

**How do New Zealand companies use capital investment  
post-completion audits for organisational learning? An  
exploratory study**

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## **Abstract**

This exploratory research studies firstly the design setup of New Zealand's publicly-listed companies for post-completion auditing (PCA). It secondly researches the prima facie occurrence of organisational learning (OL) within the same companies.

Data was obtained from an online questionnaire and this study adopted a positivist stance, merely describing reality.

The findings are similar to those in Finland by Huikku (2009). New Zealand companies, like their Finnish counterparts lack PCA system elements of organisational memory (OM). There is some evidence of prima facie single-loop learning consequent from PCA report recommendations.

Post completion audits (PCAs) are intended to provide the 'feedback loop' in the capital investment decision-making process. This research aimed to discover the way(s) in which New Zealand companies use post-completion audits (PCAs) for organizational learning. Organizational learning (OL) is regarded as a primary reason for using PCAs and is important because companies can use it to improve future capital investment projects and processes. A survey was used to ascertain the uses of PCA in OL in NZX-listed public NZ companies. This study will add to the scant existing knowledge of how PCA information is used.

From this study, the occurrence of double-loop learning was not clearly evident, with a major obstacle being the exclusion of policies and practices from the focus of PCA reporting.

It is submitted that opportunities to research from this dissertation include the exclusion of policies and procedures from PCA which may preclude the potential for double-loop learning; the standardisation of PCA reporting as an accounting topic and the blatant absence of an organisational memory containing PCA reports and information from most companies.

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## **Attestation of Authorship**

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgments), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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## **Ethical Approval**

AUT University Ethics Committee (AUTEC) approved the ethics application for this research on 23 October 2013 per application number 13/282. See Appendix 4: Ethical Approval.

# Chapter 1: Introduction

This dissertation on capital investment post-completion auditing (PCA) in New Zealand aims to answer two research questions:

- (1) How prevalent is the usage of PCA within New Zealand's publicly-listed companies?
- (2) Is PCA used by these companies for single; and/ or double-loop learning?

A survey of publicly-listed New Zealand companies was conducted. The survey included an amalgamation of PCA design elements and OL questions. The findings then reported upon the respondent companies' PCA design conduciveness and the prima facie occurrence of OL within these companies stemming from a PCA report.

This chapter will first introduce the concept of capital investment projects, and then outline the place of post-completion auditing in that process and its linkage with organisational learning.

## Capital Investment Projects

Capital investments are long-term projects requiring significant funds (Northcott, 1992). By their very nature they are risky and inherently have uncertainty. The overarching purpose is to increase a business's overall wealth.

The commitment of significant funds enhances the seriousness of the outlay. The longer the investment horizon, the lower the ability to forecast outcomes with any certainty and the greater the variation between the timing, the quantum and the actual occurrence of cash flows.

Capital investments are some of the most important decisions that a business must make (Koch, Mayper, & Wilner, 2009). Therefore it is vital that they are based upon sound and accurate information because suboptimal decisions can lock a business into years of decline and it can be very costly to get rid of such loadstones<sup>1</sup>.

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<sup>1</sup> As an illustration, Air New Zealand's acquisition of Ansett New Zealand Ltd for around NZ\$1.3 billion dragged Air New Zealand to the edge of bankruptcy. It was bailed out by the New Zealand Government by a share issue of \$885 million (O'Sullivan, 2011).

Capital investments create wealth through a number of ways, such as replacement<sup>2</sup> (Chen, 2006; Dayanada, Irons, Harrison, Herbohn, & Rowland, 2002), research and development (R&D)<sup>3</sup> (Dayanada, Irons, Harrison, Herbohn, & Rowland, 2002), expansion<sup>4</sup> (Chen, 2006; Dayanada, Irons, Harrison, Herbohn, & Rowland, 2002), new products and services<sup>5</sup> (Dayanada, Irons, Harrison, Herbohn, & Rowland, 2002), and regulatory compliance (Chen, 2006). Other authors have used slightly different or overlapping classifications for projects from other perspectives (Chen, 2006; Mukherjee, 1988; Brewer, Gation, & Reeve, 1993).

Replacement is either a new asset which is substituted for an existing one and performs the same function as the old one, or a change in the way of operating (e.g. capital-labour substitution<sup>6</sup>). Either way, the core functionality of the capital investment remains unchanged. This type of capital investment is engaged in by all businesses, as no income-generating asset lasts forever.

