volume, and reliance on ACC funding, and the workforce snapshots provided by the NZCC (2019, 2022) surveys describe practice arrangements, demographics, and, in the 2019 survey, the extent to which ACC-subsidised patients make up practice caseloads. ACC funding is an example of a contextual feature. Hill et al. (2023) examined ACC-funded low back pain healthcare service use in New Zealand between 2009 and 2020, measuring use by both claims and single contacts. Each contact represented one treatment session or use of a service, meaning that a course of five sessions was counted as five contacts but only one claim. By contacts in 2020, chiropractic ranked second among the nine services analysed, with 306,000 contacts compared with 633,000 for physiotherapy. When service use was measured by claims rather than contacts, physiotherapy, general practice, and radiology accounted for the highest volumes. Australia has no direct funder equivalent to ACC. Medicare coverage is limited to chronic disease management referrals, most private health insurers provide only partial reimbursement, and workers' compensation and motor vehicle accident schemes contribute limited third-party payments (Adams et al., 2017). Care is delivered through the private sector, where private health insurers meet the majority of the benefits paid, and private-insurance expenditure on chiropractic showed an overall increasing trend between 1998 and 2012, although average fees and per-service benefits declined in real terms from 2007 to 2012 (Engel et al., 2014).

The Canadian and United States literature is produced within different insurance, reimbursement, and competitive environments. Even where the underlying service-production process is similar, the financial consequences of pricing, visit patterns, and patient acquisition may differ across systems. Including practices from both Aotearoa New Zealand and Australia broadens the empirical base and allows average trans-Tasman differences to be considered, although the study cannot isolate specific legal, policy, funding, or market mechanisms. Pooling the two countries remains appropriate because chiropractic practice in both contexts is shaped by broadly similar professional education pathways, registration-based regulation, predominantly private fee-for-service delivery models, and strong trans-Tasman professional connections. The analysis also includes a country indicator to account for average differences between the two countries rather than treating the contexts as identical.

2.3.3 Existing Evidence on Chiropractic Financial Outcomes

Beyond Mior and Waalen's (2008) analysis of gross income, little chiropractic research was found that examines how owner or practice characteristics are associated with financial

outcomes. Professional surveys provide useful descriptive information on fees, patient volumes, and practitioner earnings, but none report practice operating expenses or tests which characteristics are associated with variation in practice-level net profit, revenue, and operating expenses (NZCC, 2019, 2022; Waalen & Mior, 2005). In the adjacent Aotearoa New Zealand general-practice context, Greatbanks et al. (2017) found, in a qualitative study of eleven Otago and Southland practices, that all practices maintained basic measures such as profit-and-loss statements and cash-flow records, while more sophisticated performance measurement was concentrated in larger and more developed practices.

In summary, the contextual evidence leaves unresolved which owner, practice, and operational characteristics are associated with practice-level net profit, revenue, and operating expenses in Aotearoa New Zealand and Australia. Existing evidence describes the structure of the profession and documents practitioner incomes and perceived preparedness, but it does not identify the characteristics associated with differences in financial outcomes between practices. This is the gap the present study addresses.

2.4 Theme 1: Owner Characteristics

2.4.1 Business Acumen

Business acumen in this study refers to the owner's self-assessed capability to understand and manage the financial, marketing, operational, and people-related functions of practice management. It is broader than financial literacy and narrower than general entrepreneurial orientation. The construct is relevant because practice owners make repeated decisions about cash flow, pricing, marketing, staffing, systems, and service delivery. Weakness in any one domain may constrain the conversion of clinical activity into sustainable financial returns.

The chiropractic education literature consistently identifies concerns about perceived business preparedness. Henson et al. (2008) surveyed practising chiropractors and found that respondents rated business knowledge across the profession well below the levels they considered necessary across major business functions. Ciolfi and Kasen (2017) reported a similar pattern among Ontario chiropractors, with statistically significant gaps between required and current knowledge in strategic management, marketing, and legal and ethical matters. In interviews with 16 Ontario chiropractors, Ciolfi et al. (2021) found that many participants perceived their business education as contributing little to their readiness for practice, although legal and ethical content was a notable exception. Studies of students and recent graduates similarly report lower perceived preparedness for business responsibilities

than for clinical work, while audits of accredited programmes show substantial variation in the business content provided (Gleberzon, 2022; Haworth et al., 2022; Sikorski et al., 2021). A comparable pattern appears in an adjacent profession, where Canadian physiotherapists working in private practice were significantly more likely than those in other non-private settings to regard business acumen as important to their work (Desveaux et al., 2012).

Collectively, this literature identifies a perceived capability problem but does not establish whether owners who rate themselves as more capable achieve stronger financial performance. Most studies examine perceptions of educational adequacy rather than revenue, operating expenses, or profit. Self-assessment also introduces uncertainty because confidence and competence are not equivalent and may not develop together. To examine this gap, the present study uses an 11-item self-assessed business acumen composite covering financial management, marketing, operations, and people management. Based on the resource-based view, stronger business acumen is hypothesised to be positively associated with practice net profit and revenue.

2.4.2 Business Education

Business education is one potential source of enhancing managerial capability, but education and acumen should not be treated as the same construct. Formal qualifications, university courses, workshops, online programmes, chiropractic college courses, and experience-based learning differ in depth, timing, and applicability. Education may improve knowledge without changing behaviour, and owners may undertake education after encountering financial or managerial difficulties. The effect may also depend on whether the content fits the practice's size, stage of development, and operating environment.

Adjacent healthcare research offers some support for the proposition that formal management practices matter. King et al. (2010) found that budgeting practices were associated with performance in small Australian healthcare businesses, particularly where the practices matched organisational needs, which suggests that capability becomes valuable when translated into systems and decisions. The closest chiropractic-specific evidence identified comes from Adebiaye and Conner (2015), who surveyed chiropractors across four USA states and found that those holding an MBA reported higher ranked yearly profit and greater perceived business success than those without one. However, the findings should be interpreted cautiously. The study used a small and geographically limited sample, respondents were aged between 30 and 47 years, and both profit and business success were self-reported

using ordinal measures. MBA holders were also significantly younger than those without an MBA, and the analysis did not separate the associations of age and MBA status with profit. The findings therefore provide suggestive, rather than conclusive, support for examining whether business education is positively associated with practice net profit and revenue.

Considered together, the evidence provides a plausible, although limited, basis for expecting business education to be positively associated with practice net profit and revenue. This expectation rests on the potential for education to strengthen managerial knowledge and decision-making, while recognising that its value depends on whether that knowledge is applied within the practice.

2.4.3 External Coaching and Advisory Support

Business coaching and practice-management consulting are prominent within chiropractic practice culture, yet independent empirical evidence on their effects on financial performance is limited. Coaching may provide knowledge, accountability, benchmarking, goal-setting, peer comparison, and standardised systems. These mechanisms are consistent with the resource-based view, because external advice may help owners acquire managerial capabilities that are difficult to develop alone. No peer-reviewed evaluation of coaching in private chiropractic practice was located.

Owners who choose coaching may be unusually growth-oriented, which would make coaching appear beneficial even if the underlying difference is motivation. An alternative pattern is also possible with dissatisfaction over revenue, profit, or lifestyle balance prompting owners to seek coaching. The timing, quality, duration, and content of coaching can also vary. The lack of direct evidence, combined with these possible mechanisms, supports examining coaching while remaining cautious in interpreting any cross-sectional association as a coaching effect. The directional expectation is therefore derived from the resource-based view, in which coaching is an external mechanism for building owner capability, rather than from chiropractic-related empirical findings.

2.4.4 Owner Experience and Time Allocation

Owner experience may improve clinical efficiency, reputation, and managerial judgement, but it could be difficult to interpret independently because it could also be correlated with practice age and/or owner age. The available evidence is consistent with a positive but qualified relationship. Mior and Waalen (2008) found that years since graduation was associated with the income of Ontario chiropractors, particularly in the formative years of practice, although

treatment characteristics, led by the number of new patients seen, were considerably stronger predictors. In the adjacent dental literature, Conrad et al. (2010) similarly reported a positive association between experience and output in their regression models, noting earlier dental research suggesting diminishing returns.

Time allocation raises the same interpretive difficulty. Clinical time can generate billable activity, and in both Mior and Waalen (2008) and Conrad et al. (2010) the measures of clinical throughput, patient volume and the practitioner's own chairside hours respectively, accounted for the largest single shares of explained variance in income and output. Managerial time, by contrast, can improve systems and resource allocation but does not bill directly. Excessive clinical work may therefore limit the time available for strategic decision-making and create dependence on the owner. The wellbeing literature reinforces this tension. Partridge et al. (2024), in a scoping review, reported that chiropractor burnout appears similar to or lower than that in other healthcare professions while chiropractic students showed higher burnout than the general population, and identified business and administrative duties, including practice ownership, among the factors associated with burnout, and a cross-sectional survey of Canadian chiropractors found generally favourable wellbeing comparisons with other groups, alongside meaningful minorities reporting mental health difficulties (Kawchuk et al., 2025). Owner experience and time allocation are therefore useful characteristics to explore. However, the literature reviewed here does not clearly support strong directional predictions.

As a whole, the owner-characteristics literature consistently documents perceived shortfalls in business capability and education and provides suggestive evidence from adjacent settings that owner capability and formal management practices may matter financially. What it does not establish is whether owners with greater business capability, or those who invest in its development, achieve stronger practice-level financial outcomes. Business acumen, business education, and coaching are therefore examined as hypothesised predictors, while owner experience and time allocation remain exploratory.

2.5 Theme 2: Practice Characteristics

2.5.1 Practice Type and Practice Age

Practice type in this study refers to the organisational arrangement through which services are delivered. Solo chiropractor, multiple-chiropractor, and multidisciplinary practices may differ in clinical capacity, operating costs, coordination requirements, and opportunities for internal

referral. The multidisciplinary healthcare literature identifies potential benefits from integrated care and broader service offerings, but also notes challenges involving billing arrangements, communication, and professional boundaries. It also cautions that direct evidence of benefit remains limited and context dependent (Lisi et al., 2018; Myburgh et al., 2022). These differences provide a basis for examining whether practice type is associated with revenue, operating expenses, and net profit.

Practice age may have a complex relationship with performance. In a panel of Spanish manufacturing firms, Coad et al. (2013) found that older firms tended to report higher absolute levels of productivity and profit, stronger equity positions, and lower debt ratios. However, they also experienced slower growth in sales, profits, and productivity. After firm size and other characteristics were taken into account, older firms also showed lower profitability than younger firms. The authors linked these competing patterns to learning by doing, through which firms accumulate knowledge and develop more efficient routines, and organisational inertia, through which established routines and structures may become less responsive to changing conditions.

Similar tensions are plausible in chiropractic practice. New practices may face start-up costs, weak brand recognition, and developing patient bases. Established practices may benefit from accumulated experience, reputation, and referral networks, but may also carry legacy systems or become less responsive to changing demand. Because neither the chiropractic nor the broader firm age literature establishes a consistent directional pattern for practice type or practice age, both are examined as exploratory structural characteristics rather than assigned directional hypotheses.

2.5.2 Clinical Capacity

Professional service delivery depends on the quantity and deployment of professional labour. The number of practitioners and clinical hours represent two related but distinct measures of capacity. Practitioner count captures headcount, while clinical hours more directly measures the time available for patient care. A practice with several part-time practitioners may have less capacity than a smaller headcount working longer hours.

Evidence from dentistry illustrates the relevance of labour capacity. Conrad et al. (2010) found that dentist productivity, measured as visits per week, was positively associated with the dentist's own chairside hours, the number of clinical support staff (dental assistants and hygienists), and the number of treatment rooms. Although chiropractic does not rely on

support roles in the same way, the broader principle is likely transferable. Professional time and supporting resources largely determine how many services a practice can deliver. More direct chiropractic evidence from Corcoran et al. (2022) is consistent with this, reporting that chiropractor staffing and facility characteristics were associated with clinical productivity in the United States Veterans Health Administration workforce. Greater capacity should therefore be associated with higher revenue and expenses. Its relationship with net profit depends on utilisation and cost control, because unused or poorly coordinated capacity can increase costs without generating a matching increase in income.

2.5.3 Administrative Support and Leverage

Administrative labour is a potentially important enabling resource. Scheduling, patient communication, billing, and other administrative tasks do not directly constitute clinical care, but they may influence how efficiently clinical capacity is used. Evidence from adjacent primary care settings supports this mechanism, although it does not establish that administrative support necessarily improves financial returns.

Using monthly data from 6,149 general practices in England, Zhao et al. (2026) included administrative staff alongside clinical staff in models of appointment production. Administrative staffing contributed positively to appointment volumes, and additional clinical staff generally produced more appointments in practices with greater administrative support. The authors concluded that sufficient administrative support may help practices realise the productivity of their clinical workforce. However, the study examined appointment capacity and patient access rather than revenue or profit.

Dobson et al. (2009) reported a related but more qualified pattern in United States primary care practices. Greater total support staffing was associated with higher visit throughput and, in some models, higher income per physician hour. However, after total staffing was considered, using a greater number of distinct staff types was associated with lower visit throughput and lower income per physician hour. The authors suggested that communication, handoffs, and other coordination requirements may offset some of the benefits of delegation and specialisation, although these coordination activities were not measured directly.

Together, these findings suggest that administrative support may increase practice capacity, but that its contribution depends on how staffing, roles, and workflows are organised. This is consistent with the productivity gains from support staff reported by Conrad et al. (2010), although that study examined clinical rather than administrative support. Administrative

labour is also an operating cost, so greater staff hours may increase expenses whether or not they generate corresponding revenue. Administrative support is therefore expected to be positively associated with revenue and operating expenses, while its association with net profit remains uncertain.

2.5.4 Geographic Context

Geographic location can influence the demand, cost, and competitive conditions faced by a practice. Population size and composition may affect the potential patient base, while rent, wages, travel patterns, workforce availability, and proximity to competing providers may influence both revenue and operating expenses. Australian chiropractic workforce research has identified urban and rural differences in workload and resource availability (Adams et al., 2019), while a spatial analysis of the New Zealand physiotherapy workforce found geographic maldistribution of the workforce, with shortage areas concentrated in a number of provincial and rural regions (Buhler et al., 2024).

More direct evidence on local chiropractic market structure is provided by Dunne et al. (2013), who estimated a dynamic model of entry, exit, profit, and firm value using data from small geographic markets in the United States. They found that average profits declined as the number of practices in a market increased, although this estimated competitive effect was substantially smaller for chiropractic practices than for dental practices and was not statistically significant for chiropractic. Relative to a market with five practices, the estimated chiropractic profit premium was approximately 15 percent for a monopoly and 5 percent for a duopoly, compared with 69 percent and 47 percent respectively for dental practices.

Dunne et al. (2013) also found that chiropractic practices had lower estimated long term firm values and higher predicted exit probabilities than dental practices operating under comparable market conditions. The authors attributed this primarily to lower per period profits in chiropractic, rather than to less favourable fixed cost conditions. They also showed that differences in population, income, wages, healthcare access, and other market characteristics produced substantial variation in firm values across geographic markets.

These findings indicate that geographic context may affect chiropractic financial performance through several overlapping pathways, including market demand, local competition, input costs, and practice turnover. However, the weaker and statistically non-significant competitive effect identified for chiropractic provides insufficient support for a strong directional

expectation. Location is therefore examined as an exploratory predictor, while country is included as a contextual control variable in the multivariable models.

Collectively, the practice-characteristics literature identifies clinical capacity, administrative support, practice type, practice age, and location as characteristics that may be associated with financial performance. The most consistent evidence from adjacent healthcare settings supports associations with clinical capacity and administrative support, whereas the evidence for practice type, practice age, and geographic location remains largely descriptive or mixed. Directional hypotheses are therefore developed only for clinical capacity and administrative support, while the remaining practice characteristics are examined exploratorily.

2.6 Theme 3: Operational Characteristics

2.6.1 New-Patient Acquisition

New patients are the principal demand input for many private practices. Mior and Waalen (2008) found that annual new-patient volume contributed the largest unique share to variation in chiropractor gross income. The relationship makes sense as new patients create an opportunity for initial services and subsequent visits. However, acquisition alone does not determine financial return. The value of a new patient depends on the cost of acquisition, the services delivered, pricing, and the capacity of the practice to manage the demand.

Practices with stronger reputations, better locations, greater clinical capacity, or higher marketing expenditure may attract more new patients. Conversely, practices with weak retention may require continuous acquisition to maintain activity. For these reasons, new-patient volume is examined as an exploratory predictor, but its interpretation must be considered alongside other variables such as regular visits, PVA, marketing, and practice scale.

2.6.2 Regular Visit Volume and Patient Visit Average

Regular visit volume is a direct measure of delivered services. In a fee-for-service setting, more billable visits should generally be associated with higher revenue. Regular visits also consume practitioner and administrative capacity, so greater activity may increase operating expenses. Whether the activity improves net profit depends on the practice's cost structures. Compared with ratios such as PVA, total regular visit volume has the advantage of representing actual scale, although it does not show whether that volume comes from efficient utilisation of practitioner labour or larger practitioner teams.

As introduced in the conceptual framework, Patient Visit Average (PVA) is used within chiropractic practice management to summarise visit activity relative to new-patient inflow (Stringer, 2016). Stringer (2016) calculated PVA as total office visits divided by new patients, whereas this study uses the number of regular or follow-up visits divided by new patients during the same period. It is therefore best understood as a practice-level proxy for subsequent visit activity rather than a direct measure of individual patient retention or clinical quality. A higher value may reflect greater visit frequency, longer care patterns, maintenance care, case complexity, or subsequent periods of care for new health concerns. These alternative explanations must be considered when interpreting any association between PVA and financial outcomes. The broader marketing literature linking customer retention with profitability provides a general rationale for examining repeated service use, but does not establish that PVA itself measures retention or financial performance (Almohaimmeed, 2019).

On balance, regular visit volume represents the scale of services delivered and is therefore expected to be positively associated with revenue and operating expenses. PVA reflects the extent to which new-patient activity is converted into ongoing visits and is expected to be positively associated with revenue and net profit, although its interpretation requires caution because it may reflect several different features of care and patient behaviour.

2.6.3 Pricing, Marketing Spend, Channels, and Breadth

Price determines the revenue generated from each visit, but its overall association with financial performance is not straightforward. Mior and Waalen (2008) found that a higher average cost per visit was positively associated with gross income but negatively associated with new-patient volume. This suggests that higher prices may increase revenue per visit while also reducing demand. Price is therefore retained as an exploratory predictor.

Marketing is commonly presented as a mechanism for patient acquisition, but expenditure and financial return should not be assumed to move together. Spending may increase enquiries and new-patient numbers, although its effect is likely to depend on channel selection, message, competition, patient experience, and available clinical capacity. Marketing expenditure also contributes directly to operating costs. It is therefore expected to be positively associated with revenue and operating expenses, while its association with net profit is less certain.

Chiropractic-specific evidence on marketing outcomes is largely descriptive. Business education studies identify marketing as a common knowledge gap among chiropractors

(Ciolfi & Kasen, 2017; Henson et al., 2008). Russell et al. (2017) also found that exposure to public-place chiropractic marketing events in Aotearoa New Zealand was associated with more favourable perceptions of chiropractic among a substantial proportion of respondents. These studies suggest that marketing knowledge and exposure may influence demand, but they do not establish practice-level financial returns.

The available chiropractic evidence on marketing channels concerns usage rather than effectiveness. In a 2019 survey of the New Zealand chiropractic profession, respondents reported using a wide range of promotional channels. Unpaid Facebook posts were the most common channel, used by 74% of respondents, followed by spinal screenings or other public-place marketing at 45%, newsletters at 37%, and paid Facebook and Google advertising at 32% each (NZCC, 2019). However, no located chiropractic study linked particular channels, or the number of channels used, to practice financial outcomes. Experimental research from the wider marketing literature suggests that exposure across more than one medium can strengthen some consumer responses through processes such as forward encoding and multiple source perception, each of which received partial experimental support (Voorveld et al., 2011). However, this evidence concerns advertising responses rather than professional service businesses or financial performance. Marketing breadth is therefore examined as an exploratory predictor rather than assigned a directional hypothesis.

Viewed as a whole, the operational-characteristics literature supports directional expectations for regular visit volume, Patient Visit Average, and marketing spend, while pricing, new-patient volume, and marketing breadth lack sufficiently consistent evidence and are therefore examined as exploratory predictors. Across all three themes, a recurring limitation is that the available evidence primarily describes practices and practitioners rather than testing which characteristics are associated with practice-level financial outcomes.

2.7 Research Gaps

2.7.1 Empirical Gap

Based on the evidence reviewed earlier in this chapter, no study was identified that modelled practice-level net profit, total revenue, and operating expenses as separate outcomes in private chiropractic practices in Aotearoa New Zealand or Australia. Existing chiropractic research appears dominated by workforce descriptions, perceived business preparedness, clinical practice, and gross-income benchmarks. Mior and Waalen (2008) provide a valuable starting point, but their Canadian analysis of gross income does not establish which characteristics are

associated with net profit, revenue, or operating expenses in contemporary Australasian practices.

2.7.2 Methodological Gap

The available chiropractic evidence relies heavily on descriptive surveys, sector averages, and measures of practitioner earnings or gross income (Adams et al., 2017; Himelfarb et al., 2025; Meyer et al., 2025; NZCC, 2019, 2022; Stochkendahl et al., 2019; Waalen & Mior, 2005). These approaches provide useful information about the profession but do not identify whether particular owner, practice, or operational characteristics are associated with practice-level revenue, operating expenses, or net profit.

Mior and Waalen (2008) modelled individual practitioner gross income rather than practice-level financial outcomes. Dunne et al. (2013) modelled average establishment profitability at the local-market level using market structure as an explanatory variable, while estimating entry costs separately as structural parameters. Neither study identifies which owner, practice, and operational characteristics are associated with differences in financial outcomes between individual practices. Adjacent healthcare studies provide closer methodological precedents through provider- and practice-level productivity modelling and analyses of management practices and performance (Conrad et al., 2010; Dobson et al., 2009; King et al., 2010; Zhao et al., 2026), but comparable approaches have not been applied to practice-level chiropractic financial performance.

2.7.3 Contextual Gap

Aotearoa New Zealand and Australia have regulatory, funding, geographic, and professional contexts that differ from the jurisdictions in which most business-related chiropractic evidence has been produced. As discussed earlier in this chapter, differences in reimbursement arrangements, market conditions, competition, and regulation may shape the financial consequences of pricing, patient activity, staffing, and other practice characteristics. Evidence from Canada, the United States, and other jurisdictions therefore provides useful mechanisms and points of comparison, but its direct applicability to contemporary Australasian chiropractic practice cannot be assumed. This leaves a contextual gap concerning whether the owner, practice, and operational characteristics identified in the wider literature are similarly associated with financial performance in Aotearoa New Zealand and Australia.

2.7.4 Theoretical Gap

The chiropractic literature reviewed in this chapter rarely articulates a clear theoretical basis for why owner, practice, and operational characteristics may be associated with financial performance. Most studies describe practitioner characteristics, practice arrangements, or perceived business preparedness without applying an explanatory framework (e.g., Ciolfi & Kasen, 2017; Henson et al., 2008; NZCC, 2019, 2022). The present study addresses this theoretical gap by integrating professional service firm theory, the resource-based view, the clinician-owner literature, and the input-throughput-output model.

The study addresses the empirical, methodological, contextual, and theoretical gaps together by collecting data from chiropractic practice owners in Aotearoa New Zealand and Australia; examining net profit, revenue, and operating expenses as distinct outcomes; applying multivariable analysis to owner, practice, and operational characteristics; and using the integrated framework to guide variable selection, hypothesis development, and interpretation of the findings.

2.8 Research Questions, Hypotheses, and Conceptual Framework

2.8.1 Research Questions

The primary research question (RQ) is: What owner, practice and operational characteristics are associated with financial performance in private chiropractic practices in Aotearoa New Zealand and Australia?

This question is addressed through four subquestions:

SQ1: Which owner characteristics are associated with financial performance?

SQ2: Which practice characteristics are associated with financial performance?

SQ3: Which operational characteristics are associated with financial performance?

SQ4: Which associations remain after multiple owner, practice, and operational characteristics are considered together?

Each subquestion is examined separately across the three dependent variables of net profit, revenue, and operating expenses.

2.8.2 Hypotheses

The hypotheses are developed from the rationale established throughout the literature review and are formally stated here. Each is grounded in the theoretical framework developed in Section 2.2 and in empirical evidence from chiropractic and adjacent sectors where available. Directional hypotheses are proposed where the literature provides a sufficiently consistent theoretical and empirical basis for expecting a positive or negative association. Where direct financial evidence is limited but the theoretical framework identifies a clear mechanism, the expected direction is derived primarily from theory. Variables are treated as exploratory predictors where the evidence is limited, mixed, or mainly descriptive.

H1: There is a positive association between owner business acumen and practice net profit and revenue.

H2: There is a positive association between owner business education and practice net profit and revenue.

H3: There is a positive association between owner use of external coaching and practice net profit and revenue.

H4: There is a positive association between practice clinical capacity and both revenue and operating expenses.

H5: There is a positive association between administrative support and both revenue and operating expenses.

H6: There is a positive association between regular visit volume and both revenue and operating expenses.

H7: There is a positive association between Patient Visit Average and practice net profit and revenue.

H8: There is a positive association between marketing spend and both revenue and operating expenses.

Owner clinical hours, owner administrative hours, practice type, practice age, geographic location, new-patient volume, pricing, and marketing breadth are examined as exploratory predictors because the reviewed literature does not provide a sufficiently clear basis for directional predictions. Country is included as a contextual control variable. Total chiropractor clinical hours, staff administrative hours, regular visit volume, and marketing spend are hypothesised to be positively associated with revenue and operating expenses. Their

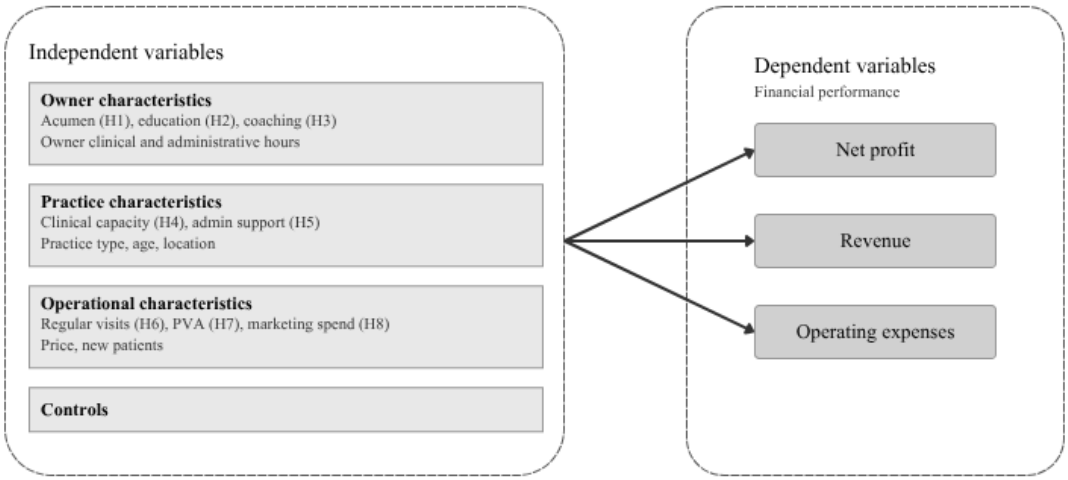
associations with net profit remain exploratory because the net effect depends on whether any additional revenue exceeds the associated costs.

2.8.3 Conceptual Framework

Figure 2.1 groups the independent variables into three domains, owner, practice, and operational characteristics, and links them to the three dependent variables of net profit, revenue, and operating expenses. The framework is not a causal path model. It is a structured representation of the associations examined. Net profit, revenue, and operating expenses are treated as related but distinct dependent variables rather than a single measure of performance. The grouping into owner, practice, and operational domains follows the structure of the theoretical foundation: owner characteristics reflect the capability and dual-role perspectives, practice characteristics reflect the labour and capacity emphases of professional service firm theory, and operational characteristics correspond to the throughput processes of the input-throughput-output model. Grouping the variables in this way also broadly informs the sequence in which they are entered into the regression models, although the benchmark specification includes selected demographic and operational variables drawn from more than one domain.

Figure 2.1

Conceptual Framework Linking Owner, Practice, and Operational Characteristics to Financial Performance



2.9 Chapter Summary

This chapter developed an integrated foundation for examining how owner, practice, and operational characteristics are associated with net profit, revenue, and operating expenses in private chiropractic practices. The theoretical perspectives together highlight the importance of professional labour, owner capability, the clinician-owner dual role, and the processes through which practice resources and activities are converted into financial outcomes.

The empirical literature identifies several plausible influences on financial performance, including business capability, clinical and administrative capacity, patient volume, pricing, marketing, and practice context. However, the evidence remains largely descriptive, commonly focuses on practitioner income or gross income, and provides limited insight into practice-level financial differences in Aotearoa New Zealand and Australia. These empirical, methodological, contextual, and theoretical gaps support the research questions, hypotheses, and conceptual framework developed in this chapter.

Chapter 3 describes the quantitative cross-sectional design used to address these gaps. It explains how data were collected directly from chiropractic practice owners, how owner, practice, operational, and financial variables were measured, and how multivariable analysis was used to examine net profit, revenue, and operating expenses as distinct outcomes.

Chapter 3: Methods

3.1 Overview

This chapter outlines the methodology used to investigate associations between owner, practice, and operational characteristics and financial performance in private chiropractic practices in Aotearoa New Zealand and Australia.

It begins by explaining the research paradigm informing the study, followed by the research design, target population, eligibility criteria, and recruitment approach. The survey instrument and its pilot testing are then described, followed by the ethical considerations, data collection procedure, data preparation, and analysis strategy. This includes the sequential ordered logistic regression models used for the primary analysis and the ordinary least squares models used as a supplementary consistency check.

3.2 Research Paradigm

This study is informed by a pragmatist research worldview. Pragmatism emphasises the practical value of research and its capacity to generate useful knowledge for addressing real-world problems (Kaushik & Walsh, 2019; Kelly & Cordeiro, 2020). Rather than requiring commitment to a single epistemological or methodological position, pragmatism allows the research question to guide the choice of research design and methods (Creswell & Creswell, 2018; Davies & Fisher, 2018; Kaushik & Walsh, 2019).

Pragmatism is appropriate for this thesis because the study addresses an applied problem relevant to chiropractic practice owners. Practice owners in Aotearoa New Zealand and Australia make ongoing decisions about pricing, marketing, staffing, business education, and coaching. However, there is limited chiropractic-specific empirical evidence to inform these decisions, particularly regarding the owner, practice, and operational characteristics associated with financial performance in an Australasian context. The thesis is intended to contribute to both the academic literature and the practising profession, and its value is closely tied to its capacity to inform practical decision-making.

The research question examines associations between owner, practice, and operational characteristics and financial performance in private chiropractic practices in Aotearoa New Zealand and Australia. Addressing this question requires a method capable of systematically examining multiple variables across a sample of independent practices. A quantitative approach was therefore appropriate because it enables patterns and associations within the

data to be examined and allows the study to assess whether particular characteristics are associated with differences in financial performance. Pragmatism is particularly well suited to this problem because financial performance in privately owned healthcare businesses is a practical, outcome-oriented phenomenon. The value of the knowledge produced lies in its capacity to inform owners' business-related management decisions. A paradigm that evaluates methods according to their usefulness in answering the research question, rather than requiring allegiance to a single epistemological position, therefore aligns directly with the purpose of the study.

3.3 Research Design

This study used a quantitative, cross-sectional correlational design. Data were collected through a single self-administered online questionnaire completed by eligible chiropractic practice owners in Aotearoa New Zealand and Australia whose practices operated during their 2024-2025 financial year. The data were analysed using descriptive statistics, correlation analysis, and ordered logistic regression, with ordinary least squares models estimated as a supplementary consistency check. These analyses examined associations between selected owner, practice, and operational characteristics and financial performance outcomes.

This design was appropriate because the study sought to examine whether naturally occurring practice characteristics were statistically associated with financial performance across a sample of practices. An experimental design was neither practical nor appropriate because characteristics such as business acumen, marketing spend, patient volume, pricing, and financial performance could not reasonably or ethically be controlled by the researcher. A recognised limitation of this design is that cross-sectional data cannot establish causality and the findings are therefore interpreted as associations throughout.

Survey-based quantitative designs and regression analyses have also been used in other healthcare practice and small-business research examining organisational and performance-related factors. Conrad et al. (2010), for example, examined factors associated with the productivity of individual general dentists, while King et al. (2010) investigated associations between business practices and performance in Australian primary healthcare businesses. These studies support the use of survey-based quantitative methods for examining practice-level characteristics and performance outcomes within owner-operated healthcare settings.

3.4 Target Population, Eligibility, and Recruitment

The target population was chiropractic practice owners in Aotearoa New Zealand and Australia whose practices operated during the relevant 2024-2025 financial year. Practice owners were selected because they were expected to have legal access to the operational and financial information required to complete the survey. Participants were eligible if they owned or partly owned a chiropractic practice in New Zealand or Australia and the practice operated during the relevant financial year. Country-specific reporting periods were used. New Zealand practices reported for the period from 1 April 2024 to 31 March 2025, while Australian practices reported for the period from 1 July 2024 to 30 June 2025. These eligibility requirements were incorporated into the Qualtrics survey as screening questions that participants completed before proceeding to the main questionnaire (Appendix A).

A non-probability sampling approach was used because no complete and accessible sampling frame of eligible chiropractic practice owners in New Zealand and Australia was available. Recruitment involved voluntary response and convenience sampling through professional networks, together with snowball sampling. The survey was distributed through the New Zealand Chiropractors' Association mailing list and Australasian chiropractic-specific Facebook groups. Recipients were also invited to share the survey with other eligible chiropractic practice owners. These approaches are commonly used when the target population may be difficult to reach (Bryman & Bell, 2015). These recruitment methods carry a risk of self-selection bias. Owners who are more engaged with their finances, more confident in their performance, or more active in professional networks may have been more likely to respond, and owners of very small or struggling practices may be under-represented. Because commercially sensitive information was requested, willingness to disclose may itself be related to financial position. The direction of any resulting bias cannot be determined, but it may affect the representativeness of the results, and it is considered when interpreting the findings in Chapter 5.

Participation was voluntary and anonymous. The recruitment and survey materials explained that findings would be reported only in aggregate, and participants could stop the survey at any time before submission. Once submitted, responses could not be withdrawn because they could not be linked back to individual participants.

Where owners operated multiple practice locations, they were asked to report on one physical practice location where possible. Owners who could report financial and operational

information separately for additional locations were invited to submit a separate response for each location using the same survey link. Where separate reporting was not possible, participants could provide consolidated figures across multiple locations. This approach was intended to maintain the physical practice location as the preferred unit of analysis while allowing participation from owners whose records could not be separated by location.

3.5 Survey Instrument

The survey instrument was a self-administered online questionnaire developed specifically for this study and hosted in Qualtrics. No existing questionnaire was identified that measured the combination of owner, practice, operational, and financial variables required to address the research question. The survey items were therefore informed by the research question, variables identified in the literature, and the researcher's practical knowledge of chiropractic practice ownership and management. The questionnaire began with a landing page, participant information sheet, and consent form. Participants who consented were directed to eligibility screening questions confirming whether they owned or partly owned a chiropractic practice in New Zealand or Australia and whether the practice had operated during the relevant 2024-2025 financial year. Respondents who met the eligibility criteria proceeded to the main questionnaire.

The main questionnaire was organised into sections covering practice characteristics, chiropractor-owner characteristics, business acumen, coaching and business education, practice management and operations, financial performance, and demographics. Practice characteristics included country, the number of physical practice locations represented in the response, practice location type, New Zealand region or Australian state or territory, practice type, number of chiropractors, total chiropractor clinical hours, number of non-chiropractic health professionals, total non-chiropractic clinical hours, and years in operation. Chiropractor-owner characteristics included registration status, year of chiropractic qualification, personal clinical hours, and personal practice management or administrative hours. The questionnaire also asked about administrative or support hours completed by non-clinical staff.

Business acumen was measured using an 11-item self-assessment scale developed for this study. Respondents rated their agreement with statements covering four areas of business acumen: financial management, marketing, operations, and people management. Coaching was measured through a question about current or previous use of an external business coach

or practice management consultant. Business education was measured separately through questions about formal and informal business education or training, including postgraduate study, university-level business courses, practice management workshops, online business courses, and chiropractic college business courses. Practice management and operations were assessed through questions about marketing and patient acquisition methods, new patient numbers, regular visit volume, new patient fees, and regular visit fees. Country-specific reporting periods were used for annual measures, including new patient numbers, regular visit volume, revenue, operating expenses, net profit, and marketing spend. Measures that were not tied to the financial year, such as visit prices, used the same questions for respondents in both countries. The 11 business acumen items were generated by the researcher by drawing on the eight business knowledge fields examined in the business preparedness literature and the researcher's practical knowledge of chiropractic practice ownership and management. These fields were condensed into four capability domains considered most relevant to small owner-operated practices: financial management, marketing, operations, and people management. Content relating to law and ethics, strategic management, and managerial decision making was not represented as a separate domain (Ciolfi & Kasen, 2017; Henson et al., 2008). The items were refined through supervisory review and pilot testing to improve clarity and face relevance. Internal consistency was assessed in Chapter 4. Because the scale was developed specifically for this study and has not been externally validated, its construct validity is considered further in the limitations discussed in Chapter 5.

The survey included questions on net profit, total revenue, operating expenses, and marketing spend. Net profit, revenue, and operating expenses were treated as financial performance outcomes, while marketing spend was treated as an operational characteristic. Respondents could provide an approximate or exact dollar figure or select a bracketed range. This approach allowed participants who were unable or unwilling to provide an exact figure to provide financial information in a less specific form. Net profit was defined as profit before tax, with instructions to add back shareholder salary where it had been recorded as an operating expense. Operating expenses were defined as excluding owner salary, drawings or dividends, loan repayments, interest, income tax, GST, depreciation, and amortisation. The questionnaire concluded with demographic questions, including gender and age group. Skip and display logic were used to reduce participant burden and ensure that respondents were shown only questions relevant to their circumstances and earlier responses. For example, participants were shown country-specific financial year questions, while financial follow-up questions

depended on whether they selected exact figures or bracketed ranges. Respondents who did not consent or did not meet the eligibility criteria were not directed to the main questionnaire. The questionnaire was reviewed and refined through pilot testing, and the final version is provided in Appendix A.

3.6 Pilot Testing

Before distribution, the survey was reviewed by the supervisory team and piloted with a small group of chiropractic practice owners and individuals with relevant experience. Pilot participants completed the survey and provided feedback on its clarity, wording, length, ease of completion, technical functionality, formatting, and any questions that were difficult to interpret or answer. The pilot involved 12 participants. This number was considered sufficient because the purpose of the pilot was to identify problems with clarity, functionality, and completion time, rather than to generate generalisable findings.

Pilot testing identified several areas for refinement. These included the wording of financial questions, instructions for reporting across multiple practice locations, consistency of country-specific terminology, interpretation of new patient and regular visit volume questions, response option formatting, and the estimated completion time. Revisions were made to improve the clarity of questions relating to practice location, practice age, registration status, financial performance, operating expenses, marketing spend, and the distinction between exact and bracketed financial responses.

The pilot testing also supported the practical feasibility of the survey. Participants indicated that it could generally be completed within 10 to 15 minutes, although completion time depended on whether financial and operational information was readily available. Following pilot testing, the final questionnaire was implemented in Qualtrics for data collection.

3.7 Ethical Considerations

Ethical approval was obtained through the Massey University Human Ethics process before data collection began. The study was assessed as low risk and approved under application number 4000031407 on 10 November 2025 (Appendix B). Approval was granted for a maximum of three years. Ethical considerations were addressed in accordance with the Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants (Massey University, 2017), and the ethical aspects of the study were reviewed with the supervisory team during the planning stage.

Participant autonomy was supported through a participant information sheet and consent form presented at the beginning of the Qualtrics survey (Appendix A). Potential participants were informed of the purpose of the study, what participation involved, the approximate completion time, the voluntary nature of participation, and their right to exit the survey at any time before submission. Participants were required to provide consent before proceeding to the eligibility screening questions and main questionnaire.

The avoidance of harm was particularly important because the survey requested commercially sensitive information, including revenue, operating expenses, net profit, marketing spend, patient volume, and business management practices. To reduce this risk, the survey was anonymous and did not collect names, practice names, phone numbers, or email addresses for analysis. Findings were reported only in aggregate form. Bracketed financial response options also allowed participants to provide usable financial information without disclosing exact figures. Participants were advised that submitted responses could not be withdrawn because they could not be linked back to individual participants. This limitation was explained in the participant information sheet and consent process. Participants could, however, leave the survey at any time before submission.