Capital investment includes maintenance or modernisation of a business's existing capability and capacity. Expansionary projects increase the company's range of operations, geographically or by market share. New products and services are those made available on the market but not previously sold by the business. R&D projects search for novel products and services; these projects are exploratory because they acquire something that the company never before had.

Each of the above will have different inputs and levels of initial capital outlay and their goals will differ from project to project. Terminal cash flows will differ also, as replacement projects can often be sold if they later underperform, while R&D expenditures are usually lost if they are fruitless. Expansionary projects which fail can be sold at a discount as a going concern, or by individual asset if liquidated. The varying evaluation and degrees of sunk costs and irreversibility demonstrate the importance of correct decision-making.

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<sup>2</sup> Lion Breweries moving from Newmarket to East Tamaki in 2008 at a cost of \$250 million (Gibson, Brewer settles on East Tamaki, 2007).

<sup>3</sup> Living Cell Technologies' creation of a treatment for Parkinson's disease which is at the human testing phase in 2013 (Living Cell Technologies Limited, 2013).

<sup>4</sup> Fletcher Building Limited acquiring the Crane Group for A\$1.1 billion in (Gibson, Crane to lose head office in Sydney, 2011).

<sup>5</sup> Telecom (NZ) Limited's XT Mobile Network involving \$574 million and launched in 2009 (Telecom Media, 2009).

<sup>6</sup> Transpower Limited's capital-labour substitution of camcopters for foot inspections of power lines in 2013, saving \$4.2 million annually and costing \$1 million per camcopter drone (Bradley, 2013),

Hence capital investment is therefore engaged in by many companies – and on a larger scale by those companies listed on the NZX<sup>7</sup>. These larger companies in New Zealand must continually upgrade their technology and expand their capacity to supply both the domestic economy and their international markets. Additionally, facilities in place must be replaced over time as they wear out, expire and become obsolete.

At the barest and simplest, replacement and new products and services are invested in – these must be carried out for a business to survive (March, 2006a). Growing businesses will invest in expansionary projects. Technology companies will undertake extensive R&D. These latter are exploratory projects – for future prosperity and long-term survival (March, 2006a).

Initial cash flows are often the most significant, in nominal value, of the entire project. Once spent, the value of the underlying asset or income earning structure acquired becomes a sunk cost and can often be difficult to reverse or modify without loss of value or additional expenditure. Subsequent future cash flows become increasingly difficult to accurately predict the less proximate to the present they are. They become risky in regards to their timing, quantum and crystallisation. Additionally many non-financial considerations must also be met, such as output quality and quantity and access to resources and supply chains needed to operate the project.

### **The Scale of Capital Investment in New Zealand**

During the latest financial year, the 112 publicly listed companies on the New Zealand Exchange (NZX) spent a total of \$7.0 billion (investing cash outflows) on capital investment ending with a total non-current asset total of \$80.4 billion<sup>8</sup>. This represents an increase of 9.2% upon the opening value of non-current assets. .

### **Importance of Capital Investment to the New Zealand Economy**

Capital investment is needed to maintain and grow a business. Growth in business leads to increased investment, increased customer spending, increased government spending from additional revenues and increased export earnings. These expenditures contribute to national GDP, a measure of a nation's wealth and economic wellbeing. Generally, capital expenditure leads to a need for more labour, skilled and unskilled, benefitting a country's citizens and a population that is growing.

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<sup>7</sup> New Zealand Exchange.

<sup>8</sup> This calculation is based on a review of the online summary of financial statements for all NZX-companies, the latest available being either for the year-ended 2012 or 2013.

Suboptimal or failed investment leads to a contraction in business and a loss of confidence in models, people and the market. This loss of money makes the next capital-raising exercise more difficult and more expensive as shareholders require a higher rate of return for the risk, as do lenders. Suboptimal investment leads to a lag behind competitors, and performance evaluation becomes difficult.

The New Zealand Government's latest policy is also very supportive of capital investment, aiming for exports to be 40% of GDP in value by 2025 (Joyce & English, 2013). This can be achieved by an increase in capital investment of between 70% and 90% upon current levels in export industries. Currently, exports are valued at 30% of GDP (New Zealand Trade & Enterprise, n.d.).