Data were collected through Qualtrics and exported for analysis. The survey data were stored digitally and were accessible only to the researcher and supervisory team. In accordance with the participant information sheet, the data will be retained for a maximum of five years and then securely destroyed.

The potential benefits of the study were also considered. The research was designed to generate evidence that may assist chiropractic practice owners, educators, and the wider profession to better understand the owner, practice, and operational characteristics associated with financial performance. The findings are intended to contribute to both academic knowledge and business education within the profession.

Justice was addressed by making participation available to all chiropractic practice owners and part-owners who met the eligibility criteria. Recruitment through professional associations, professional networks, chiropractic-specific online groups, and participant referral was intended to extend access beyond individuals directly known to the researcher.

The researcher's professional relationships within the chiropractic sector were also considered. The researcher is a chiropractor, teaches business-related subjects, and holds professional roles within the profession. Some potential participants may therefore have

known the researcher. Recruitment materials emphasised that participation was voluntary, that choosing not to participate would have no consequences, and that individual responses would not be identifiable to the researcher, professional associations, or other participants.

Te Tiriti o Waitangi was considered during the development of the study. Although the study was not specifically focused on Māori knowledge, tikanga Māori, or Māori communities, Māori practice owners were eligible to participate. The study did not collect ethnicity data, so Māori participants or practices could not be separately identified in the dataset or reporting.

The required Massey University low-risk ethics statement was included in the recruitment materials, participant information sheet, consent form, and survey instrument. These materials also provided contact details for Massey University Human Ethics for participants who wished to raise concerns about the ethical conduct of the study with someone other than the researcher or supervisory team (Appendix A).

3.8 Data Collection Procedure

Following ethical approval and review by the supervisory team, the survey was distributed through an anonymous link. Data were collected between 29 January 2026 and 17 April 2026 using the self-administered online questionnaire hosted in Qualtrics.

3.9 Data Preparation

At the close of data collection, responses were exported from Qualtrics as an SPSS .sav file and imported into Stata for data preparation. Initial preparation involved removing survey metadata that was not required for analysis and excluding responses from participants who did not provide consent or meet the eligibility criteria.

Numeric variables were examined for implausible values. Where a value appeared likely to represent a data-entry error, it was coded as missing rather than removing the entire response. Missing values were not replaced or estimated. Responses relating to multiple practice locations were reviewed to maintain consistency in the unit of analysis. Responses were retained where the respondent reported information for one physical practice location or where the figures could be analysed at the individual practice-location level. Responses containing consolidated data for multiple locations that could not be separated into practice-level figures were excluded from the analysis. This approach maintained the physical practice location as the unit of analysis.

Financial variables were prepared by combining exact or approximate dollar responses with bracketed responses. Exact values for net profit, revenue, operating expenses, and marketing spend were recoded into the corresponding survey categories. This created ordinal categorical variables that allowed respondents who entered dollar figures and those who selected ranges to be analysed together. Net profit, revenue, and operating expenses were treated as financial performance outcomes, while marketing spend was treated as an operational predictor.

Several categorical variables were recoded or collapsed for analysis. Business education was grouped into three categories: no business education or experience only, informal business education, and formal business education. Coaching was recoded as a binary variable indicating whether the respondent had ever worked with a business coach or practice management consultant. Owner age was grouped as under 30 years, 30 to 39 years, 40 to 49 years, and 50 years or over for the regression analyses. Gender identity was recoded as a binary indicator comparing male and female owners, with missing responses retained as missing. Practice age was initially grouped into less than 6 years, 6 to 10 years, and 11 years or more for descriptive analysis. For the regression models, it was collapsed into a binary variable comparing practices aged less than 11 years with those aged 11 years or more. Urban location was defined as a city or suburban location, with small town, rural, and remote locations forming the reference category. Country was recoded as a binary indicator comparing New Zealand with Australia. Geographic variables were also created from New Zealand regions and Australian states or territories for use in preliminary analyses. Where variables were recoded or collapsed, the purpose was to preserve adequate cell sizes for stable estimation and to keep the categories interpretable. Where variables were transformed, the purpose was to reduce the influence of strong skew on the regression estimates, and where responses were excluded, it was because the information required for the analysis could not be recovered.

Practice clinical capacity was operationalised as the total number of chiropractor clinical hours completed across the practice each week. Total chiropractor clinical hours was selected because it provided a more direct measure of available chiropractor clinical labour than chiropractor headcount.

Business acumen scores were calculated from the 11 Likert-type items. An overall business acumen score was created by calculating the mean across all 11 items. Four subscale scores were also calculated for financial acumen, marketing acumen, operations acumen, and people management acumen. Internal consistency was assessed using Cronbach’s alpha for the

overall scale and each subscale. Marketing variables were prepared from the select-all-that-apply question on marketing and patient acquisition methods. Marketing breadth was calculated as the total number of methods selected.

New patient volume and regular or follow-up visit volume were prepared separately for New Zealand and Australian respondents because the relevant financial-year reporting periods differed, and were then combined into shared variables for analysis. Patient Visit Average was calculated by dividing annual regular or follow-up visits by annual new patients. Skewness and kurtosis diagnostics showed that new patient volume, regular visit volume, and Patient Visit Average were strongly right-skewed. Natural log transformations were therefore created for each variable, and the log-transformed versions were used in the regression analyses. A summary of the variables used in the analysis, including their coding and reference categories, is provided in Appendix C.

3.10 Analysis Strategy

Descriptive statistics were used to summarise the sample and study variables. Spearman rank-order correlations were used to examine bivariate associations between the predictors and the financial performance outcomes, as well as associations between the predictors themselves. Correlations among predictors were examined to identify strongly related variables and inform model specification. Variables measuring similar characteristics were not entered together where this could create substantial overlap, in order to avoid multicollinearity among the predictors.

The primary inferential analysis used sequential ordered logistic regression models. Ordered logistic regression was selected because the three financial performance outcomes were measured as ordered categories rather than exact continuous values. Separate models were estimated for net profit category, revenue category, and operating expense category. Linear regression was not appropriate as the primary method because the outcome categories represented ordered ranges of unequal width rather than values measured on an interval scale. Ordered logistic regression models the odds of being in a higher rather than a lower outcome category without assuming equal spacing between categories. It was therefore aligned with how the financial outcomes were measured.

For each outcome, Model 1 was the benchmark specification and included the benchmark variables. Models 2 to 4 each extended this specification by adding a separate set of characteristics. Model 2 added owner characteristics of business acumen and coaching status.

Model 3 added practice characteristics of practice type, practice age, and urban location. Model 4 added operational characteristics of staff administrative hours, owner clinical hours, owner administrative hours, new-patient price, and marketing breadth. Model 5 combined the benchmark variables and all three sets of additional characteristics in the full specification. Models 5a to 5c were variants of the full specification that substituted or added alternative measures of patient volume and clinical capacity.

Model 5a added log-transformed new patient volume while retaining log-transformed regular visit volume. Model 5b replaced regular visit volume with total chiropractor clinical hours and included log-transformed new patient volume. Model 5c replaced the patient-volume measures with log-transformed Patient Visit Average and included total chiropractor clinical hours. Regular visit volume and new patient volume were excluded because Patient Visit Average was calculated from these variables. This allowed alternative measures of patient volume, visit patterns, and clinical capacity to be examined without entering closely related variables in the same specification. All primary models included the New Zealand indicator as the geographic control.

This modelling structure allowed selected characteristics to be examined separately and alongside the benchmark variables. Because some owner, practice, and operational characteristics were included in the benchmark specification or alternative models, Models 2 to 4 did not correspond exclusively to SQ1 to SQ3. These subquestions were therefore addressed by considering the pattern of associations across the full set of models. Model 5 addressed SQ4 by examining the benchmark variables and all three sets of characteristics together.

Ordinary least squares models mirroring the ordered logistic specifications were estimated as a supplementary consistency check by treating the ordered outcome categories as continuous. These models were not used as the primary analysis because the outcome variables represented ordered ranges rather than exact dollar values. They were used to assess whether the direction and general pattern of the main associations were similar under an alternative estimation method.

Associations with *p* values between .05 and .10 are described as marginal and were not treated as confirmatory evidence when assessing the study hypotheses. The results of the analyses are presented in Chapter 4.

Chapter 4: Results

4.1 Overview

This chapter presents the empirical results of the study. It begins with a summary of the sample for analysis, followed by descriptive statistics for the independent variables and the distributions of net profit, revenue, and operating expenses. The internal consistency of the business acumen scale and subscales is reported, along with the distributional diagnostics that informed the variable transformations. The bivariate analysis examines associations between selected predictors and the financial outcomes, as well as associations between the predictor variables. Sequential ordered logistic regression models are then reported for each financial outcome, with ordinary least squares models included as a supplementary consistency check. The chapter concludes with a summary of the main findings. Interpretation of the findings and assessment of the study hypotheses are addressed in Chapter 5.

4.2 Sample for Analysis

A total of 204 survey entries were recorded in Qualtrics. The number of non-missing responses varied across variables because of item-level missing data, particularly for commercially sensitive questions relating to revenue, operating expenses, net profit, marketing spend, and patient volume.

The largest descriptive sample was 116 for practice country. The regression models included only observations with non-missing data for all variables entered in each specification, resulting in sample sizes ranging from 68 to 74 practices across the models. The full specification, Model 5, included 69 practices for net profit, 68 for revenue, and 69 for operating expenses.

4.3 Descriptive Statistics for Categorical Variables

Table 4.1 reports descriptive statistics for the categorical independent variables, grouped into controls, owner characteristics, and practice characteristics.

The sample included chiropractic practice owners from Aotearoa New Zealand and Australia. Among respondents who provided country information, 78 owned a practice in New Zealand only (67.2%) and 38 owned a practice in Australia only (32.8%). No respondent reported owning practices in both countries. Among those who provided gender identity information, 51 identified as male (63.0%) and 30 identified as female (37.0%). The largest owner age

group was 50 years or over (31.7%), followed by 30 to 39 years (30.5%), 40 to 49 years (26.8%), and under 30 years (11.0%).

Forty-four respondents reported no formal or informal business education beyond experience (44.0%). Informal and formal business education were each reported by 28 respondents (28.0% each). Fifty-nine respondents had worked with a business coach or practice management consultant (56.7%), while 45 had not (43.3%).

Solo chiropractor practices were the largest practice type, accounting for 52 practices (46.4%). This was followed by multiple chiropractor practices (n = 32, 28.6%) and multidisciplinary practices (n = 28, 25.0%). Among respondents who provided practice age information, 36 practices had operated for less than 6 years (33.0%), 19 for 6 to 10 years (17.4%), and 54 for 11 years or more (49.5%).

Table 4.1

Descriptive Statistics for Categorical Independent Variables

Characteristic	*n*	%
Controls		
Country of practice (*n* = 116)		
New Zealand only	78	67.2
Australia only	38	32.8
Owner gender identity (*n* = 81)		
Male	51	63.0
Female	30	37.0
Owner age group (*n* = 82)		
Under 30	9	11.0
30-39	25	30.5
40-49	22	26.8
50 or over	26	31.7
Owner characteristics		
Business education (*n* = 100)		
None/experience only	44	44.0
Informal business education	28	28.0
Formal business education	28	28.0
Ever worked with a business coach (*n* = 104)		
No	45	43.3
Yes	59	56.7
Practice characteristics		
Practice type (*n* = 112)		
Solo chiropractor	52	46.4
Multiple chiropractors	32	28.6
Multidisciplinary	28	25.0
Practice age (*n* = 109)		
Less than 6 years	36	33.0
6-10 years	19	17.4
11 years or more	54	49.5

Note. Sample sizes vary because of item-level missing data.

4.4 Descriptive Statistics for Continuous and Ordinal Variables

Table 4.2 reports descriptive statistics for the continuous and ordinal independent variables, grouped into owner, practice, and operational characteristics.

Owners had been qualified for a mean of 16.83 years, with values ranging from 1 to 44 years. The business acumen composite had a mean of 3.85 on a five-point scale. Financial acumen had the highest subscale mean at 3.99, followed by operations acumen at 3.93, people management acumen at 3.77, and marketing acumen at 3.56. Owner clinical hours had a mean

of 24.01 hours per week, while owner administrative hours had a mean of 8.00 hours per week.

The mean number of chiropractors per practice was 2.65, with values ranging from one to five chiropractors. Total chiropractor clinical hours had a mean of 43.29 hours per week, while staff administrative hours had a mean of 27.49 hours per week.

Patient volume varied substantially across the sample, with a mean of 298.86 new patients and 6,123.98 regular visits per year. Patient Visit Average had a mean of 30.51 and ranged from 0.90 to 181.82. Marketing breadth had a mean of 3.25 channels. Regular visit price had a mean category of 4.21 and new patient price a mean category of 3.50 on their respective scales. Marketing spend had a mean category of 2.04 on the 16-category spend scale.

Table 4.2

Descriptive Statistics for Continuous and Ordinal Independent Variables

Variable	*N*	*M*	*SD*	Min	Max
Owner characteristics					
Years since qualification	109	16.83	10.62	1.00	44.00
Business acumen (composite)	104	3.85	0.62	1.18	5.00
Financial acumen	104	3.99	0.78	1.67	5.00
Marketing acumen	104	3.56	0.99	1.00	5.00
Operations acumen	104	3.93	0.69	1.00	5.00
People management acumen	104	3.77	0.83	1.00	5.00
Practice characteristics					
Number of chiropractors	57	2.65	1.17	1.00	5.00
Total clinical hours (chiropractors)	108	43.29	27.95	2.00	185.00
Operational characteristics					
Staff admin hours/week	105	27.49	31.65	0.00	136.00
Owner clinical hours/week	108	24.01	11.35	0.00	70.00
Owner admin hours/week	100	8.00	6.89	0.00	50.00
New patients per year	94	298.86	325.26	5.00	2400.00
Regular visits per year	83	6123.98	5634.66	90.00	28059.00
Patient Visit Average	83	30.51	31.39	0.90	181.82
Marketing spend (category)	83	2.04	2.11	1.00	16.00
Regular visit price (category)	90	4.21	1.29	1.00	8.00
New patient price (category)	90	3.50	1.43	1.00	6.00
Marketing breadth (channels)	104	3.25	1.71	1.00	9.00

Note. Sample sizes vary because of item-level missing data. *M* = mean; *SD* = standard deviation. Regular visit price ranges from less than $40 (category 1) to $100 or more (category 8), and new patient price ranges from less than $70 (category 1) to $150 or more

(category 6). Marketing spend ranges from less than $10,000 (category 1) to $150,000 or more (category 16). Acumen scores are means of items measured on five-point scales.

4.5 Financial Performance Outcomes

The dependent variables were net profit, revenue, and operating expenses, each measured using ordered categories. Table 4.3 reports all survey categories for each outcome, including those that received no responses. No respondent reported a net loss, and the lowest reported net profit category was break-even.

Net profit was distributed across a range of categories. Among respondents who provided net profit information, the largest group reported net profit between $50,000 and $99,999 (27.6%) and 20.7% reported net profit between $1 and $49,999.

Revenue also varied across the sample. The category containing the largest number of respondents was $100,000 to $199,999 (20.5%), followed by $200,000 to $299,999 (15.7%) and less than $100,000 (14.5%). 10.8% reported revenue of $1,000,000 or more.

Operating expenses were concentrated in the lower categories. The largest group reported operating expenses below $100,000 (43.4%), followed by $100,000 to $199,999 (25.3%).

Table 4.3

Descriptive Statistics for Financial Performance Dependent Variables

Category	*n*	%
Net profit category (n = 87)		
More than -$100,000 loss	0	0.0
-$99,999 to -$50,000	0	0.0
-$49,999 to -$1	0	0.0
$0 (break even)	2	2.3
$1-$49,999	18	20.7
$50,000-$99,999	24	27.6
$100,000-$149,999	14	16.1
$150,000-$199,999	8	9.2
$200,000-$249,999	5	5.7
$250,000-$299,999	7	8.0
$300,000-$349,999	4	4.6
$350,000-$399,999	1	1.1
$400,000 or more	4	4.6
Revenue category (n = 83)		
Less than $100,000	12	14.5
$100,000-$199,999	17	20.5
$200,000-$299,999	13	15.7
$300,000-$399,999	10	12.0
$400,000-$499,999	6	7.2
$500,000-$599,999	2	2.4
$600,000-$699,999	5	6.0
$700,000-$799,999	4	4.8
$800,000-$899,999	4	4.8
$900,000-$999,999	1	1.2
$1,000,000 or more	9	10.8
Operating expenses category (n = 83)		
Less than $100,000	36	43.4
$100,000-$199,999	21	25.3
$200,000-$299,999	4	4.8
$300,000-$399,999	7	8.4
$400,000-$499,999	1	1.2
$500,000-$599,999	1	1.2
$600,000-$699,999	2	2.4
$700,000-$799,999	5	6.0
$800,000-$899,999	0	0.0
$900,000-$999,999	1	1.2
$1,000,000 or more	5	6.0

Note. Sample sizes vary because of item-level missing data.

4.6 Internal Consistency of the Business Acumen Scale and Subscales

Internal consistency was assessed for the full 11-item business acumen scale and its four subscales: financial acumen, marketing acumen, operations acumen, and people management

acumen. Cronbach's alpha (Cronbach, 1951) was used as a widely reported measure of internal consistency for multi-item scales. Values above .70 are commonly considered acceptable for research purposes (Hair et al., 2006).

Table 4.4 reports the results. The full business acumen scale demonstrated good internal consistency, with a Cronbach's alpha of .88. The subscales also demonstrated acceptable internal consistency. Financial acumen had an alpha of .78, marketing acumen .81, operations acumen .81, and people management acumen .82.

The full composite was retained for the main regression models because it provided a broader measure of owner-reported business capability and reduced the number of predictors relative to the available sample size. The subscales were examined descriptively and in preliminary analyses not reported.

Table 4.4

Internal Consistency of the Business Acumen Scale and Subscales

Scale	Number of items	Cronbach's alpha
Business acumen composite	11	.88
Financial acumen	3	.78
Marketing acumen	2	.81
Operations acumen	4	.81
People management acumen	2	.82

Note. Cronbach's alpha values of .70 or above generally indicate acceptable internal consistency.

4.7 Distributional Diagnostics and Transformations

Table 4.5 reports skewness and kurtosis for the raw and transformed patient volume variables. The raw variables were strongly right-skewed. New patients per year had a skewness of 3.56 and kurtosis of 21.09, regular visits per year had a skewness of 1.76 and kurtosis of 6.34, and Patient Visit Average had a skewness of 2.96 and kurtosis of 13.79. Natural log transformations reduced the skewness of new patient volume, regular visit volume, and Patient Visit Average to -0.71, -1.01, and -0.15, respectively. The log-transformed versions of these variables were used in the regression analyses.

Table 4.5

Skewness and Kurtosis for Raw and Transformed Patient Volume Variables

Variable	*N*	Skewness	*SE*	Kurtosis	*SE*
New patients per year	94	3.56	0.249	21.09	0.493
New patients (log)	94	-0.71	0.249	4.53	0.493
Regular visits per year	83	1.76	0.264	6.34	0.523
Regular visits (log)	83	-1.01	0.264	4.55	0.523
Patient Visit Average	83	2.96	0.264	13.79	0.523
Patient Visit Average (log)	83	-0.15	0.264	2.03	0.523

4.8 Bivariate Associations

4.8.1 Associations With the Financial Outcomes

Bivariate correlations were used to examine the direction and strength of associations between selected predictors and the three financial outcomes. Table 4.6 reports Spearman correlations between selected independent variables and the net profit, revenue, and operating expense outcomes.

Operational and practice-scale variables had the largest correlations with the financial outcomes. Regular visits per year, new patients per year, total chiropractor clinical hours, and staff administrative hours were positively correlated with all three financial outcomes at $p < .01$. Solo practice status was negatively correlated with all three outcomes, with the largest correlations observed for revenue and operating expenses. Practice age category was positively correlated with all three outcomes.

Among the owner characteristics, business acumen was positively correlated with all three financial outcomes. Having ever worked with a coach was positively correlated with operating expenses at $p < .05$ and revenue at $p < .10$, but not with net profit. Business education level was not significantly correlated with any of the financial outcomes.