Capital expenditure also serves a growing population who have additional needs and wants, provided for by additional production and outputs. More people also require access to services and employment.

However, capital investment decisions are not straightforward and present some significant challenges to businesses.

## **A Challenge with Capital Investment**

A major challenge with capital investment is to predict the future accurately. The longer into the future a business forecasts and predicts, the more new influential factors can, and often do, materialise.

Capital investments are evaluated financially by mapping out their lifecycle cash flows from commencement to termination<sup>9</sup>. The comparison between actual and proposed project outcomes results in variances, which are indicative of the degree to which planned results were incorrectly forecast. The ultimate goal of evaluations is to reduce variances as much as possible because, by doing so, confidence in capital investment proposals will be improved and optimal decision-making of the best projects can take place.

Variances are greatest with sales and initial outlay forecasts. In contrast, operating expenses, except personnel costs, are usually very accurately forecasted (Soares,

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<sup>9</sup> Cash flow evaluation methods include: Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PP), Real Options Net Present Value, Equivalent Annual Cost (EAC), Replacement-Chain Method (RCM), and Discounted Payback Period (DPP).

Coutinho, & Martins, 2007). These findings are the same regardless of industry and company size.

PCA evaluates the success or otherwise of a project with a focus on improving the performance of future decisions (Dobbins & Pike, 1980). Variances can be articulated, with significant ones focused upon for research into their reduction. Post-completion auditing is the tool through which this is done. Its place within the capital investment decision-making process is outlined below.

## **Capital Investment Decision-Making and Post-Completion Auditing**

### **The capital investment process**

This subsection will describe the capital investment process, the place of post-completion auditing within it, and then the linkage between post-completion auditing (PCA) and organisational learning.

Capital investment is carried out through a capital budgeting process. This was described by King (1975) in his seminal work on capital investments. He detailed six steps: triggering, screening, definition, evaluation, transmission and decision. After projects have been accepted, they enter into the execution phase (King, 1975). Recently, an additional stage has been added to the King (1975) model: post audit review (Harris, 1999a) (see Figure 1 on page 6, below):



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Figure 1 The Strategic Investment Appraisal Process (Harris, 1999a)

The DCF analysis & evaluation stage (*see* step 4 in Figure 1, above) is where the project is assessed for feasibility, both practical and economic. At this step, the project is being evaluated by a decision-making board of managers who have financial and non-financial information from the feasibility study on which to base their decision on whether to accept or reject the proposal.

The step 4 proposals are later compared with a project's actual results in the post-audit review (*see* step 7 in Figure 1, above). The feedback loops in Harris's (1999a) diagram contribute to executive knowledge adjustment, materialising in some form of learning.

## **Post-Completion Auditing**

Post-completion audit is defined as (CIMA, 2005, p. 60):

“... an objective, independent assessment of the success of a capital project in relation to [its] plan. [It covers] the whole life of the project and provides feedback to managers to aid the implementation and control of future projects.”

A post-completion audit (PCA) must therefore compare a project's actual results with those planned at the time of its acceptance. Only accepted capital investment projects can be post-completion audited, because they are the only projects for which actual results and outcomes are known.

There are three aspects to PCA: decision auditing, which gauges the efficacy of the stipulated process; commission auditing, which concerns the change in the initial outlay of funds; and implementation auditing, which is a performance evaluation of a project after it has commenced (Mills & Kennedy, 1990).

The purpose of PCA is to discover how closely proposals have reflected future reality. A PCA which incorporates the abovementioned three aspects will enable a firm to holistically assess not only the project under scrutiny but the process through which it was approved.

Variances take the form of either differences in monetary values (prices) or differences in quantities of physical or notional amounts (scope). PCA can articulate such differences.

The objective of PCA is that the closer the planned results match actual results, the better decision-making that can be made; that is, more optimal decision-making can take place. Decisions based upon inaccurate information and evaluations lead to lower profitability and lower overall attainment of strategic objectives.

When variances are reduced, organisational learning has occurred. What then, is organisational learning?

## **Organisational Learning**

Organisational learning is seen as a key benefit flowing from PCA (Huikku, 2008). This section will cover the literature on frameworks for organisational learning; then it will detail the scant literature on organisational learning linked to PCA.