Marketing spend was positively correlated with revenue and operating expenses, with the largest correlation observed for operating expenses. Its correlation with net profit was positive but small and not statistically significant. Marketing breadth was positively correlated with all three outcomes. Patient Visit Average showed weaker bivariate associations than the direct patient volume measures. It was positively correlated with all three financial outcomes, although the correlations were smaller than those observed for regular visit volume and new patient volume.

Regular visit price was positively correlated with net profit at $p < .01$ and with revenue at $p < .10$, but not with operating expenses. Owner clinical hours were positively correlated with net profit at $p < .01$ but not with revenue or operating expenses. Owner administrative hours showed a different pattern, correlating positively with revenue and operating expenses at $p < .05$ but not with net profit. New patient price was positively correlated with net profit at $p < .10$ but was not significantly correlated with revenue or operating expenses. Male owner was positively correlated with revenue and operating expenses at $p < .01$ and with net profit at $p < .10$. Neither owner age group nor the New Zealand indicator was significantly correlated with any financial outcome.

Table 4.6

Spearman Correlations Between Selected Predictor Variables and the Financial Performance Outcomes

Predictor	Net profit	Revenue	Operating expenses
Controls			
Male owner	.19*	.31***	.31***
Owner age group	.18	.10	.03
New Zealand practice	-.07	-.11	-.14
Owner characteristics			
Business acumen (composite)	.26**	.36***	.35***
Business education level	-.12	.09	.13
Ever worked with a coach	.01	.22*	.25**
Practice characteristics			
Total clinical hours (chiropractors)	.46***	.77***	.72***
Solo practice (vs group)	-.23**	-.60***	-.59***
Practice age category	.31***	.43***	.37***
Operational characteristics			
Staff admin hours/week	.36***	.78***	.71***
Regular visits per year	.52***	.89***	.78***
New patients per year	.35***	.58***	.57***
Patient Visit Average (log)	.23**	.37***	.23**
Marketing spend category	.05	.47***	.58***
Owner clinical hours/week	.31***	.17	.09
Owner admin hours/week	-.08	.28**	.29**
Regular visit price	.31***	.20*	.12
New patient price	.19*	.08	-.02
Marketing breadth (channels)	.22**	.39***	.32***

Note. Spearman rank-order correlations. Because practice type is nominal, a binary indicator comparing solo practices with multiple-chiropractor and multidisciplinary practices was used in the correlation analyses.

*$p < .10$. **$p < .05$. ***$p < .01$.

4.8.2 Associations Between Predictor Variables

Table 4.7 reports pairwise Spearman correlations among the predictor variables. These correlations were examined to identify strongly related predictors that could create overlap within the regression models.

Several correlations informed the model specifications. Owner age group and years since qualification were strongly correlated (rho = .86), so years since qualification was not entered in the regression models. Total chiropractor clinical hours and regular visit volume were also strongly correlated (rho = .78). These variables were therefore not entered in the same model, with total clinical hours replacing regular visit volume in Models 5b and 5c. Staff administrative hours was correlated with regular visit volume at rho = .74 but was retained from Model 4 onward because it represented a distinct operational characteristic.

Patient Visit Average was calculated by dividing regular visit volume by new patient volume. Its correlations with these component variables therefore partly reflect the way the measure was constructed. Patient Visit Average and regular or new patient volume were not entered together in the same model specification.

Table 4.7

Spearman Correlations Between Predictor Variables

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*
1. Male owner																					
2. Owner age group	0.07																				
3. Years since qualification	0.06	0.86																			
4. Business acumen (composite)	0.24	-0.00	0.03																		
5. Ever worked with a coach	-0.12	0.15	0.09	0.07																	
6. Business education level	0.09	-0.06	-0.02	0.17	0.12																
7. Solo practice	-0.18	0.05	0.01	-0.32	-0.09	0.03															
8. Practice age 11+ years	0.21	0.52	0.52	0.12	0.08	0.10	-0.25														
9. Urban location (city or suburban)	0.12	-0.02	0.11	-0.10	-0.04	0.11	-0.08	0.19													
10. Regular visits (log)	0.30	0.11	0.14	0.37	0.20	0.12	-0.62	0.45	0.19												
11. New patients (log)	0.35	-0.23	-0.19	0.41	-0.10	-0.00	-0.52	0.05	0.04	0.59											
12. Patient Visit Average (log)	-0.01	0.39	0.39	0.01	0.36	0.01	-0.13	0.46	0.11	0.45	-0.39										
13. Regular visit price (category)	-0.08	0.18	0.11	-0.01	0.14	-0.13	-0.03	0.07	0.02	0.09	-0.01	0.04									
14. New patient price (category)	-0.10	0.23	0.18	-0.06	0.01	-0.06	0.14	0.10	-0.07	-0.00	-0.17	0.10	0.48								
15. Total clinical hours (chiropractors)	0.22	0.04	0.05	0.42	0.01	0.00	-0.68	0.24	0.07	0.78	0.67	0.10	0.16	0.02							
16. Owner clinical hours/week	0.23	0.13	0.10	0.04	-0.21	-0.18	-0.01	0.14	-0.03	0.25	0.22	0.08	0.14	0.11	0.35						
17. Owner admin hours/week	-0.05	-0.08	-0.10	0.03	0.00	0.07	-0.10	0.01	0.17	0.21	0.07	0.11	0.16	0.14	0.21	0.05					
18. Staff admin hours/week	0.27	0.02	0.13	0.36	0.13	0.16	-0.56	0.38	0.04	0.74	0.62	0.16	0.09	-0.06	0.65	0.09	0.23				
19. Marketing spend (category)	0.25	-0.34	-0.29	0.26	0.31	0.19	-0.49	-0.07	0.18	0.50	0.46	0.04	0.02	-0.15	0.47	-0.11	0.28	0.42			
20. Marketing breadth (channels)	0.20	-0.26	-0.33	0.22	0.16	0.18	-0.32	-0.11	0.02	0.40	0.45	-0.09	0.09	-0.05	0.32	-0.09	0.08	0.29	0.53		
21. New Zealand practice	0.14	-0.01	-0.00	-0.07	-0.14	0.09	0.04	0.11	-0.01	-0.10	0.03	-0.05	-0.47	-0.14	-0.06	0.03	-0.08	0.01	-0.06	-0.07	

Note. Sample sizes vary by pair. Because practice type is nominal, a binary indicator comparing solo practices with multiple-chiropractor and multidisciplinary practices was used in the correlation analysis. Patient Visit Average is calculated from regular visit volume and new patient volume, so its correlations with these variables partly reflect the construction of the measure.

4.9 Sequential Ordered Logistic Regression Models

The main analysis uses the sequential ordered logistic regression models specified in Section 3.10, estimated separately for each financial performance outcome. For each outcome, Model 1 is the benchmark specification containing the benchmark variables. Models 2, 3, and 4 each extend Model 1 separately by adding the owner, practice, and operational characteristics, respectively. Model 5 combines the benchmark variables and all three sets of additional characteristics in the full specification.

Models 5a to 5c are variants of the full specification described in Section 3.10. These models substitute alternative measures of patient volume, visit patterns, and clinical capacity. Total chiropractor clinical hours and regular visit volume are not included in the same model because they are highly correlated, $\rho = .78$, which would increase multicollinearity concerns.

All models include the New Zealand indicator as the geographic control. Specifications using detailed regional controls were also examined but were not retained because the small number of observations within individual regions did not support stable estimation.

Wald tests reject the null hypothesis that the predictor coefficients are jointly equal to zero for all ordered logistic regression models, with $p < .01$ in each case. This indicates that the predictors are jointly associated with the relevant financial outcome, but the tests do not assess overall model fit. Tables 4.8a, 4.8b, and 4.8c report the models for net profit, revenue, and operating expenses, respectively.

4.9.1 Net Profit

In the full specification, Model 5 ($n = 69$, pseudo $R^2 = .210$), staff administrative hours are positively associated with being in a higher net profit category ($b = 0.04$, $p < .05$). Formal business education, relative to no business education or experience only ($b = -2.11$, $p < .05$), and marketing spend ($b = -0.73$, $p < .05$) are negatively associated with the net profit category. Male owner status, relative to female owner status ($b = 1.49$, $p < .10$), and regular visit volume ($b = 0.93$, $p < .10$) show marginal positive associations. No statistically significant associations are observed for regular visit price, informal business education, business acumen, coaching, practice type, practice age, urban location, owner age, owner clinical or administrative hours, new-patient price, marketing breadth, or the New Zealand indicator.

In Models 1 to 3, which are estimated using the same sample of 73 practices, the direction and statistical significance of the benchmark associations are consistent. Regular visit volume is positively associated with the net profit category at $p < .01$, while marketing spend shows a marginal negative association and regular visit price shows a marginal positive association. None of the owner characteristics added in Model 2 or the practice characteristics added in Model 3 is statistically significant.

In the operational extension, Model 4 ($n = 69$), staff administrative hours are positively associated with the net profit category at $p < .01$. Male owner status, owner age 30 to 39 relative to under 30, formal business education, regular visit volume, and marketing spend are also statistically significant. Regular visit price is not statistically significant. Because Model 4 uses a smaller sample than Models 1 to 3, differences in statistical significance between these models cannot be attributed solely to the addition of the operational characteristics. In the full specification using the same sample, the association for owner age 30 to 39 is no longer statistically significant.

The alternative specifications provide no statistically significant evidence that new-patient volume, total chiropractor clinical hours, or Patient Visit Average is associated with the net profit category. New-patient volume is not statistically significant in Model 5a. In Model 5b ($n = 74$), neither new-patient volume nor total chiropractor clinical hours is statistically significant, while new-patient price is positively associated with the net profit category ($b = 0.34$, $p < .05$) and owner administrative hours show a marginal negative association ($b = -0.07$, $p < .10$).

In Model 5c ($n = 69$), neither Patient Visit Average nor total chiropractor clinical hours is statistically significant. Male owner status is positively associated with the net profit category ($b = 1.73$, $p < .05$), while owner age 30 to 39 shows a marginal negative association ($b = -2.27$, $p < .10$). Formal business education ($b = -2.23$, $p < .05$), marketing spend ($b = -0.67$, $p < .05$), and staff administrative hours ($b = 0.04$, $p < .01$) remain statistically significant. Across Model 5 and the same-sample variants, Models 5a and 5c, the negative associations for formal business education and marketing spend and the positive association for staff administrative hours remain statistically significant.

Table 4.8a

Sequential Ordered Logistic Models Predicting Net Profit Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	0.61	0.39	0.55	1.46**	1.49*	1.67*	1.03	1.73**
Owner age 30-39	-0.67	-0.50	-0.50	-2.20**	-2.00	-2.03	-1.86	-2.27*
Owner age 40-49	-0.02	0.28	0.19	-0.76	-0.43	-0.40	-0.28	-0.38
Owner age 50 or over	-0.49	-0.20	-0.28	-1.93	-1.72	-1.91	-1.44	-2.12
Informal business education	0.40	0.78	0.31	0.27	0.03	-0.07	-0.20	-0.34
Formal business education	-0.86	-0.79	-0.90	-1.90**	-2.11**	-2.16**	-1.81**	-2.23**
Marketing spend (category)	-0.52*	-0.47*	-0.49*	-0.75**	-0.73**	-0.73**	-0.54**	-0.67**
Regular visits (log)	1.55***	1.71***	1.72***	0.80**	0.93*	1.09*		
Regular visit price (category)	0.34*	0.38*	0.34*	0.29	0.28	0.32	0.29	0.29
New Zealand practice	-0.37	-0.39	-0.31	-0.69	-0.67	-0.53	-0.33	-0.45
Owner characteristics								
Business acumen (composite)		-0.09			0.19	0.28	0.47	0.54
Ever worked with a coach		-0.75			0.07	0.01	0.16	0.24
Practice characteristics								
Multiple chiropractors			-0.30		-0.70	-0.80	-0.49	-0.81
Multidisciplinary			-0.45		-0.78	-0.72	-0.88	-0.70
Practice age 11+ years			-0.25		-0.26	-0.45	0.17	-0.44
Urban location (city or suburban)			0.11		0.11	0.16	0.19	0.17
Operational characteristics								
Staff admin hours/week				0.03***	0.04**	0.04***	0.04**	0.04***
Owner clinical hours/week				-0.02	-0.02	-0.02	0.01	-0.01
Owner admin hours/week				-0.06	-0.06	-0.06	-0.07*	-0.07
New patient price (category)				0.26	0.27	0.24	0.34**	0.25
Marketing breadth (channels)				0.08	0.05	0.08	0.03	0.11
New patients (log)						-0.40	0.06	
Total clinical hours (chiropractors)							0.01	0.01
Patient Visit Average (log)								0.72
Observations	73	73	73	69	69	69	74	69
Pseudo R^2	0.149	0.155	0.152	0.204	0.210	0.214	0.184	0.208
Wald χ^2	38.26	40.87	41.10	67.00	71.46	82.64	71.51	86.34

Note. Blank cells indicate variables not entered in the model. All Wald χ2 tests of joint significance are statistically significant at $p < .01$. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia. *$p < .10$. **$p < .05$. ***$p < .01$.

4.9.2 Revenue

In the full specification, Model 5 ($n = 68$, pseudo $R^2 = .505$), regular visit volume ($b = 5.41$, $p < .01$), regular visit price ($b = 1.12$, $p < .01$), and staff administrative hours ($b = 0.04$, $p < .01$) are positively associated with being in a higher revenue category. Business acumen is negatively associated with the revenue category ($b = -1.80$, $p < .05$). No statistically significant associations are observed for the remaining predictors in the full specification.

In Models 1 to 3, which are estimated using the same sample of 72 practices, regular visit volume and regular visit price are positively associated with the revenue category at $p < .01$. Marketing spend is positively associated with revenue in Models 1 and 2 and shows a marginal positive association in Model 3. Some owner age categories also show significant or marginal positive associations relative to owners aged under 30, although these associations are not statistically significant in the later specifications.

In Model 4 ($n = 68$), regular visit volume and regular visit price remain positively associated with the revenue category, and staff administrative hours are positively associated with revenue on entry ($b = 0.04$, $p < .05$). Marketing spend and the owner age categories are not statistically significant. Because Model 4 uses a smaller sample than Models 1 to 3, these changes in statistical significance cannot be attributed solely to the addition of the operational characteristics.

The alternative specifications provide mixed evidence for the substituted measures. In Model 5a, which uses the same sample as Model 5, new-patient volume is not statistically significant. Regular visit volume, regular visit price, staff administrative hours, and business acumen retain statistically significant associations with the revenue category.

Model 5b uses a larger sample of 72 practices and replaces regular visit volume with total chiropractor clinical hours while also including new-patient volume. Total chiropractor clinical hours ($b = 0.05$, $p < .05$) and staff administrative hours ($b = 0.05$, $p < .01$) are positively associated with the revenue category. Practice age of 11 years or more shows a marginal positive association relative to practices operating for less than 11 years. New-patient volume is not statistically significant. Business acumen and regular visit price are also not statistically significant in this specification, although differences from Model 5 should be interpreted cautiously because the estimation sample and model specification differ.

In Model 5c ($n = 68$), Patient Visit Average ($b = 2.24$, $p < .01$), total chiropractor clinical hours ($b = 0.07$, $p < .05$), regular visit price ($b = 0.73$, $p < .05$), staff administrative hours ($b =$

0.06, $p < .01$), and male owner status relative to female owner status ($b = 2.01$, $p < .05$) are positively associated with the revenue category. The positive associations for staff administrative hours and regular visit price therefore remain evident in this alternative same-sample specification, while Patient Visit Average and total chiropractor clinical hours provide alternative measures of visit patterns and clinical capacity.

Table 4.8b

Sequential Ordered Logistic Models Predicting Revenue Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	-0.14	-0.10	-0.05	0.17	0.84	0.72	0.98	2.01**
Owner age 30-39	1.10*	1.37*	1.46**	0.27	0.88	0.93	-0.54	-0.53
Owner age 40-49	1.37	1.76	1.66*	1.27	1.67	1.69	0.72	1.27
Owner age 50 or over	1.06	1.23*	1.35*	0.86	1.13	1.25	0.13	-1.03
Informal business education	-0.60	0.09	-0.20	-0.79	0.79	0.83	-0.24	-0.16
Formal business education	0.04	0.49	0.34	-0.60	0.40	0.42	-0.49	-0.12
Marketing spend (category)	0.44**	0.50**	0.37*	0.33	0.32	0.32	0.36	0.47
Regular visits (log)	4.86***	5.31***	5.68***	3.95***	5.41***	5.40***		
Regular visit price (category)	0.83***	1.02***	0.97***	0.65**	1.12***	1.12***	0.35	0.73**
New Zealand practice	0.01	0.11	0.27	-0.28	-0.18	-0.21	-0.62	0.25
Owner characteristics								
Business acumen (composite)		-0.89			-1.80**	-1.84**	-0.35	-0.44
Ever worked with a coach		-0.85			-0.85	-0.84	0.77	0.09
Practice characteristics								
Multiple chiropractors			-0.16		-0.50	-0.48	-0.19	-0.79
Multidisciplinary			1.13		1.08	1.02	0.21	0.81
Practice age 11+ years			-0.79		-0.12	-0.10	1.36*	0.12
Urban location (city or suburban)			-0.72		-1.11	-1.13	-0.62	-1.11
Operational characteristics								
Staff admin hours/week				0.04**	0.04***	0.04***	0.05***	0.06***
Owner clinical hours/week				-0.02	-0.05	-0.05	0.00	-0.01
Owner admin hours/week				0.01	0.02	0.02	-0.03	-0.02
New patient price (category)				0.02	-0.18	-0.17	0.13	-0.14
Marketing breadth (channels)				0.22	0.27	0.25	0.15	0.32
New patients (log)						0.17	0.39	
Total clinical hours (chiropractors)							0.05**	0.07**
Patient Visit Average (log)								2.24***
Observations	72	72	72	68	68	68	72	68
Pseudo R^2	0.429	0.443	0.450	0.449	0.505	0.506	0.353	0.435
Wald χ^2	29.46	40.51	30.52	107.96	143.96	144.19	150.41	148.90

Note. Blank cells indicate variables not entered in the model. All Wald χ2 tests of joint significance are statistically significant at $p < .01$. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia. *$p < .10$. **$p < .05$. ***$p < .01$.

4.9.3 Operating Expenses

In the full specification, Model 5 ($n = 69$, pseudo $R^2 = .468$), marketing spend ($b = 1.06$, $p < .01$), regular visit volume ($b = 4.35$, $p < .05$), and practice age of 11 years or more relative to less than 11 years ($b = 1.35$, $p < .05$) are positively associated with being in a higher operating-expense category. New-patient price is negatively associated with the operating-expense category ($b = -0.43$, $p < .05$), while the New Zealand indicator shows a marginal negative association relative to Australia ($b = -2.00$, $p < .10$). No statistically significant associations are observed for the remaining predictors in the full specification.

In Models 1 to 3, which are estimated using the same sample of 73 practices, marketing spend and regular visit volume are positively associated with the operating-expense category at $p < .01$. The New Zealand indicator shows a marginal negative association in Models 1 and 2, while formal business education, relative to no business education or experience only, shows a marginal positive association in Model 3. None of the owner characteristics added in Model 2 or the practice characteristics added in Model 3 is statistically significant.

Model 4 is estimated using a smaller sample of 69 practices. Marketing spend and regular visit volume remain positively associated with the operating-expense category, while the New Zealand indicator shows a marginal negative association. None of the operational characteristics added in Model 4 is statistically significant. Because Model 4 uses a different estimation sample from Models 1 to 3, differences in statistical significance should not be attributed solely to the addition of the operational variables.

The alternative specifications provide broadly consistent evidence for marketing spend and practice age, but more mixed evidence for the alternative measures of clinical capacity and visit patterns. In Model 5a, which uses the same sample as Model 5, the New Zealand indicator is negatively associated with the operating-expense category ($b = -2.11$, $p < .05$), while urban location shows a marginal negative association. New-patient volume is not statistically significant.

Model 5b uses 73 observations and replaces regular visit volume with total chiropractor clinical hours while also including new-patient volume. Total chiropractor clinical hours shows a marginal positive association with the operating-expense category ($b = 0.04$, $p < .10$), while practice age of 11 years or more remains positively associated ($b = 2.39$, $p < .01$). Urban location and the New Zealand indicator show marginal negative associations. New-

patient volume is not statistically significant. Differences from Model 5 should be interpreted cautiously because both the specification and estimation sample differ.

In Model 5c (n = 69), total chiropractor clinical hours is positively associated with the operating-expense category (b = 0.05, $p < .05$), while Patient Visit Average shows a marginal positive association (b = 1.14, $p < .10$). Marketing spend (b = 1.04, $p < .01$) and practice age of 11 years or more (b = 1.75, $p < .05$) remain positively associated, while the New Zealand indicator remains negatively associated (b = -1.90, $p < .05$). New-patient price shows a marginal negative association (b = -0.41, $p < .10$).

Table 4.8c

Sequential Ordered Logistic Models Predicting Operating Expenses Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	-1.01	-1.10	-0.98	-0.55	-0.24	-0.42	0.76	0.89
Owner age 30-39	0.03	-0.07	-0.02	0.48	0.65	0.75	-0.24	-0.63
Owner age 40-49	-0.31	-0.32	-0.80	-0.28	-0.85	-0.86	-0.32	-0.60
Owner age 50 or over	0.60	0.68	-0.01	0.93	0.14	0.34	-0.27	-1.26
Informal business education	-0.12	-0.39	-0.04	0.25	-0.01	0.19	-0.13	-0.07
Formal business education	1.01	0.85	1.08*	1.11	1.04	1.16	0.69	1.07
Marketing spend (category)	0.80***	0.82***	0.87***	0.85***	1.06***	1.04***	0.97***	1.04***
Regular visits (log)	3.74***	3.67***	3.89***	4.08***	4.35**	4.32***		
Regular visit price (category)	0.13	0.08	0.19	0.12	0.21	0.21	0.25	0.23
New Zealand practice	-1.01*	-1.04*	-1.12	-1.67*	-2.00*	-2.11**	-1.72*	-1.90**
Owner characteristics								
Business acumen (composite)		0.37			0.24	0.10	0.28	0.46
Ever worked with a coach		0.15			0.61	0.68	1.55	1.23
Practice characteristics								
Multiple chiropractors			-0.20		-1.06	-1.03	-0.92	-0.99
Multidisciplinary			1.16		1.20	1.12	0.81	1.12
Practice age 11+ years			0.74		1.35**	1.48**	2.39***	1.75**
Urban location (city or suburban)			-0.89		-1.38	-1.51*	-1.51*	-1.22
Operational characteristics								
Staff admin hours/week				-0.01	-0.01	-0.01	0.02	0.02
Owner clinical hours/week				-0.04	-0.04	-0.04	0.02	-0.00
Owner admin hours/week				0.02	0.03	0.03	-0.02	-0.03
New patient price (category)				-0.28	-0.43**	-0.39*	-0.13	-0.41*
Marketing breadth (channels)				-0.08	-0.08	-0.10	-0.13	-0.02
New patients (log)						0.44	0.38	
Total clinical hours (chiropractors)							0.04*	0.05**
Patient Visit Average (log)								1.14*
Observations	73	73	73	69	69	69	73	69
Pseudo R^2	0.412	0.414	0.435	0.419	0.468	0.470	0.394	0.430
Wald χ^2	34.17	39.40	32.06	40.15	47.91	60.72	57.47	43.30

Note. Blank cells indicate variables not entered in the model. All Wald $\chi 2$ tests of joint significance are statistically significant at $p < .01$. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia. *$p < .10$. **$p < .05$. ***$p < .01$.

4.10 Supplementary OLS Models

Ordinary least squares models mirroring the ordered logistic specifications were estimated as a supplementary consistency check, with the ordered financial categories treated as continuous outcomes. These models are not used as the primary analysis because the categories represent ordered ranges of unequal width rather than values measured on an interval scale. The coefficients should therefore be interpreted cautiously and are used only to assess whether the main patterns are broadly similar under an alternative estimation method. Tables 4.9a, 4.9b, and 4.9c report the results.

Overall, the directions of several principal associations are consistent with the ordered logistic regression results, although differences in statistical significance are observed.

For net profit, the OLS models reproduce the positive association for staff administrative hours and the negative associations for marketing spend and formal business education. Regular visit volume remains positively associated with the outcome in the specifications in which it is included, although it is not statistically significant in Model 5. Differences from the ordered logistic results include negative associations for some owner age categories and owner administrative hours. Patient Visit Average also shows a marginal positive association with net profit in Model 5c.

For revenue, the OLS models reproduce the positive associations for regular visit volume, staff administrative hours, total chiropractor clinical hours, and Patient Visit Average, together with the negative association for business acumen. Differences include negative associations for owner clinical hours and the New Zealand indicator in several specifications, as well as a marginal positive association for marketing breadth in the full specifications.

For operating expenses, the OLS models reproduce the positive associations for marketing spend, practice age of 11 years or more, and total chiropractor clinical hours, together with the negative associations for new-patient price and the New Zealand indicator. Additional differences include negative associations for urban location and multiple-chiropractor practices and a marginal positive association for formal business education.

Table 4.9a

Supplementary OLS Models for Net Profit Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	0.60	0.50	0.53	1.21***	1.18**	1.31**	1.05**	1.33**
Owner age 30-39	-0.78	-0.66	-0.91	-1.82**	-1.93**	-2.01**	-1.91**	-2.09***
Owner age 40-49	-0.62	-0.48	-0.71	-0.97	-1.10	-1.07	-0.93	-1.02
Owner age 50 or over	-1.06	-0.91	-1.17	-1.88**	-2.00**	-2.19**	-1.78**	-2.24**
Informal business education	0.60	0.90	0.50	0.53	0.40	0.27	0.08	0.12
Formal business education	-0.78	-0.71	-0.89*	-1.26***	-1.33**	-1.39**	-1.28**	-1.43**
Marketing spend (category)	-0.46**	-0.43**	-0.45**	-0.55***	-0.55***	-0.53**	-0.43**	-0.50**
Regular visits (log)	1.35***	1.47***	1.25***	0.58**	0.56	0.70*		
Regular visit price (category)	0.32*	0.37**	0.30*	0.26	0.23	0.28	0.26	0.28
New Zealand practice	-0.36	-0.35	-0.41	-0.69	-0.74	-0.59	-0.52	-0.56
Owner characteristics								
Business acumen (composite)		-0.18			-0.07	0.06	0.20	0.19
Ever worked with a coach		-0.52			0.09	0.04	0.10	0.15
Practice characteristics								
Multiple chiropractors			0.34		0.07	0.00	0.03	0.04
Multidisciplinary			-0.37		-0.34	-0.26	-0.46	-0.21
Practice age 11+ years			0.16		0.17	-0.04	0.41	-0.06
Urban location (city or suburban)			0.19		0.08	0.14	-0.02	0.14
Operational characteristics								
Staff admin hours/week				0.03***	0.03**	0.03***	0.03***	0.03***
Owner clinical hours/week				-0.01	-0.01	-0.01	0.01	-0.00
Owner admin hours/week				-0.05**	-0.05*	-0.04	-0.04*	-0.05*
New patient price (category)				0.19	0.20	0.18	0.32**	0.18
Marketing breadth (channels)				0.07	0.09	0.11	0.10	0.13
New patients (log)						-0.40	-0.10	
Total clinical hours (chiropractors)							0.00	-0.00
Patient Visit Average (log)								0.57*
Observations	73	73	73	69	69	69	74	69
R^2	0.445	0.455	0.462	0.577	0.586	0.598	0.549	0.595

Note. Blank cells indicate variables not entered in the model. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia.

*$p < .10$. **$p < .05$. ***$p < .01$.

Table 4.9b

Supplementary OLS Models for Revenue Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	-0.30	-0.28	-0.28	0.46	0.76	0.84	1.06**	1.12***
Owner age 30-39	1.35**	1.46**	1.05	0.17	0.01	-0.04	-0.72	-0.64
Owner age 40-49	0.90	0.82	0.42	0.56	-0.08	-0.06	-0.07	0.08
Owner age 50 or over	1.22*	1.26**	0.67	0.61	0.08	-0.03	-0.39	-0.73
Informal business education	0.08	0.64	0.12	0.01	0.60	0.52	-0.08	0.09
Formal business education	0.39	0.72	0.40	-0.27	0.21	0.18	-0.10	0.13
Marketing spend (category)	0.54***	0.53**	0.53**	0.25	0.17	0.18	0.26	0.24
Regular visits (log)	2.28***	2.60***	2.05***	1.41***	1.74***	1.83***		
Regular visit price (category)	0.20	0.26	0.24	0.12	0.26	0.29	0.13	0.28
New Zealand practice	-0.47	-0.52	-0.56	-0.84*	-0.98**	-0.88*	-0.67	-0.39
Owner characteristics								
Business acumen (composite)		-0.81*			-1.19***	-1.11***	-0.48	-0.52*
Ever worked with a coach		-0.37			-0.07	-0.10	0.68	0.31
Practice characteristics								
Multiple chiropractors			0.23		-0.03	-0.07	-0.33	-0.50
Multidisciplinary			0.50		0.54	0.59	0.03	0.22
Practice age 11+ years			0.74		0.66	0.53	1.12**	0.18
Urban location (city or suburban)			-0.22		-0.54	-0.50	-0.86	-0.62
Operational characteristics								
Staff admin hours/week				0.04***	0.03***	0.04***	0.04***	0.04***
Owner clinical hours/week				-0.05**	-0.05***	-0.05**	-0.02	-0.03**
Owner admin hours/week				-0.01	0.00	0.01	-0.01	-0.02
New patient price (category)				0.01	-0.07	-0.09	0.14	-0.06
Marketing breadth (channels)				0.17	0.23*	0.24*	0.19	0.21*
New patients (log)						-0.25	-0.13	
Total clinical hours (chiropractors)							0.05***	0.05***
Patient Visit Average (log)								1.14***
Observations	72	72	72	68	68	68	72	68
R^2	0.728	0.745	0.738	0.837	0.872	0.874	0.834	0.893

Note. Blank cells indicate variables not entered in the model. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia.

*$p < .10$. **$p < .05$. ***$p < .01$.

Table 4.9c

Supplementary OLS Models for Operating Expenses Category

Predictor	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 5a*	*Model 5b*	*Model 5c*
Benchmark								
Male owner	-0.93	-1.00	-0.91	-0.15	0.15	0.10	0.31	0.30
Owner age 30-39	1.13	1.29*	0.71	1.06	0.77	0.80	0.48	0.44
Owner age 40-49	0.48	0.56	-0.24	0.66	-0.21	-0.21	-0.15	-0.16
Owner age 50 or over	1.82**	1.96**	0.92	1.64*	0.63	0.70	0.36	0.27
Informal business education	-0.00	0.48	0.03	0.45	0.65	0.70	0.37	0.47
Formal business education	0.70	0.88	0.71	0.60	0.85*	0.87*	0.71*	0.85*
Marketing spend (category)	0.90***	0.92***	0.93***	0.79***	0.83***	0.82***	0.86***	0.84***
Regular visits (log)	1.45***	1.69***	1.19**	0.81**	0.83	0.78		
Regular visit price (category)	-0.07	-0.02	-0.01	0.14	0.31*	0.30	0.27*	0.29*
New Zealand practice	-0.88*	-0.90*	-1.01*	-1.08**	-1.30***	-1.35***	-0.95**	-1.06**
Owner characteristics								
Business acumen (composite)		-0.48			-0.60	-0.64	-0.31	-0.31
Ever worked with a coach		-0.60			0.08	0.10	0.47	0.35
Practice characteristics								
Multiple chiropractors			-0.15		-0.84	-0.81	-1.14**	-1.10**
Multidisciplinary			0.53		0.60	0.57	0.21	0.31
Practice age 11+ years			1.29**		1.50***	1.58***	1.63***	1.41**
Urban location (city or suburban)			-0.49		-0.98**	-1.00**	-1.21***	-1.07**
Operational characteristics								
Staff admin hours/week				0.02**	0.02*	0.02	0.02	0.02
Owner clinical hours/week				-0.03	-0.02	-0.03	-0.01	-0.02
Owner admin hours/week				0.00	0.01	0.01	-0.00	0.00
New patient price (category)				-0.35*	-0.44***	-0.43***	-0.34**	-0.41**
Marketing breadth (channels)				-0.12	-0.01	-0.02	-0.07	-0.05
New patients (log)						0.15	0.04	
Total clinical hours (chiropractors)							0.04**	0.04**
Patient Visit Average (log)								0.32
Observations	73	73	73	69	69	69	73	69
R^2	0.643	0.655	0.674	0.733	0.790	0.791	0.790	0.804

Note. Blank cells indicate variables not entered in the model. Reference categories were female owner, owner aged under 30 years, no business education or experience only, solo chiropractor practice, practice age of less than 11 years, small town/rural/remote location, and Australia.

*$p < .10$. **$p < .05$. ***$p < .01$.

4.11 Summary of Results

Across the main and alternative ordered logistic specifications, operational and capacity-related variables show the most consistent associations with the three financial performance outcomes.

In the main full specifications, regular visit volume is positively associated with being in a higher revenue and operating-expense category and shows a marginal positive association with the net profit category. Staff administrative hours are positively associated with net profit and revenue. Marketing spend is positively associated with operating expenses and negatively associated with net profit. Regular visit price is positively associated with revenue, while Patient Visit Average is positively associated with revenue in the relevant alternative specification.

Among the practice characteristics, total chiropractor clinical hours are positively associated with revenue and operating expenses in the alternative specifications that replace regular visit volume. Practice age of 11 years or more is also positively associated with operating expenses.

Business acumen is negatively associated with revenue in Model 5 and the same-sample Model 5a, but not in the alternative specifications using total chiropractor clinical hours. Formal business education, relative to no business education or experience only, is negatively associated with net profit across the full specifications. Coaching is not significantly associated with any financial outcome in the multivariable models.

Among the benchmark variables, male owner status is positively associated with net profit in several full specifications and with revenue in Model 5c. The New Zealand indicator is negatively associated with operating expenses, although the association is marginal in the main full specification and reaches statistical significance in Models 5a and 5c.

The supplementary OLS models reproduce several of the principal associations from the ordered logistic analysis, although differences occur for regular visit price, regular visit volume, owner characteristics, and several contextual variables. Chapter 5 interprets these findings, assesses hypotheses H1 to H8, and considers the exploratory results.

Chapter 5: Discussion

5.1 Overview

The aim of this study was to examine the associations between owner, practice, and operational characteristics and the financial performance of private chiropractic practices in Aotearoa New Zealand and Australia. Financial performance was assessed using three related but distinct outcomes: net profit, revenue, and operating expenses. Chapter 4 presented the descriptive, bivariate, and multivariable results. This chapter interprets those findings and considers their implications for practice owners, educators, and the profession.

The discussion is organised by substantive theme rather than by model sequence. Section 5.2 interprets the findings across five themes: patient volume, clinical capacity, and administrative support; pricing and marketing; business acumen, education, and coaching; practice structure and context; and owner demographics and time allocation. Section 5.3 assesses each of the eight hypotheses stated in Chapter 2. Section 5.4 considers the practical implications of the findings, Section 5.5 evaluates the strengths and limitations of the study, and Section 5.6 summarises the chapter and leads into the conclusion. Given the cross-sectional and correlational design described in Chapter 3, the findings are interpreted as associations rather than causal effects.

A central interpretive issue is the distinction between the three financial outcomes. Characteristics associated with higher revenue were often also associated with higher operating expenses, whereas fewer characteristics were associated with net profit. This pattern is consistent with the input-throughput-output framework presented in Chapter 2 (Katz & Kahn, 1966; Scott, 2003), in which practice resources and activities may contribute to both income generation and operating costs, while net profit reflects the balance between them. Examining the outcomes separately therefore provides a more differentiated account of financial performance than treating it as a single construct.

5.2 Interpretation of the Findings

The five themes below form an integrated account of the findings rather than a series of isolated results. Considered together, they indicate that financial performance in this sample was more consistently associated with how care was organised, delivered, and supported than with the measured indicators of owner business capability. The themes are interpreted through the integrated framework developed in Chapter 2, drawing on professional service firm

theory, the resource-based view, the clinician-owner literature, and the input-throughput-output model. Detailed coefficients from Chapter 4 are included only where they assist the interpretation.

5.2.1 Patient Volume, Clinical Capacity, and Administrative Support

The most consistent findings concern the volume of care delivered, the clinical capacity available to provide it, and the administrative labour supporting service delivery. As reported in Chapter 4, regular visit volume is positively associated with revenue and operating expenses in the full specification, while its association with net profit is only marginal. In the alternative specifications, total chiropractor clinical hours are positively associated with revenue and, in one specification, operating expenses, but are not associated with net profit. Taken together, these findings indicate that greater regular visit volume and clinical capacity are associated with higher revenue and operating expenses, but are not consistently associated with higher net profit.

This pattern is consistent with the characterisation of professional service firms as dependent on professional labour (von Nordenflycht, 2010). Where the core service is delivered personally by clinicians, revenue is constrained by the clinical hours available and the extent to which that capacity is used. The findings also align with evidence from adjacent healthcare settings. Conrad et al. (2010) identified chairside hours as an important predictor of dentist productivity, while Corcoran et al. (2022) found that chiropractor staffing and facility characteristics were associated with clinical productivity. The present findings apply this general pattern to practice-level financial outcomes by showing that greater clinical activity and capacity are associated not only with higher revenue but also with a larger operating-cost base. Greater scale therefore does not consistently correspond with higher net profit. In input-throughput-output terms, greater clinical capacity may support increased service throughput while also increasing the costs of delivery. This is consistent with the observed pattern of higher revenue and operating expenses, without a corresponding consistent association with net profit (Katz & Kahn, 1966; Scott, 2003).

New-patient volume is not significantly associated with any financial outcome in Model 5a. This differs from Mior and Waalen (2008), who identified new-patient volume as an important predictor of chiropractor gross income. Several differences may contribute to the contrasting findings. The present study examines practice-level revenue, operating expenses, and net profit separately rather than practitioner gross income. In addition, new-patient inflow

contributes to financial performance only to the extent that it results in delivered and paid services. Regular visit volume is therefore more closely aligned with the services delivered during the financial year.

The alternative specification using Patient Visit Average is consistent with this interpretation, although it does not confirm it. PVA is positively associated with revenue in Model 5c, is not significantly associated with net profit, and shows a marginal positive association with operating expenses. Within this sample, regular visits relative to new-patient inflow are therefore more clearly associated with revenue than new-patient volume alone. However, as discussed in Chapter 2, PVA is a practice-level proxy for visit patterns rather than a measure of individual patient retention or clinical quality. It may reflect recommended care frequency, case complexity, maintenance care, patient adherence, or subsequent periods of care for new health concerns.

Administrative support shows a somewhat different pattern. Staff administrative hours are positively associated with both revenue and net profit in the main full specifications, while their association with operating expenses is not statistically significant. The OLS estimates reproduce the positive associations with revenue and net profit, although the findings for operating expenses are weaker and vary across specifications. These results do not demonstrate that administrative support is cost-neutral. Rather, they are consistent with the possibility that administrative support helps practices use their clinical capacity more effectively.

This interpretation aligns with the labour-capacity reasoning developed from professional service firm theory in Section 2.2.2 and with evidence from adjacent healthcare settings. Zhao et al. (2026) found that administrative staffing contributed to appointment production and supported the productivity of clinical staff, while Dobson et al. (2009) reported that support staffing was associated with greater throughput and, in some models, higher income per physician hour. Administrative staff may support scheduling, patient communication, billing, and other functions that allow chiropractors to devote more time to clinical care. The result is also consistent with the clinician-owner literature, which highlights the competing clinical and managerial demands placed on owners (Llewellyn, 2001; Noordegraaf, 2007). Owner administrative hours, however, are not consistently associated with the financial outcomes. This suggests that administrative work performed by owners and administrative support provided by staff may represent different aspects of practice organisation.

Several mechanisms may help explain why administrative support, but not clinical capacity, was associated with net profit. From a professional service firm perspective, administrative support may provide leverage by shifting non-billable tasks away from fee-earning clinicians and helping the practice use its clinical capacity more efficiently. Its cost may therefore be offset by additional billable activity and by improvements in scheduling, patient communication, and billing (von Nordenflycht, 2010). Additional clinical capacity, by contrast, may increase service delivery while also increasing labour and related operating costs, limiting its association with net profit. The clinician-owner literature suggests a further mechanism: delegating administrative work may reduce the competing clinical and managerial demands described by Llewellyn (2001) and Noordegraaf (2007), allowing owners to direct more attention to clinical care or managerial responsibilities. In input-throughput-output terms, administrative support may improve the conversion of existing clinical capacity into delivered and paid services, whereas additional clinical capacity expands the resource base that must itself be effectively utilised. These mechanisms are consistent with the observed pattern but were not measured directly and should therefore be treated as possible explanations rather than confirmed mechanisms.