Organizational learning (OL) is “the process by which individuals and the organization as a whole, develop and use their stock of knowledge” (Herbert, 2000, p. 69). OL enables the development of an organization’s intelligence; organisations pursue intelligence because it enables them to achieve improved business outcomes (March, 2006b). The use of PCA has the potential to support organizational learning because the information disseminated via the PCA report is a “prerequisite for effective knowledge transfer and sharing, and hence for [OL]” (Huikku, 2011, p. 1986).

Organisational learning is a flow concept which is a measure of the increment in the stock of knowledge within an organisation between two points in time (Bontis, Crossan, & Holland, 2002). Knowledge exists in an organisation and it is categorised in different ways. According to Sanchez and Heene (1997), OL includes know-how (practical), know-why (theoretical) and know-what (strategic). According to Whitehill (1997), OL also includes know-what (encoded), know-how (habitual) and know-why (strategic).

Argyris and Schön’s (1978) seminal work on organisational learning developed the theory of learning loops, of which they theorised two types: single-loop and double-loop. A ‘single-loop’ involves changing actions based upon results. A ‘double-loop’ involves revising and evaluating the beliefs underlying the actions which were taken. Double-loop learning benefits are seen as a major potential advantage of PCAs (Huikku, 2008) and should lead to “increased improvement and innovation” (DellaNeve & Pepperdine University, 2007).

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Figure 2 Learning Loops (Argyris & Schön, 1996)

A good example to explain the difference between these two types of learning loops is one involving an air conditioning thermostat (Argyris, 1991). Room temperature is set at a constant 23°C. When the thermostat records a temperature either above or below that value, it pumps out either cool or warm air to readjust the room temperature to 23°C. These actions are taken to achieve the result of constant room temperature. This is called single-loop learning – the actions are changed but the ideal result remains the same: a comfortable working room temperature. If the beliefs or ideals underlying such actions are then reviewed, actions themselves could change. For example, the room temperature could be set to remain within a comfortable band of between 21°C and 25°C. This could minimize the number of opposing pumping actions performed by the air conditioner, and reduce power consumption. An analysis of the results of the air conditioner system has led to changes in both the governing values of the system as well as the actions taken by the air conditioner. This is an example of double-loop learning.

In the diagram by Argyris and Schön (see Figure 2 above), when consequences match planned consequences, the objective has been achieved; however, when a mismatch occurs, then the feedback from knowledge of consequences is channeled into learning loops, which aim to improve the result for the next iteration of the actions. If results continue to be mismatched, then double-loop learning is engaged in to change the beliefs behind the actions in an attempt to achieve aims by a different means. In the case of the thermostat example (Argyris, 1991), this means accepting that a comfortable temperature for optimal performance can exist within a pre-determined range of temperatures, rather than at a fixed temperature as was the goal under a single-loop learning process.

An objective of this dissertation is to discover whether New Zealand publicly listed companies achieve single-loop and/ or double-loop learning.

In capital investment project evaluation, the beliefs, actions and results as nodes of learning loop must be identified. The following will apply to this research:

**Results** are: the assessment of the accuracy of project forecasts.

**Actions** are: the inputs into the evaluation models.

**Beliefs** are: the rationale for the application of the evaluation models for evaluating capital investments.

### **Structure of the Dissertation**

This dissertation is organized into six chapters. This first chapter has outlined the research topic. The second chapter is a literature review of the frameworks used in the survey. The third chapter explains the research methodology and the development of the survey instrument from the literature review. The fourth chapter reports the findings as they were collated. The findings are then explained and discussed in the fifth chapter. Finally, the study is concluded in the brief sixth chapter.

## **Chapter 2: Literature Review**

This chapter will present the literature review in two parts: post-completion auditing (PCA) and organisational learning (OL). These two sections will form the foundation for the research instrument, which is presented in Chapter 3.

### **Part A: Post-Completion Auditing (PCA)**

#### **The timing of PCA**

Azzone and Maccarrone (2001) classify PCAs according to the audits' *timing* in the capital project's lifecycle as either early, intermediate or final PCAs.

A whole-life PCA cannot be conducted with the view of reassessing the viability of a project or rescuing it, because a whole-life audit is conducted post-termination of the project. To know the progress of a planned capital investment project, one must audit the project either early or at an intermediate stage within its lifecycle.