Greater administrative support may contribute to more effective use of clinical labour, but the direction of the relationship cannot be determined from the cross-sectional data. Larger, busier, or more profitable practices may be better able to employ administrative staff, rather than administrative staffing itself producing stronger financial performance. The findings therefore identify administrative support as an important practice characteristic for further investigation, rather than demonstrating that increasing staff administrative hours will improve financial performance.

5.2.2 Pricing and Marketing

Pricing and marketing show different patterns across the three financial outcomes. Regular visit price is positively associated with revenue in the main full specification but is not significantly associated with operating expenses or net profit. This finding is broadly consistent with Mior and Waalen (2008), who reported that average treatment cost, measured as the patient co-payment, was positively associated with chiropractor gross income. However, they also identified a negative association between treatment cost and new-patient volume, suggesting a possible trade-off between the revenue generated per visit and patient demand.

The present findings do not demonstrate that increasing regular visit prices would increase revenue. Rather, practices charging higher regular visit fees tended to be in higher revenue categories while accounting for the other included characteristics. Regular visit price is also not statistically significant in the supplementary OLS models, meaning that the association is not consistent across estimation methods. It should therefore be interpreted as an association identified in the primary ordered logistic analysis rather than as a consistent association across the analyses.

New-patient price shows a different and less readily interpretable pattern. It is negatively associated with operating expenses in the main full model, with similar negative associations appearing in several alternative and OLS specifications. It is not consistently associated with revenue or net profit, although a positive association with net profit appears in one alternative specification and its OLS counterpart. Because this relationship was not hypothesised and the literature reviewed provides no clear basis for interpreting it, the finding is best treated as exploratory. It may reflect unmeasured differences in practice structure, pricing strategies, service delivery, or cost bases and requires replication before substantive conclusions can be drawn.

Marketing spend produces one of the more consistent patterns in the study. It is positively associated with operating expenses in the full specification, with the same direction and statistical significance across the alternative ordered logistic and OLS models. It is also negatively associated with net profit in the full specification, and this association remains evident across the alternative specifications. The evidence for revenue is less consistent. Marketing spend is positively associated with revenue in Models 1 and 2 and marginally associated in Model 3, but is not statistically significant in Models 4 or 5. Because Models 4 and 5 use a smaller estimation sample than Models 1 to 3, the change in statistical significance cannot be attributed solely to the inclusion of the operational characteristics. The OLS full specifications similarly provide no statistically significant evidence of an association with revenue. Overall, greater marketing expenditure is consistently associated with higher operating-expense categories and lower net profit categories, but not consistently with higher revenue.

Several explanations are possible, and the cross-sectional design cannot distinguish between them. First, some marketing expenditure may not generate sufficient revenue within the period examined to offset its cost. However, the literature reviewed in Chapter 2 provides limited direct evidence against which the financial productivity of marketing expenditure in

chiropractic practices can be evaluated. The direction of the relationship may also run partly in reverse. Owners experiencing lower revenue or profitability may increase marketing expenditure in an attempt to improve performance, meaning that higher spending may be a response to weaker financial outcomes rather than their cause. Marketing expenditure may produce benefits over a longer period than the single financial year captured by the study. Spending intended to increase awareness, reputation, or patient acquisition may affect later patient activity rather than financial outcomes measured within the same period.

Measurement limitations provide a further explanation. Marketing spend was recorded as an ordered annual category and did not distinguish between channels, campaign quality, timing, target market, or attributable return. Practices reporting similar expenditure may therefore have achieved substantially different results. The aggregate measure may capture the direct cost of marketing sufficiently to produce an association with operating expenses while failing to distinguish effective from ineffective expenditure. The findings should therefore not be interpreted as evidence that marketing is inherently ineffective. Rather, they indicate only that greater expenditure was not associated with stronger revenue or net profit after the other included characteristics were considered.

Marketing breadth, measured as the number of channels used, is not significantly associated with any outcome in the primary ordered logistic models. Marginal positive associations with revenue appear in some OLS specifications, but these are not sufficiently consistent to support a substantive conclusion. Voorveld et al. (2011) found that exposure across multiple media strengthened some consumer responses, but their study examined advertising effects rather than financial performance in small professional practices. The present findings provide little evidence that using a greater number of marketing channels is associated with stronger financial outcomes in itself. Channel selection, execution quality, audience fit, and management of the overall marketing activity may matter more than the number of channels used.

5.2.3 Business Acumen, Education, and Coaching

The findings for business acumen, education, and coaching do not support the study hypotheses and require cautious interpretation. Self-rated business acumen is not positively associated with any financial outcome. Instead, it is negatively associated with revenue in the main full specification and the same-sample alternative specification, although not in the specifications using alternative measures of clinical capacity and visit patterns. Formal

business education, relative to no business education or experience only, is negatively associated with net profit, with the same direction and statistical significance across the alternative specifications and OLS models. Coaching is not significantly associated with any financial outcome in the multivariable models.

From the perspective of the resource-based view, these findings are unexpected because managerial knowledge and capability may constitute resources that support stronger performance (Barney, 1991; Wernerfelt, 1984). However, the three variables represent different aspects of owner capability. Business acumen is a self-assessed proxy for capability, while business education and coaching represent potential sources of capability development. None directly measures whether business knowledge is applied effectively within the practice.

Because these findings do not support either the hypotheses or the resource-based expectation, several explanations should be considered before concluding that owner capability itself is unrelated to financial performance. These include reverse causation and self-selection, measurement limitations, differences in the timing and content of capability development, and whether the knowledge acquired was applied within the practice.

The business acumen result is particularly difficult to interpret. At the bivariate level, business acumen is positively correlated with net profit, revenue, and operating expenses, but its association with revenue is negative in the main full specification. This difference may reflect adjustment for correlated measures of practice activity or scale, differences in the samples used for the analyses, measurement limitations, or instability arising from the number of predictors relative to the available sample. It should not be interpreted as evidence that greater business capability reduces revenue.

One plausible explanation lies in how business acumen was measured. The scale was developed for this study and demonstrates good internal consistency, with a Cronbach's alpha of .88. However, internal consistency does not establish construct validity, and the scale has not been externally validated against observed managerial behaviour or objective measures of business capability. Self-ratings may reflect owners' confidence, self-awareness, or standards of comparison as well as their underlying capability. Owners with greater knowledge may, for example, evaluate their skills more critically than owners with less knowledge. The result may therefore reflect limitations in how business capability was measured rather than a negative financial consequence of capability itself.

Reverse causation and self-selection also offer plausible explanations for the formal education finding. Owners may undertake business education in response to financial or managerial difficulties, meaning that weaker performance may precede the capability investment rather than result from it. Owners anticipating growth, restructuring, or exit may also self-select into education, producing associations that reflect the circumstances of the practice rather than the effect of education itself. Formal education may also be associated with unmeasured differences in career stage, external professional commitments, or practice involvement. Although owner clinical and administrative hours are included in the full model, the study does not measure employment, teaching, consulting, or other commitments outside the practice.

The broad formal education category introduces further uncertainty. It combines programmes that may differ considerably in depth, content, quality, and relevance to chiropractic practice ownership. It also does not capture whether the education was completed before or after the financial period examined, whether the knowledge was applied, or how closely the programme addressed the practical requirements of managing a small healthcare business. Education completed many years earlier may not reflect current management practice, while recently completed education may not yet have had time to influence financial outcomes within the single year examined. The negative association should therefore not be interpreted as evidence that business education harms financial performance. Nevertheless, the findings do not support the expectation that owners with formal business education, as measured here, achieve stronger financial outcomes.

This result is relevant to the perceived gaps in business preparation identified in the chiropractic literature (Ciolfi et al., 2021; Ciolfi & Kasen, 2017; Henson et al., 2008) and to the variation in business curriculum content documented across accredited programmes (Gleberzon, 2022). It raises the possibility that access to education alone may be insufficient to produce measurable financial differences unless the content is relevant, timely, and translated into applied management practices.

The coaching result requires similar caution. Coaching is measured as a binary indicator of whether the owner has ever worked with a business coach or practice-management consultant. It does not distinguish between engagements of different duration, intensity, content, provider, or quality. This broad measure may conceal meaningful differences between forms of coaching and their relationships with financial performance.

Coaching is positively correlated with operating expenses at the bivariate level and has a marginal positive correlation with revenue, but the multivariable models do not reproduce these associations. This may reflect differences in practice scale, selection into coaching, or limitations of the binary measure. Owners may seek coaching in response to weaker performance, but they may also engage coaches during periods of growth, restructuring, or expansion. These contrasting pathways make the direction of the relationship difficult to establish using cross-sectional data.

The contrast with Adebiaye and Conner (2015) is noteworthy. They found that chiropractors holding an MBA reported higher profit ranks and greater perceived business success. However, their study used a smaller, geographically limited United States sample, relied on self-reported ordinal outcomes, and did not clearly separate the association of MBA status from possible age differences. The present multivariable analysis does not reproduce a positive association between formal business education and financial performance.

In sum, the study provides no evidence that self-rated business acumen, formal business education, or coaching, as measured here, is positively associated with financial performance. The negative associations for business acumen and formal education warrant further investigation but should not be interpreted as causal effects. Longitudinal research using validated measures of managerial capability, more detailed information about educational and coaching engagements, measures of applied managerial behaviour, and objective financial outcomes would be needed to determine whether these capability-related inputs contribute to subsequent changes in practice performance. Until longitudinal research can distinguish between these explanations, the safest conclusion is that the capability measures used here did not support the hypothesised positive associations, not that owner capability is financially irrelevant.

5.2.4 Practice Structure and Context

Practice structure shows fewer consistent associations with financial performance than patient volume, clinical capacity, and administrative support. Practice type is not significantly associated with net profit, revenue, or operating expenses in any of the full ordered logistic specifications. After accounting for the other included characteristics, the study therefore finds no clear evidence that multiple-chiropractor or multidisciplinary practices differ financially from solo chiropractor practices. This does not establish that the practice types

perform equivalently, as differences in staffing, service mix, ownership arrangements, and scale may not be fully captured by the variables included in the models.

Practice age shows a more consistent association with operating expenses. In the main full specification, practices operating for 11 years or more are more likely to be in a higher operating-expense category than younger practices, and the positive association persists across the alternative models. Because these models differ from the main specification in both the variables included and the estimation sample, their coefficients are not directly comparable across models.

Practice age is not significantly associated with net profit in any full ordered logistic specification. Its association with revenue is limited to a marginal positive coefficient in Model 5b, with a corresponding positive association in the OLS model. Older practices in this sample therefore tend to have higher operating expenses without consistent corresponding differences in revenue or net profit categories.

Several mechanisms could contribute to this pattern. Established practices may have accumulated greater staffing, premises, equipment, or infrastructure commitments, or may retain systems and cost structures developed during earlier stages of the practice. These mechanisms were not measured directly and remain possible explanations rather than demonstrated causes. The finding is broadly consistent with firm-age research showing that older firms may accumulate resources and operate at a larger scale without necessarily achieving stronger profitability or growth (Coad et al., 2013). The use of a binary practice-age measure may also conceal non-linear differences between newer, established, and mature practices.

Geographic context produces a suggestive but less consistent pattern. The New Zealand indicator shows a marginal negative association with operating expenses in the main full specification relative to Australia and reaches statistical significance in two alternative specifications. The OLS models also show negative associations across the full specifications. No statistically significant country association is observed for net profit or revenue in the primary ordered logistic models. Although negative associations with revenue appear in several OLS specifications, these are not reproduced by the primary estimation method. Overall, the findings provide some evidence that New Zealand practices may have lower operating expenses than Australian practices, although the association is not fully consistent across specifications and estimation methods.

Studies of the New Zealand and Australian healthcare systems describe differences in funding arrangements and practice environments that could contribute to differences in practice costs (Engel et al., 2014; Hill et al., 2023). However, these studies do not directly compare the financial structures of chiropractic practices in the two countries, and the present study cannot determine which regulatory, funding, labour, property, or other factors may account for the observed association. The country indicator captures average differences between the two national samples rather than the effects of any specific institutional mechanism. More detailed regional specifications were examined but were not retained because the small number of observations within individual regions did not support stable estimation.

Urban location is not significantly associated with any financial outcome in the main full ordered logistic specifications. Negative associations with operating expenses appear in some alternative ordered logistic and OLS models, but the pattern is not sufficiently consistent to support a firm conclusion. The financial relevance of geographic location should therefore be regarded as unresolved rather than absent.

5.2.5 Owner Demographics and Time Allocation

Owner gender shows some associations with financial performance, although the pattern is not consistent across specifications. Male owner status is positively associated with the net profit category in two alternative specifications and marginally associated in the main full specification. It is also positively associated with the revenue category in one alternative specification but not in the others. Because these associations were not hypothesised and vary across models, they are best regarded as tentative rather than as evidence of a consistent gender difference in financial performance.

The study does not measure the mechanisms that might underlie these associations. They may reflect unmeasured differences in working arrangements, patient mix, ownership structure, remuneration practices, or other characteristics associated with owner gender. Mior and Waalen (2008) similarly found that personal characteristics were associated with chiropractor gross income, although their study examined an individual-level outcome in a different jurisdiction. The present findings should therefore not be interpreted as indicating differences in owner capability or effort. They are exploratory associations that require further investigation.

Owner age is not consistently associated with the financial outcomes in the primary ordered logistic models. Owners aged 30 to 39 have lower odds of being in a higher net profit

category than owners aged under 30 in Model 4, but this association is not statistically significant in the main full specification. Some age associations also appear in the supplementary OLS models, particularly for net profit, but the pattern is not consistent across estimation methods or alternative specifications. The owner-age findings are therefore inconclusive.

The allocation of owner time between clinical and administrative work also shows limited evidence of a consistent association with financial performance. Owner clinical hours are not significantly associated with any outcome in the ordered logistic full specifications, although negative associations with revenue appear in several OLS models. Owner administrative hours are not significantly associated with the outcomes in the main full ordered logistic specifications but show a marginal negative association with net profit in Model 5b and negative associations in several OLS net profit models. These model-dependent findings provide no clear basis for concluding that either greater clinical time or greater administrative time by the owner is financially advantageous.

The absence of consistent associations may reflect the competing demands described in the clinician-owner literature (Llewellyn, 2001; Noordegraaf, 2007). Clinical hours may contribute directly to billable activity, while administrative hours may support planning, staffing, marketing, and financial management. However, hours alone do not indicate the type, quality, or productivity of the work completed. The same number of administrative hours may be devoted to strategic management in one practice and routine tasks in another. Similarly, the financial return from owner clinical hours may differ according to visit volume, pricing, available administrative support, and the contribution of other chiropractors. More detailed measures of how owners allocate and use their time may therefore be needed to determine whether particular forms of clinical or managerial activity are associated with financial performance.

Viewed as a whole, Section 5.2 indicates that financial performance in this sample was more consistently associated with the organisation and throughput of care, and the support structures surrounding it, than with the measured indicators of owner capability, practice structure, or geographic context.

5.3 Hypothesis Outcomes

Table 5.1 assesses the eight hypotheses stated in Section 2.8.2 against the findings interpreted in Section 5.2. The assessments are based primarily on the full ordered logistic specifications,

with alternative specifications used where the hypothesised variable does not appear in the main full model. Marginal associations at $p < .10$ are not treated as confirmatory support.

Table 5.1

Summary of Hypothesis Outcomes

Hypothesis	*Prediction*	*Result in relevant full specifications*	*Assessment*
H1	Business acumen positively associated with net profit and revenue	Net profit ns; revenue $b = -1.80$, $p < .05$ in Model 5, but ns in Models 5b and 5c	Not supported; opposite direction for revenue in the main full model
H2	Business education positively associated with net profit and revenue	Formal education negatively associated with net profit, $b = -2.11$, $p < .05$ in Model 5; informal education ns; revenue ns	Not supported; opposite direction for formal education and net profit
H3	Coaching positively associated with net profit and revenue	No significant association with either outcome	Not supported
H4	Clinical capacity positively associated with revenue and operating expenses	Revenue $b = 0.05$, $p < .05$ in Model 5b and $b = 0.07$, $p < .05$ in Model 5c; expenses $b = 0.04$, $p < .10$ in Model 5b and $b = 0.05$, $p < .05$ in Model 5c	Supported, although expense evidence was less consistent
H5	Administrative support positively associated with revenue and operating expenses	Revenue $b = 0.04$, $p < .01$ in Model 5; expenses ns; net profit $b = 0.04$, $p < .05$, exploratory	Partially supported for revenue
H6	Regular visit volume positively associated with revenue and operating expenses	Revenue $b = 5.41$, $p < .01$; expenses $b = 4.35$, $p < .05$ in Model 5	Supported
H7	Patient Visit Average positively associated with net profit and revenue	Revenue $b = 2.24$, $p < .01$ in Model 5c; net profit ns	Partially supported for revenue
H8	Marketing spend positively associated with revenue and operating expenses	Expenses $b = 1.06$, $p < .01$ in Model 5; revenue ns in the full specifications	Partially supported for operating expenses

Note. Coefficients are drawn from Tables 4.8a to 4.8c. ns = not statistically significant. Associations in the direction opposite to that predicted are assessed as not supporting the hypothesis. Marginal associations at $p < .10$ are not treated as confirmatory support.

Overall, H4 and H6 are supported, H5, H7, and H8 are partially supported, and H1, H2, and H3 are not supported. The statistically significant findings for H1 and H2 are in directions opposite to those predicted, although the negative association between business acumen and revenue is not consistent across all alternative specifications.

5.4 Practical Implications

The implications of this study are framed as considerations rather than prescriptions. The cross-sectional design identifies associations rather than causal effects, and the non-probability sample may not represent all private chiropractic practices in Aotearoa New

Zealand and Australia. The discussion is organised by audience, beginning with current and prospective practice owners, followed by educators and providers of business education, and then coaching providers and professional bodies.

For current and prospective practice owners, an important implication is that revenue, operating expenses, and net profit should be monitored as related but distinct financial outcomes. Greater regular visit volume and clinical capacity are associated with higher revenue, but they are also associated with higher operating expenses and are not consistently associated with higher net profit. Growth in activity or capacity should therefore not be evaluated using revenue alone. Owners considering additional clinical hours, practitioners, premises, or services may benefit from assessing the additional revenue expected, the accompanying change in operating costs, and the resulting contribution to net profit.

Regular visit price is more clearly associated with revenue than with net profit or operating expenses in the primary ordered logistic analysis. This suggests that pricing decisions may be relevant to revenue performance, although the study does not establish that increasing fees would improve financial outcomes. The association is also not reproduced in the supplementary OLS models. Higher prices may affect affordability, demand, and patient access. Where third-party contributions apply, owners must also consider the interaction between those contributions, patient co-payments, and private-pay services.

Patient Visit Average is positively associated with revenue, but not with net profit, in the alternative ordered logistic specification. This finding should not be interpreted alone as support for increasing the number of visits recommended to patients. PVA is a practice-level measure of visit patterns rather than clinical quality or appropriateness and may reflect patient needs, case complexity, adherence, maintenance care, or subsequent periods of care. Its practical value is therefore as one component of understanding regular visit activity relative to new-patient inflow, alongside measures of clinical outcomes, patient experience, and appropriateness of care.

The administrative support findings are among the most practically relevant in the study. Staff administrative hours are positively associated with revenue and net profit, while their association with operating expenses is not statistically significant in the full ordered logistic models. The absence of a statistically significant expense association does not mean that administrative staffing carries no cost. Rather, the findings are consistent with the possibility that administrative support helps practices use clinical capacity more effectively through

scheduling, billing, patient communication, and other non-clinical functions. Owners considering additional support may therefore benefit from evaluating whether administrative staffing allows clinicians to devote more time to appropriate clinical work or improves the efficiency of practice operations. However, the study does not establish that increasing administrative hours will improve profitability, and larger or more profitable practices may simply be better able to employ support staff.

The marketing findings highlight the value of evaluating expenditure against measurable outcomes. Marketing spend is consistently associated with higher operating expenses and lower net profit. It is positively associated with revenue in some earlier specifications but is not significantly associated with revenue in the main full specification or its variants.

These findings do not show that marketing is ineffective. The study does not measure campaign quality, channel-level expenditure, timing, lead quality, conversion rates, or longer-term returns. Nevertheless, the results suggest that expenditure alone should not be treated as evidence of effective marketing. Practice owners may benefit from monitoring enquiries, new patients, acquisition costs, conversion rates, subsequent service use, and attributable revenue when assessing individual campaigns or channels.