#### **Conducting PCA after a project has stabilised**

This is consistent with Huikku's (2009) assertion that the PCA set-up most conducive to organisational learning is one which takes place once the project has stabilised. However, with a failing project, it is unlikely that it will have stabilised by the time an audit is needed. However, a PCA at this point is useful because it will enable the company to decide whether to rapidly take corrective action to mitigate the negative outcomes of the project or to abandon the project altogether.

Timing an audit to take place after a project has stabilised also confirms the purpose PCA: it is to provide feedback to managers to enable them to make better decisions about future capital investment projects for their company.

### **Part B: Organisational Learning (OL)**

The following contains a broad overview of literature on organisation learning, following by a focus on the seminal single-loop / double-loop learning model (Argyris & Schön, 1978).

Organizational learning (OL) is "the process by which individuals and the organization as a whole, develop and use their stock of knowledge" (Herbert, 2000, p. 69) and a learning organisation is "one which improves its knowledge and understanding of itself

and its environment over time, by facilitating and making use of the learning of its individual members.” (Galer & van der Heijden, 1992, p. 11). A company engages in OL by using the inputs from its personnel to improve its understanding of how to best use its own resources to optimise its performance in its operating environment. This research aims to find out what type(s) of OL occur and whether the companies surveyed are in fact learning from the PCA reports which they produce.

### **Benefits of organisational learning (OL)**

In Argyris and Schön’s (1978) seminal model of OL there are two ‘learning loops’ that are connected by actions. A single loop involves changing actions based upon results. A ‘double-loop’ involves revising and evaluating the beliefs underlying the actions which were taken. Double loop learning benefits are seen as a major potential advantage of PCAs (Huikku, 2008) and should lead to “increased improvement and innovation” (DellaNeve, 2007) Increased learning enhances an organization by enabling it to perform better through its use of resources. One aspect of this process is learning to make more from its current resources, i.e. *exploitation* (March, 2006a). Another aspect of learning is that of using new resources, including technology and know-how, i.e. *exploration* (March, 2006a).

Nonaka (1991) states that “knowledge is the one source of lasting competitive advantage” when the economic and business environment is uncertain. Developing knowledge involves both *articulation*, the “converting [of] tacit knowledge into explicit knowledge”, and *internationalization*, “using that knowledge to extend one’s own tacit knowledge base” (Nonaka, 1991, (p. 99).

Therefore, improvement of the organisation and creating a lasting competitive advantage are key benefits from acquiring knowledge, which is conducted through organisational learning.

### **Models of Organizational Learning**

Argyris and Schön (1978) identify two types of OL: single-loop learning (SLL) and double-loop learning (DLL). Organisations engage in both types to varying degrees, with DLL being a higher form of OL.

To further define Argyris and Schön’s (1978) model of learning loops, the optimal balance between exploitation (single loop) and exploration (double loop) has been

examined (March, 2006b). If organizations only engage in exploitation, they are maximizing the benefits of existing resources and this can only be taken so far. Without exploration, these resources in place become obsolete and the organization remains fixed in time. If organisations only engage in exploration, they run the risk of suboptimal use of current resources which are funding uncertain and risky exploration; if nothing is found, then the expenditure is lost and the organisation must fall back on to core operations for it to survive. An example of the application of March's (2006b) exploitation and exploration distinction could resemble the following scenario: an organisation is manufacturing typewriters in the 1980s. The organisation's personnel spend a lot of time perfecting this machine. However, they are ignoring an eminent emerging threat: the personal computer. It is vastly superior and is expected to have wide-ranging effects upon the labour force as well as paper consumption and printing inventories. If this organisation is fixated on perfecting the performance, accuracy and efficiency of the typewriter, then it will perish as it will no longer have a marketable product. However, if this organisation also look into personal computers and sees the advantage of them over their fast becoming obsolete product, they will be exploring the opportunity to profit from an entirely new type of superior substitute.