New-patient volume is not significantly associated with the financial outcomes in the multivariable models, whereas regular visit volume and PVA are associated with revenue in the relevant specifications. New-patient counts may therefore provide an incomplete indication of financial performance. Owners may gain a clearer understanding by considering new-patient acquisition alongside the services subsequently delivered, capacity utilisation, revenue generated, and the costs of acquiring and caring for those patients. These measures should be interpreted within clinical and ethical requirements rather than used solely to maximise visit volume.

For educators and providers of business education, the negative association between formal business education and net profit should not be interpreted as evidence that education reduces performance. Owners may undertake education in response to existing financial or managerial difficulties, and the formal education category combines programmes that may differ in content, depth, timing, and relevance to chiropractic practice ownership. The result therefore cannot be attributed to any specific qualification or programme.

Nevertheless, the study does not support the expectation that formal business education, as measured here, is positively associated with stronger financial performance. Together with

concerns in the chiropractic literature about preparation for practice ownership (Ciolfi et al., 2021; Ciolfi & Kasen, 2017; Gleberzon, 2022), this finding supports closer examination of both the content and application of business education. Programmes may benefit from emphasising applied financial interpretation, capacity planning, staffing decisions, pricing, marketing evaluation, and the distinction between revenue growth and profitability. Evaluation should also consider whether participants apply the knowledge gained rather than measuring participation in education alone.

For coaching and professional development providers, the absence of a statistically significant association between coaching and the financial outcomes means that financial benefits cannot be assumed from the broad measure used in this study. The coaching variable does not distinguish between providers, content, duration, quality or intensity. Coaching may also contribute to outcomes not measured here, including wellbeing, confidence, leadership capability, or longer-term organisational change. Owners considering coaching for financial reasons may nevertheless benefit from establishing clear objectives, expected outcomes, and measures of progress before beginning an engagement. For professional bodies, these findings support a role in collating improved financial benchmarking information for members and encouraging providers to evaluate and report the outcomes of business education and coaching.

5.5 Strengths and Limitations

The interpretations above are shaped by the design and measures described in Chapter 3. This section considers the study's strengths and the limitations that qualify its findings. This study has several strengths. It generates chiropractic-specific, practice-level evidence from Aotearoa New Zealand and Australia, where previous evidence concerning financial performance has largely been descriptive or aggregated with other health services. Based on the literature reviewed in Chapter 2, the study provides an initial empirical basis for examining how owner, practice, and operational characteristics are associated with financial performance in Australasian chiropractic practices.

The study examines net profit, revenue, and operating expenses as related but distinct outcomes. This distinction proves important. Several characteristics associated with higher revenue are also associated with higher operating expenses but show no consistent association with net profit. Marketing spend, for example, is positively associated with operating

expenses and negatively associated with net profit in the full models. These differences could have been obscured if financial performance had been represented by a single outcome.

The analysis uses a benchmark specification, separate thematic extensions, full multivariable specifications, alternative operationalisations, and supplementary OLS models. This allows the characteristics and financial outcomes to be examined jointly rather than only at the bivariate level. It also enables the consistency of the findings to be considered across alternative measures of patient volume, visit patterns, and clinical capacity.

The study is guided by an integrated theoretical framework combining professional service firm theory, the resource-based view, the clinician-owner literature, and the input-throughput-output model. The framework informs variable selection and provides complementary perspectives for interpreting the relationships between professional labour, managerial capability, practice resources, service delivery, and financial outcomes.

These strengths should be considered alongside several limitations. The study uses a non-probability, voluntary-response sample recruited through professional associations, social media, professional networks, and snowball methods. The findings may therefore not generalise to all chiropractic practices in either country. Owners who are more engaged with professional networks, more interested in business management, or more comfortable disclosing financial information may have been more likely to participate. The direction and extent of any resulting selection bias cannot be determined.

The financial and operational data are self-reported by a single respondent from each practice. The study does not access tax returns, accounting systems, bank records, or independently verified practice records. Reporting errors, recall errors, rounding, and differences in interpretation cannot therefore be excluded. The use of the same respondent for both the predictor and outcome variables also creates the possibility of common method bias, particularly for self-assessed characteristics such as business acumen.

The financial outcomes are constructed by combining exact, approximate, and bracketed responses into ordered categories. This approach retains responses from owners who are unable or unwilling to provide exact figures, but it reduces the precision of the financial information. Practices with materially different financial results may be placed within the same category, while relatively small differences around category thresholds may place otherwise similar practices into different categories.

The financial categories are also reported in the local currencies of Aotearoa New Zealand and Australia. Although the analysis includes a country indicator to account for average differences between the two national samples, this does not make the monetary thresholds economically equivalent across countries. Exchange rates, purchasing power, labour costs, property costs, and other differences in national cost structures may therefore affect the comparability of the financial categories.

Reported net profit may not be fully comparable across practices because owners may differ in how they remunerate themselves and account for owner compensation. Although the survey provides a definition of net profit and instructs respondents to add back shareholder salary where relevant, practices may use different combinations of salary, drawings, and dividends. Differences in accounting treatment and owner interpretation may therefore have influenced the reported figures.

Several predictor variables are also measured broadly. Formal business education combines courses and qualifications that differ in level, duration, content, timing, and relevance to practice ownership. Coaching is measured according to whether an owner has ever worked with a business coach or practice-management consultant and does not capture recency, duration, intensity, provider, content, or quality. Marketing spend is measured using ordered annual categories and does not identify expenditure by channel, campaign timing, or attributable return. These broad measures may obscure meaningful differences within each category.

Patient Visit Average is calculated at the practice level as annual regular or follow-up visits divided by annual new patients. It does not track individual patients or distinguish between visit frequency, length of care, maintenance care, case complexity, or subsequent periods of care for new health concerns. PVA should therefore be interpreted as a proxy for practice-level visit patterns rather than as a direct measure of patient retention, clinical quality, or appropriateness of care.

Business acumen is measured using an 11-item self-assessment scale developed for this study. The scale demonstrates good internal consistency, but it has not been externally validated against observed managerial behaviour, objective business knowledge, or independently assessed capability. The measure may therefore reflect owners' confidence, self-awareness, or standards of comparison as well as underlying differences in business capability. Its

associations should be interpreted as relating to self-rated business acumen rather than a fully validated measure of managerial capability.

Complete-case analysis is used, and item-level non-response reduces the model samples to approximately 68 to 74 practices. Missingness may not be random, as owners with weaker records, more complex practices, or greater concerns about financial disclosure may be less likely to answer particular questions. The reduced samples also limit statistical power, increase uncertainty around the coefficient estimates, and constrain the number of predictors that can be included without producing unstable models.

The estimation samples also differ across some specifications because the substituted variables have different patterns of missing data. Changes in coefficients or statistical significance across models may therefore reflect differences in both model specification and sample composition. Comparisons across models with different numbers of observations cannot isolate the effect of adding or replacing particular variables.

The OLS models provide a useful supplementary consistency check using the same underlying outcome information, but they require the ordered financial categories to be treated as approximately continuous. Although the middle categories of each outcome measure use near equal-width bands, the lowest and highest categories are open-ended, and net profit also includes a separate zero-profit category. The scales are therefore not strictly interval. Consequently, the OLS coefficients provide only approximate changes across the financial categories and are not equivalent to estimates based on continuous dollar values. The ordered logistic models therefore remain the primary basis for inference.

The cross-sectional and correlational design prevents causal direction from being established. Reverse causality is plausible for several findings. For example, weaker profitability may encourage owners to seek education, coaching, or additional marketing, while larger, busier, or more profitable practices may be better able to employ administrative staff.

Finally, country is included as a contextual control, and some evidence suggests lower operating expenses among New Zealand practices. However, the study is not designed to identify the mechanisms underlying country differences. Specifications containing detailed regional controls could not be retained because the small numbers of practices within individual regions did not support stable estimation.

These limitations qualify the findings without removing their contribution. The study was designed as an initial practice-level examination of a topic for which little Australasian

evidence existed. Its contribution lies in identifying the associations observed in this sample, their directions, and their consistency across specifications, rather than in establishing precise or causal effects. The more consistent patterns, particularly the differing associations observed for revenue and net profit and the positive associations involving administrative support, provide a basis for future research using stronger designs to test and refine.

5.6 Chapter Summary

Together, the findings indicate that financial performance in this sample is more consistently associated with operational and capacity-related characteristics, administrative support, pricing, and marketing expenditure than with owner capability measures, practice structure, or geographic context. Greater regular visit volume and clinical capacity are associated with both higher revenue and higher operating expenses, reinforcing the importance of examining the three financial outcomes separately. Characteristics associated with higher revenue are not necessarily associated with higher net profit.

Net profit is associated with a narrower set of characteristics. Staff administrative hours are positively associated with net profit, while formal business education and marketing spend are negatively associated with it across the relevant full specifications. These findings require cautious interpretation because the cross-sectional design cannot establish causal direction, and the observed associations may reflect selection effects, measurement limitations, unmeasured confounding, or differences in practice organisation.

The hypotheses concerning clinical capacity and regular visit volume are supported, while those concerning administrative support, Patient Visit Average, and marketing spend are partially supported. The hypotheses concerning business acumen, business education, and coaching are not supported. The negative associations observed for business acumen and formal business education are opposite to the hypothesised directions, although the business acumen result is not consistent across all alternative specifications. Chapter 6 draws these findings together to answer the research question, identify the study's contribution, and outline priorities for future research.

Chapter 6: Conclusion

6.1 Answering the Research Question

The primary research question asks: What owner, practice, and operational characteristics are associated with financial performance in private chiropractic practices in Aotearoa New Zealand and Australia? The overall answer is that financial performance in this sample was more consistently associated with how care was organised, delivered, and supported than with the measured indicators of owner capability or most structural and geographic characteristics. The clearest associations concerned regular visit volume, available clinical capacity, administrative support, and marketing expenditure, while pricing and visit patterns showed more outcome-specific associations. The four subquestions are addressed briefly below, with the detailed evidence interpreted in Chapter 5.

For SQ1, none of the three hypothesised owner capability variables showed the expected positive associations. Formal business education was negatively associated with net profit, while self-rated business acumen was negatively associated with revenue in the main full specification and one alternative specification, but not in the other alternative specifications. Coaching showed no statistically significant associations. Owner gender, age, and the allocation of owner time between clinical and administrative work showed model-dependent or inconclusive patterns.

For SQ2, clinical capacity was positively associated with revenue and, less consistently, with operating expenses. Practice age of 11 years or more was positively associated with operating expenses, the New Zealand indicator was negatively associated with operating expenses in some specifications, and practice type and urban location showed no consistent associations.

For SQ3, regular visit volume was positively associated with revenue and operating expenses, staff administrative hours with revenue and net profit, and regular visit price and Patient Visit Average with revenue in the relevant specifications. Marketing spend was positively associated with operating expenses and negatively associated with net profit. New-patient volume and marketing breadth were not consistently associated with the outcomes, while the negative association between new-patient price and operating expenses remains exploratory.

For SQ4, the multivariable models show that several associations remained after owner, practice, and operational characteristics were considered together. However, each financial outcome had a different profile of associated characteristics, and net profit was associated with the narrowest set. The most consistent findings across the full ordered logistic and

supplementary OLS specifications were the positive associations of staff administrative hours with revenue and net profit, regular visit volume and clinical capacity with revenue, and marketing spend and practice age with operating expenses, together with the negative associations of marketing spend and formal business education with net profit. The positive association between regular visit price and revenue was confined to the ordered logistic models, while the evidence linking clinical capacity with operating expenses was less consistent.

Overall, the findings indicate that financial performance in this sample was more consistently associated with the organisation and operation of the practice than with the measured attributes of its owner. Higher revenue was most clearly associated with greater regular visit volume, clinical capacity, and administrative support; higher operating expenses with regular visit volume, clinical capacity, marketing expenditure, and practice age; and net profit with a narrower set of characteristics, particularly greater administrative support and lower marketing expenditure. In terms of the framework developed in Chapter 2, the clearest patterns concerned practice throughput and the administrative leverage supporting it, while the hypothesised positive associations for the owner capability measures were not observed.

6.2 Summary of the Contribution

This study makes four contributions corresponding to the gaps identified in Chapter 2. Empirically, based on the literature reviewed, it provides the first identified multivariable practice-level analysis to examine net profit, revenue, and operating expenses as separate outcomes in private chiropractic practices in Aotearoa New Zealand and Australia. It identifies the presence, direction, and consistency of associations within this sample while also indicating possible explanations that require testing through stronger research designs.

Methodologically, the study demonstrates the importance of examining net profit, revenue, and operating expenses as distinct outcomes. Characteristics associated with revenue are not necessarily associated with net profit, while some characteristics show different patterns across revenue and operating expenses. The study also presents a practical approach to combining exact, approximate, and bracketed financial responses into ordered outcomes where commercially sensitive financial information may otherwise be difficult to obtain. This approach retains responses that could not have been included using exact financial figures alone, although at the cost of reduced measurement precision.

Contextually, the study provides evidence from private chiropractic practices operating within the regulatory, funding, and market environments of Aotearoa New Zealand and Australia. Findings generated in other jurisdictions cannot necessarily be assumed to apply directly within these settings. The results also provide tentative evidence of a country difference in operating expenses, with New Zealand practices tending to fall within lower operating-expense categories in some specifications.

Theoretically, the study applies an integrated framework drawing on professional service firm theory, the resource-based view, the clinician-owner literature, and the input-throughput-output model. The findings are consistent with the professional service firm emphasis on professional labour and leverage. Revenue is positively associated with clinical capacity and regular visit volume, while administrative support is positively associated with both revenue and net profit (von Nordenflycht, 2010). These findings indicate that the amount of care delivered and the support surrounding its delivery are important to understanding financial performance in small professional practices.

The findings are also consistent with the input-throughput-output framework. Clinical capacity and regular visit volume are associated with both revenue generation and operating expenses, while fewer characteristics are consistently associated with net profit. This pattern illustrates the value of considering how practice resources and service delivery relate to both income and costs rather than assuming that greater activity will correspond with greater profitability (Katz & Kahn, 1966; Scott, 2003).

The findings do not support the specific expectations derived from the resource-based view that self-rated business acumen, formal business education, and coaching would be positively associated with financial performance. This does not show that owner capability is unimportant. Instead, it suggests that future applications of the resource-based view in this context should distinguish between possessing knowledge or participating in capability development and applying that capability through observable management practices and routines (Barney, 1991; Wernerfelt, 1984).

Finally, the findings are consistent with the clinician-owner literature's emphasis on the competing clinical and managerial demands placed on practice owners. Staff administrative support is positively associated with revenue and net profit, whereas owner administrative hours show no consistent associations. This pattern suggests that delegating administrative

work may help practices use clinical and managerial capacity more effectively, although the underlying process was not directly measured (Llewellyn, 2001; Noordegraaf, 2007).

6.3 Priorities for Future Research

Several priorities emerge from the findings and limitations of this study. Longitudinal research is needed to clarify the timing and possible direction of the observed associations. This is particularly important for marketing expenditure, business education, and coaching, where weaker performance may lead owners to seek additional support rather than the support producing weaker performance. Coaching could be examined by following practices before, during, and after an engagement and comparing their changes with those of otherwise similar practices that do not use coaching. Where feasible, quasi-experimental designs and repeated financial measurements would provide stronger evidence than a single cross-sectional comparison.

Future studies should also use more detailed and independently verifiable financial information where possible. Accounting-system exports, financial statements, or partnerships with accounting providers could reduce reliance on self-reported categories and provide more precise and comparable measures of revenue, operating expenses, and net profit. Greater consistency in the treatment of owner remuneration could also improve the comparability of net profit across practices.

Larger samples would improve statistical power and the precision of the estimates. They would also allow closer examination of regional and country differences, interactions between characteristics, non-linear relationships, and qualifications or educational pathways represented by only a small number of respondents in this study. Probability-based sampling would strengthen representativeness where a suitable sampling frame can be developed.

The negative associations involving formal business education and self-rated business acumen require closer examination. Future research should distinguish between qualification types, course content, duration, providers, timing, and the stage of an owner's career at which education is undertaken. It should also measure work outside the practice, as some highly qualified owners may divide their time between practice, teaching, consulting, research, or other professional roles. Combining self-assessment with tests of business knowledge, observed management practices, or independent assessment would help clarify what the business acumen measure captures and whether capability is translated into management behaviour.

The administrative support finding should also be examined in greater detail. Longitudinal and qualitative studies could explore how support staff affect scheduling, billing, patient communication, workflow, capacity utilisation, and the allocation of clinician and owner time. This would help determine whether administrative support contributes to improved financial performance, whether stronger practices are simply better able to employ support staff, or whether both processes operate together.

More detailed research is also needed on marketing expenditure and effectiveness. Future studies could distinguish expenditure by channel, campaign timing, target audience, lead quality, conversion rate, acquisition cost, attributable revenue, and the period over which returns are assessed. This would help determine whether the observed negative association with net profit reflects ineffective expenditure, delayed returns, selection into marketing by weaker-performing practices, or differences in campaign execution.

Finally, the approach used in this study could be applied in other small private healthcare sectors in Australasia, including physiotherapy, osteopathy, podiatry, and dentistry. Comparative research would help establish which findings are specific to chiropractic practice and which reflect the broader organisation and economics of small clinician-owned healthcare businesses. Replication in larger chiropractic samples is also needed before the present findings can be treated as established patterns.

6.4 Concluding Statement

This thesis set out to identify which owner, practice, and operational characteristics are associated with the financial performance of private chiropractic practices in Aotearoa New Zealand and Australia. Its central conclusion is that, within this sample, financial performance was most consistently associated with how care was organised, delivered, and supported. The clearest patterns concerned regular visit volume, clinical capacity, administrative support, pricing, and marketing expenditure, with revenue, operating expenses, and net profit showing distinct profiles of associated characteristics.

The hypothesised positive associations involving self-rated business acumen, formal business education, and coaching were not observed. These findings do not establish that owner capability is financially unimportant. Rather, they leave unresolved how capability is best measured, when its effects may become evident, and whether knowledge and support are translated into management practices within the business.

The contribution of this thesis lies in providing an initial multivariable, practice-level analysis of net profit, revenue, and operating expenses in Australasian chiropractic. It adds empirical evidence to a literature that has largely been descriptive, indirect, or focused on practitioner income rather than practice-level financial outcomes. In doing so, it provides practice owners, educators, professional bodies, and future researchers with a set of specific associations that can be examined and refined through further research.

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Appendix A: Survey Instrument

Landing Page



Survey of Practice Characteristics and Profitability in Chiropractic Practice in Aotearoa New Zealand and Australia

SECTION 1: PARTICIPANT INFORMATION SHEET & CONSENT

Participant Information Sheet

Invitation

You are invited to participate in a research project exploring the relationship between practice characteristics and profitability in private chiropractic practices across New Zealand (NZ) and Australia (AU).

The survey should take approximately 10-15 minutes to complete.

Purpose

This research aims to identify which practice characteristics are associated with practice profitability. There is currently very limited, if any, research examining the profitability of different practice characteristics in an NZ/AU context. The findings of this project will provide evidence-informed guidance for chiropractic practice management and chiropractic business education. The results will be published in a master's thesis. They may also be shared through professional associations, published in academic journals, and presented at conferences.

Eligibility

To ensure the information obtained contributes to the aims of the study, we would like to invite you to take part in our research if you meet the following criteria:

- Owner or part-owner of a chiropractic practice in New Zealand or Australia
- The practice was operating during the 2024-2025 financial year

Project Procedures

If you agree to participate, you will complete an anonymous online survey taking approximately 10-15 minutes. You will be asked about:

- Characteristics of the practice (type, location, size)
- Characteristics as an owner and/or chiropractor
- Self-assessment of your business management knowledge and skills
- Practice operations (marketing, patient numbers, fees)
- Practice financial performance

Your Rights, Anonymity, Confidentiality & Data Management

- This survey is completely anonymous, your participation is entirely voluntary, and you are under no obligation to accept this invitation.
- If you decide to participate, you may stop at any time before submitting the survey
- Once submitted, responses cannot be withdrawn (due to anonymity)
- Only aggregated results will be reported
- All data will be stored securely
- Data will be retained for a maximum of 5 years, then destroyed
- You can ask questions about the research at any time

Project Contact Information

Lead Supervisor: Dr Vasudha Rao, MBA, PhD - v.rao@massey.ac.nz

This project has been evaluated by peer review and judged to be low risk. Following review by a Massey University Ethics Advisor and Chair of the Ethics Chairs' Committee, the project has been approved. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the ethical conduct of this research that you want to raise with someone other than the researcher(s), please contact Massey University Human Ethics by email: humanethics@massey.ac.nz.