All organisations are inanimate fictions which rely upon people to operate and exist. It is through these individuals that an organisation acquires knowledge – the knowledge of its individuals is accumulated by the organisation. The organisation benefits from current individuals and will benefit into the future so long as individualised knowledge is somehow captured and becomes part of the organisation itself. Kim (1993) has created a model which combines together individual and organizational learning (*see* Figure 3 on page 14, below). In this model, the invisible bridge between individual learning and organizational learning is identified, clearly indicating that for organizational double-loop learning to occur, this bridge must be built and maintained. Double-loop learning occurs when the individual's knowledge framework and the organisation's *weltanschauung*<sup>10</sup> interact, and when the organisation's routines mirror those of its individuals.

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<sup>10</sup> This is a German word meaning “a particular philosophy or view of life; the world view of an individual or group” (Oxford Dictionaries, 2013).



*This image has been removed by the author of this dissertation for copyright reasons.*

Figure 3 Kim's (1993, p. 44) Integrated Model of Organisational Learning: OADI-Shared Mental Models (SMM) cycle

Kim (1993) has also created a second model which clearly shows the barriers to learning in both the individual and organisational context (see Figure 4 on page 15, below).

*This image has been removed by the author of this dissertation for copyright reasons.*

Figure 4 Kim's (1993, p. 47) Incomplete Learning Cycles model

Kim's (1993) amalgamated model of various OL models aims to link individual learning with organizational learning. This linkage is still a 'black box' insofar as it is uncertain how OL is linked to individual learning. A second model also shows where learning disconnects occur in the learning process. These disconnects are defined as barriers to OL and exist in many different forms. Kim (1993) divided the different types of disconnects into "fragmented learning" and "opportunistic learning". Collectively, the various types of disconnects constitute "incomplete learning cycles" (Kim, 1993).

Single-loop learning in the Kim (1993) model occurs when individual actions are the manifestation of the organization's activities, and these actions are altered to improve

the organisation's results. Such cycles become obsolete in the presence of barriers, especially audience learning<sup>11</sup>.

Organizational learning can be detected when one observes a change in actions or beliefs, with the aim of improving results; in the case of capital investment, this change is an improvement in forecast accuracy, which reduces variances between actual and budgeted results.

Organizational learning can be inferred from the *absence of blockage* to its occurrence (Galer & van der Heijden, 1992). It is submitted that barriers provide impediments to organizational learning, provided that OL is the goal of the individuals' activities and that individual knowledge contributes to the organization's knowledge. Where there is a lack of individual learning, the barrier could be psychological: a limited motivation to learn.

To increase OL, there has to be change. This change is caused by some influential factor. This factor might be a PCA recommendation or another factor.

OL can also be expressed in terms of its achievement with resources. March (2006a) proposes two types of learning: exploitation and exploration. The former makes the best use of existing resources and business infrastructure, resulting in efficiency, organization, refinement and maximization; the latter searches for new technology which modernizes and expands the organisation's activities, ending in improvement, widening of scope and advancement. Each type cannot be carried out whilst ignoring the other. If a company focusses upon exploitation, then it will fail to move with the times; if a company focusses solely upon exploration, it will make losses and profits on speculative activities, yet fail to retain its core operations and purpose, which can result in failure as searches may prove fruitless or less profitable than current activities. The right balance between these two activities is required for success (March, 2006a).

SLL can be said to be exploitative and DLL can be said to be explorative.

Organisations learn through their individuals. A company itself is a legal fiction and exists on a database or a register. It cannot walk, think, act, talk, or operate without individuals to carry out its purpose.

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<sup>11</sup> Individual contributions to an organisation's are ambiguous because the individual no longer affects the organisation (March & Olsen, 1975).

Thus, OL is a summation of individuals' learning. How individual learning becomes incorporated into an organization's learning is still not widely understood. The total learning of all individuals will exceed the organization's learning because only part of individuals' knowledge is captured in the organization (Hedberg, 1981). This gap indicates potential learning by the company.

In the capital investment process, PCA forms the feedback loop. This feedback is necessary to enable the identification of areas where improvements can be made. Such improvements become manifest in the form of changes in actions (SLL) and changes in models and processes (DLL).

Beliefs, actions and results are the three key nodes of the Argyris and Schön (1978) OL model of learning loops. Actions are carried out to achieve results. Beliefs influence which actions are undertaken to achieve the results. Actions can be changed to achieve different results and beliefs can change to adjust actions to achieve results.