Participant Consent Form

By clicking "I Agree" below, you confirm that:

- You have read, and you understand the Participant Information Sheet (above)
- You understand participation is voluntary, and that you may withdraw from the study up until survey submission
- You understand the survey is anonymous
- You understand that you may ask further questions at any time
- You are 18 years of age or older

- You consent to participate in this research

○ I agree - I consent to participate in this research project under the conditions set out in the Patricipant Information Sheet

○ I do not agree - I do not wish to participate in this research project

SECTION 2: ELIGIBILITY SCREENING

Do you own or partly own a chiropractic practice in New Zealand or Australia?

It is preferred that you answer for one physical practice location per survey response. If you can report figures separately for other locations (or a different country), please submit additional responses using the same starting survey link. If you cannot separate figures, you may provide consolidated figures across locations.

○ Yes, in New Zealand only

○ Yes, in Australia only

○ Yes, in both New Zealand and Australia

○ No

For this survey response, please answer all remaining questions with one country and practice location in mind. If you cannot separate figures, you may provide consolidated figures across locations.

Which country will you report on for this survey response?

- ○ New Zealand
- ○ Australia

Was the practice in New Zealand operating during the 2024-2025 financial year? (1 April 2024 to 31 March 2025)

- ○ Yes
- ○ No

Was the practice in Australia operating during the 2024-2025 financial year? (1 July 2024 to 30 June 2025)

- ○ Yes
- ○ No

SECTION 3: PRACTICE CHARACTERISTICS

How many physical practice locations does your business operate?

- ○ 1

- ○ 2
- ○ 3
- ○ 4 or more

Can you report the financial and operational figures in this survey for one physical practice location only (separately from your other locations)?

It is preferred that you answer for one physical practice location per survey response. If you can report figures separately for other locations (or a different country), please submit additional responses using the same starting survey link. If you cannot separate figures, you may provide consolidated figures across locations.

- ○ Yes, I can report for one location separately
- ○ No, I can only report combined figures across locations

For this survey response, please answer all remaining questions with one physical practice location in mind. If you are able report separately for other locations, please submit additional responses using the same starting survey link

How many physical practice locations are included in the combined figures you will report in this survey response?

- ○ 2
- ○ 3
- ○ 4 or more

What best describes the practice location(s)? (select all that apply)

- ☐ City
- ☐ Suburb
- ☐ Small town
- ☐ Rural
- ☐ Remote

In what region(s) is the practice located? (select all that apply)

- ☐ Northland
- ☐ Auckland
- ☐ Waikato
- ☐ Bay of Plenty
- ☐ Gisborne
- ☐ Hawke's Bay
- ☐ Taranaki
- ☐ Manawatū-Whanganui
- ☐ Wellington / Greater Wellington
- ☐ Tasman
- ☐ Nelson

- [ ] Marlborough
- [ ] West Coast
- [ ] Canterbury
- [ ] Otago
- [ ] Southland
- [ ] Prefer not to say

If Australia, what state/territory is the practice located? (select all that apply)

- [ ] Australian Capital Territory
- [ ] New South Wales
- [ ] Northern Territory
- [ ] Queensland
- [ ] South Australia
- [ ] Tasmania
- [ ] Victoria
- [ ] Western Australia

Which of the following best describes the practice type?

- ○ Solo chiropractor - A practice with one chiropractor who is the only clinical provider
- ○ Multiple chiropractors - A practice with two or more chiropractors, and no other types of non-chiropractic health professionals
- ○ Multidisciplinary - A practice where one or more chiropractors work alongside other non-chiropractic health professionals

○ Other (please specify)

How many chiropractors (including yourself if you are a chiropractor) work at the practice?

In a typical week, approximately how many total hours of patient care are provided by all chiropractors in the practice combined (including your own clinical hours)?

In a typical week, approximately how many hours do you PERSONALLY spend providing patient care (clinical contact hours)?

How many other non-chiropractic health professionals work at the practice?

This is EXCLUDING ALL chiropractors

In a typical week, approximately how many total hours of patient care are provided by all non-chiropractic health professionals in the practice combined?

This is EXCLUDING ALL chiropractors

Approximately how many years has the practice been in operation?

If you took over the practice from a previous owner, please select the range that best reflects when the practice was first opened.

- [ ] Less than 1 year
- [ ] 1-2 years
- [ ] 3-5 years
- [ ] 6-10 years
- [ ] 11-20 years
- [ ] More than 20 years

SECTION 4: CHIROPRACTOR OWNER CHARACTERISTICS

Are you currently registered as a chiropractor in New Zealand and/or Australia? (select all that apply)

- ☐ Yes - I am currently a registered chiropractor in New Zealand
- ☐ Yes - I am currently registered as a chiropractor in Australia
- ☐ No

In which year did you complete your chiropractic qualification?

In a typical week during the 2024/2025 financial year, approximately how many hours do you PERSONALLY spend on practice management, administrative tasks, or other business operations (non-clinical work)?

Excluding yourself, in a typical week during the 2024/2025 financial year, approximately how many total

hours are spent on administrative or support tasks by all non-clinical staff in the practice?

e.g., Chiropractic Assistants, reception, practice management, or other office support roles

SECTION 5: BUSINESS ACUMEN SELF-ASSESSMENT

The following is a short self-assessment of your current business knowledge and skills.

Please indicate your level of agreement with each statement, using a scale from:
1 = Strongly disagree
2 = Disagree
3 = Neither agree or disagree
4 = Agree
5 = Strongly agree

There are no right or wrong answers.

	1 = Strongly disagree	2 = Disagree	3 = Neither agree or disagree	4 = Agree	5 = Strongly agree
I can interpret my practice's profit & loss and balance sheet statements to make decisions	○	○	○	○	○

	1 = Strongly disagree	2 = Disagree	3 = Neither agree or disagree	4 = Agree	5 = Strongly agree
I can prepare and manage an annual practice budget	○	○	○	○	○
I can forecast cash flow and adjust plans when needed	○	○	○	○	○
I can develop an effective marketing plan to attract a consistent flow of new patients	○	○	○	○	○
I know how to measure whether my marketing is working	○	○	○	○	○
I can set up systems and processes that help my practice run smoothly	○	○	○	○	○
I can identify operational issues and implement improvements	○	○	○	○	○
I can set clear business goals and translate them into action plans	○	○	○	○	○
I can review performance against goals on a regular schedule (e.g., weekly/monthly)	○	○	○	○	○
I can recruit the right team members to meet the needs of my practice	○	○	○	○	○

	1 = Strongly disagree	2 = Disagree	3 = Neither agree or disagree	4 = Agree	5 = Strongly agree
I can support and manage team members to improve their performance	○	○	○	○	○

Do you currently work with, or have you worked ever with, an external business coach or practice management consultant?

- ○ Yes, currently working with a coach/consultant
- ○ Yes, worked with a coach/consultant in the past
- ○ No, never worked with a coach/consultant

Have you completed any other formal business education or training? (select all that apply)

- ☐ PhD
- ☐ Masters (Non-MBA)
- ☐ MBA
- ☐ Business management courses (university level)
- ☐ Practice management workshops/seminars
- ☐ Online business courses
- ☐ Chiropractic college business courses
- ☐ No formal business education

☐ _____ Other (please specify)

SECTION 6: PRACTICE MANAGEMENT & OPERATIONS

During the 2024/2025 financial year, what were the primary marketing and patient acquisition methods of the practice? (Select all that apply)

- ☐ Word of mouth referrals
- ☐ Website / Search engine optimisation (SEO)
- ☐ Social media (non-paid)
- ☐ Google Ads
- ☐ Facebook Ads
- ☐ Spinal Screenings
- ☐ Health Talks
- ☐ Print advertising (newspapers, magazines, directories)
- ☐ Sponsorships
- ☐ _____ Other (please specify)

Approximately how many NEW patients did the practice see from 1 April 2024 and 31 March 2025?

Approximately how many NEW patients did the practice see from 1 July 2024 to 30 June 2025?

Approximately how many patient visits (excluding new patient visits) did the practice see in total from 1 April 2024 to 31 March 2025?

*This includes all visits **except** NEW PATIENT visits*

Approximately how many "regular/follow-up" visits (excluding new patient visits) did the practice see in total from 1 July 2024 to 30 June 2025?

*This includes all visits **except** NEW PATIENT visits*

During the 2024/2025 financial year, what was the fee for an ADULT private NEW PATIENT without x-rays visit to a chiropractor at the practice?

- ○ Less than $70
- ○ $70-$89
- ○ $90-$109
- ○ $110-$129
- ○ $130-$149
- ○ $150 or more

During the 2024/2025 financial year, what was the fee for an ADULT private "regular/follow-up" visit to a chiropractor at the practice?

This is not for a report of findings (ROF) or progress visit if it differs from your "regular/follow-up" visit fee

- ○ Less than $40
- ○ $40-$49
- ○ $50-$59
- ○ $60-$69
- ○ $70-$79
- ○ $80-$89
- ○ $90-$99
- ○ $100 or more

SECTION 7: FINANCIAL PERFORMANCE

The following questions ask about the practice's financial performance. All information is anonymous and will only be reported in aggregate.

This data is essential for understanding which practice characteristics are associated with profitability.

We understand that exact figures may be difficult to access. If you are unable to provide specific numbers, please select the range that best estimates the practice's performance in the 2024-2025 financial year.

All responses are strictly confidential.

How would you prefer to answer the practices net profit?

- ○ I prefer to provide an approximate or exact number
- ○ I prefer to select a range (e.g., $100,000-199,999)

Approximately what was the net profit of the practice in the 2024-2025 financial year?

Net profit before tax = total revenue - total operating expenses. You can usually find this figure on your

profit and loss statement.

Please add back any shareholder salary to the net profit if it is listed as a deduction in your operating expenses.

Example: If your total revenue was 700,000 and your operating expenses were 520,000, and you paid yourself 80,000 as shareholder salary but this appears as an expense on your P&L, then:

Net profit = 700,000 - 520,000 + 80,000 = 260,000

Please also remove any $ sign or commas from your response.

Approximately what was the net profit of the practice in the 2024-2025 financial year?

Net profit before tax = total revenue - total operating expenses. You can usually find this figure on your profit and loss statement.

Please add back any shareholder salary to the net profit if it is listed as a deduction in your operating expenses.

Example: If your total revenue was 700,000 and your operating expenses were 520,000, and you paid yourself 80,000 as shareholder salary but this appears as an expense on your P&L, then:

Net profit = 700,000 - 520,000 + 80,000 = 260,000

- ○ More than -$100,000 loss
- ○ -$99,000 to -$50,000
- ○ -$49,999 to -$1
- ○ $0 (Break Even)

- ○ $1-$49,999
- ○ $50,000-$99,999
- ○ $100,000-$149,999
- ○ $150,000-$199,999
- ○ $200,000-$249,999
- ○ $250,000-$299,999
- ○ $300,000-$349,999
- ○ $350,000-$399,999
- ○ $400,000 or more

How would you prefer to answer the practice's total revenue/sales?

- ○ I prefer to provide an approximate or exact number
- ○ I prefer to select a range (e.g., $100,000-199,999)

Approximately how much total revenue/sales did the practice generate in the 2024-2025 financial year?

Note: Please remove any $ sign or commas from your response.

Approximately how much total revenue/sales did the practice generate in the 2024-2025 financial year?

- ○ Less than $100,000
- ○ $100,000-$199,999
- ○ $200,000-$299,999
- ○ $300,000-$399,999
- ○ $400,000-$499,999
- ○ $500,000-$599,999
- ○ $600,000-$699,999
- ○ $700,000-$799,999
- ○ $800,000-$899,999
- ○ $900,000-$999,999
- ○ $1,000,000 or more

How would you prefer to answer the practice's total operating expenses?

- ○ I prefer to provide an approximate or exact number
- ○ I prefer to select a range (e.g., $100,000-199,999)

Approximately what were the practice's total operating expenses for the 2024-2025 financial year?

You can usually find this figure on your profit and loss statement.

Do not include the following items:

- *Any owner's salary, drawings, or dividends*
- *Loan repayments*

- *Interest on loans*
- *Income taxes*
- *GST*
- *Depreciation and amortisation*

(Include all other running costs.)

Note: Please remove any $ sign or commas from your response.

Approximately what were the practice's total operating expenses for the 2024-2025 financial year?

You can usually find this figure on your profit and loss statement.

Do not include the following items:

- *Any owner's salary, drawings, or dividends*
- *Loan repayments*
- *Interest on loans*
- *Income taxes*
- *GST*
- *Depreciation and amortisation*

(Include all other running costs.)

○ Less than $100,000

- ○ $100,000-$199,999
- ○ $200,000-$299,999
- ○ $300,000-$399,999
- ○ $400,000-$499,999
- ○ $500,000-$599,999
- ○ $600,000-$699,999
- ○ $700,000-$799,999
- ○ $800,000-$899,999
- ○ $900,000-$999,999
- ○ $1,000,000 or more

How would you prefer to answer your practices total marketing spend?

- ○ I prefer to provide an approximate or exact number
- ○ I prefer to select a range (e.g., $100,000-199,999)

Approximately what was the practice's total marketing spend for the 2024-2025 financial year?

Note: Please remove any $ sign or commas from your response.

Approximately what was the practice's total marketing spend for the 2024-2025 financial year?

- ○ Less than $10,000
- ○ $10,000-$19,999
- ○ $20,000-$29,999
- ○ $30,000-$39,999
- ○ $40,000-$49,999
- ○ $50,000-$59,999
- ○ $60,000-$69,999
- ○ $70,000-$79,999
- ○ $80,000-$89,999
- ○ $90,000-$99,999
- ○ $100,000-$109,999
- ○ $110,000-$119,999
- ○ $120,000-$129,999
- ○ $130,000-$139,999
- ○ $140,000-$149,999
- ○ $150,000 or more

SECTION 8: DEMOGRAPHICS

What gender do you identify as?

- ○ Male
- ○ Female
- ○ Non-binary

- ○ [ ] Prefer to self-describe
- ○ Prefer not to say

What is your age group?

- ○ Under 30
- ○ 30-39
- ○ 40-49
- ○ 50-59
- ○ 60 or over
- ○ Prefer not to say

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Appendix B: Ethics Documentation

TE KUNENGA KI PŪREHUROA | MASSEY UNIVERSITY
UNIVERSITY OF NEW ZEALAND

10/11/2025

Dear: Jesse Cleave

Re: Low Risk Approval - 4000031407 - An Investigation of the Relationship Between Practice Characteristics and Profitability in Private Chiropractic Practices in Aotearoa New Zealand

Thank you for submitting a low risk application for your research/teaching/evaluation.

This email is to acknowledge receipt of the low risk application which has been approved. The details of your project will be included in the annual reports to the Health Research Council Ethics Committee (HRCEC) and the Massey University Research Committee (URC).

The low risk approval for this project is valid for a maximum of three years.

Please notify me if changes occur which cause you to reconsider your initial ethical analysis or project as outlined in the low risk application.

Please include the following statement on all public documents (e.g., information sheet, consent form) related to your project:

> ***This project has been evaluated by peer review and judged to be low risk. Following review by a Massey University Ethics Advisor and Chair of the Ethics Chairs' Committee, the project has been approved. The researcher(s) named above are responsible for the ethical conduct of this research.***
>
> ***If you have any concerns about the ethical conduct of this research that you want to raise with someone other than the researcher(s), please contact Massey University Human Ethics by email: humanethics@massey.ac.nz.***

I wish you all the best in your research, teaching or evaluation activities and appreciate your thoughtful consideration of ethical principles and practices.

Ngā mihi nui,



Professor Tracy Riley
Acting Chair, Research Ethics Chair's Committee

Research Ethics, Graduate Research School and Ethics
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand
E humanethics@massey.ac.nz; animalethics@massey.ac.nz
www.massey.ac.nz/research/ethics

Appendix C: Variable Labels and Descriptions

Variable	*Description*	*Survey item*
Dependent variables		
Net profit category	Annual practice net profit for the 2024-2025 financial year, recorded as an exact figure (Q37) and/or as a bracketed band (Q38), then combined into a single 13-category ordinal scale from a loss of more than $100,000 to $400,000 or more.	Q36-Q38
Revenue category	Annual practice revenue, taken from the exact figure (Q40) and/or the bracketed band (Q41), then combined into an 11-category ordinal scale from less than $100,000 to $1,000,000 or more.	Q39-Q41
Operating expenses category	Annual operating expenses, taken from the exact figure (Q43) and/or the bracketed band (Q44) then combined into an 11-category ordinal scale identical in bands to revenue.	Q42-Q44
Independent variables		
Owner age group	1 = under 30; 2 = 30-39; 3 = 40-49; 4 = 50 or over (combining 50-59 and 60 or over for analysis).	Q49
Business acumen (composite)	Mean of 11 self-rated Likert items covering financial, marketing, operations, and people-management capability. Higher values indicate greater self-assessed business capability.	Q25
Business education	0 = none or experience only; 1 = informal (practice-management workshops/seminars, online business courses); 2 = formal (PhD, Master's, MBA, university or chiropractic-college business courses).	Q27
Total clinical hours (chiropractors)	Total weekly patient-care hours provided by all chiropractors at the practice (including the owner) in a typical week.	Q16
Owner clinical hours/week	Total weekly patient-care hours provided by the owner chiropractor in a typical week.	Q17
City location	1 = main-city location; 0 = suburban, small town, rural, or remote location.	Q11
Ever worked with a coach	1 = currently or previously worked with an external business coach or practice-management consultant; 0 = never.	Q26
Male owner	1 = male; 0 = female.	Q48
New Zealand practice	1 = New Zealand; 0 = Australia.	Q4
Practice age 11+ years	1 = practice operating for 11 years or more; 0 = less than 11 years. Binary recoding of practice age used in the regression models.	Q20
Suburb location	1 = suburban location; 0 = main-city, small town, rural, or remote location.	Q11
Urban location	1 = city or suburban location; 0 = small town, rural, or remote location. Combined indicator used in the regression models.	Q11
Financial acumen	Mean of the three financial self-assessment items.	Q25_1-Q25_3
New patients (log)	Natural log of the number of new patients seen in the financial year (New Zealand Q29 and Australia Q30 combined).	Q29, Q30
Patient Visit Average (log)	Natural log of Patient Visit Average (regular or follow-up visits divided by new patients over the same period). Used in Model 5c.	Q29-Q32
Regular visits (log)	Natural log of the number of regular/follow-up visits (excluding new-patient visits) in the financial year (New Zealand Q31 and Australia Q32 combined).	Q31, Q32
Marketing acumen	Mean of the two marketing self-assessment items.	Q25_4-Q25_5
Marketing breadth (channels)	Count of distinct marketing channels used during the year.	Q28
Marketing spend (category)	Annual marketing spend for the 2024-2025 financial year, taken from the exact figure (Q46) and/or the bracketed band (Q47), combined into a 16-category ordinal scale from less than $10,000 to $150,000 or more.	Q45-Q47
New patient price (category)	Fee category for an adult private new-patient visit without x-rays.	Q33
Number of chiropractors	Headcount of chiropractors working at the practice, including the owner.	Q15
Operations acumen	Mean of the four operations self-assessment items.	Q25_6-Q25_9
Owner admin hours/week	Hours the owner personally spends on practice management, administration, or other non-clinical business operations in a typical week.	Q23

Variable	*Description*	*Survey item*
Years since qualification	2025 minus the year the owner completed their chiropractic qualification.	Q22
People management acumen	Mean of the two people-management self-assessment items.	Q25_10-Q25_11
Practice age	1 = under 6 years; 2 = 6-10 years; 3 = 11 years or more.	Q20
Practice type	1 = solo chiropractor; 2 = multiple chiropractors; 3 = multidisciplinary.	Q14
Patient Visit Average	Regular or follow-up visits divided by new patients over the same period.	Q29-Q32
Region	Practice region (16 New Zealand regions and 8 Australian states/territories).	Q12, Q13
Regular visit price (category)	Fee category for an adult private regular or follow-up visit.	Q34
Staff admin hours/week	Total weekly administrative or support hours provided by all non-clinical staff, excluding the owner.	Q24