An example would be the choice of different revenue inputs into the same model for the evaluation of capital investments. Revenues are refined until thought of as correct. The model used remains unchanged, e.g. the NPV model. An example of DLL would occur with the change in the evaluation model, to the Real Options NPV model.

This research paper aims to discover whether SLL, DLL or both occur within New Zealand's publicly listed companies.

### **How is knowledge acquired?**

Huber (1991) wrote about knowledge acquisition using five constructs: (1) knowledge available at an organisation's birth ("congenital learning" consisting of knowledge at inception and knowledge obtained prior to the organisation's birth), (2) learning from experience ("experiential learning"), (3) learning by observing other organisations ("vicarious learning"), (4) grafting on to the organisation the knowledge needed but not possessed by it ("grafting"), and (5) noticing or searching for information about the organisation's environment and performance ("searching or noticing").

Huber uses a behavioural perspective on learning: "An entity learns if, through its processing of information, the range of its potential behaviors is changed." (p. 89). Huber also discusses learning in a four-stage process: knowledge acquisition (the process by which knowledge is obtained), knowledge distribution (the process by which

knowledge is shared, leading to new knowledge and understanding), knowledge interpretation (the process by which knowledge is given one or more commonly understood interpretations) and organisational memory (the means by which knowledge is stored for future use).

Knowledge is acquired in a PCA largely via experiential learning. A PCA compares actual results (experience) with planned results. The differences are highlighted and sorted for further investigation into the reason(s) for them arising with an aim to reduce such variances either by changing the inputs or the capital investment process. Rejected proposals cannot be post-completion audited because actual results do not exist.

This paper aims to ascertain the presence of experiential learning.

### **Capital Investment Teams' Role in OL**

Capital investment project teams act as agents of organisational learning because their role brings together the organisation as a whole and its constituent individuals (Schofield & Wilson, 1995). The specific rules, roles and relationships in these teams assist individual team members with their effective sharing of knowledge. The management of boundaries and individual roles and the development of groups into communities of practice are important to the transference of OL. The effective sharing of knowledge can be facilitated through capital investment teams. Applying the work of Nutt (1982), the vehicle for achieving capital investment is the capital investment decision-making process, which is the activity carried out by the team. The sharing of information may become inhibited by PCA programmes which evaluate the performance of staff (Argyris, 1991) and accountability for capital investment decisions (Cheng, Schultz, & Booth, 2009), as reviewed below.

### **Barriers to OL**

Galer and van der Heijden (1992) argue that dynamic learning is incompatible with a very strong goal-alignment amongst the organisation's members. Such rigid objectives make the questioning of underlying goals a difficult task, and hence double-loop learning is more difficult to achieve because it critiques the goals behind the actions undertaken for their attainment. Interestingly, Galer and van der Heijden write about two important features of studies on organisational learning: measurement and occurrence. They argue that one way to test for occurrence is to ascertain if any blockages to OL are happening. Vaill (1991) argued that many obstacles exist to

learning: lack of awareness of the world outside the company or industry (an insular focus), using outdated frames of reference, time pressure, shortages of resources needed for analysis and embedding learning in individuals, executive politics, management copycats, scepticism about strategic thinking's value, algorithmism, and turbulence in the business environment resulting in confused interpretation of 'weak signals'. They also cite Argyris (1991) who discusses human barriers to organisational learning which manifest themselves in defensive routines which are a developed response to the criticism and evaluation of an individual's own performance. These defensive routines include: (i) to bypass threats and embarrassment whenever possible, (ii) to act as if one is not bypassing the above, (iii) to not discuss steps (i) and (ii) when they occur, and (iv) to not discuss the indiscussability of steps (i) and (ii). Faced with such a potential threat, employees will apply defensive reasoning (Argyris, 1991) to avoid or to explain away their part of the adverse components of an unfavourable capital investment project. This is a barrier to PCA conduction and can be a limiting factor in the selection of optimal capital investment projects.

Cheng et al. (2009) found that when accountability is involved with performance evaluation, staff are less likely to propose riskier projects and more likely to create extensive justifications prior to submission. Capital investment project members in such a situation are likely to be less forthcoming with information during a post-completion audit report because they may personally and professionally suffer adverse consequences from an unfavourable audit. Conversely, accountability also enhances the quality of proposals because projects which are outside the company's investment criteria or are flimsy to justify will be re-examined and filtered out before submission for approval: proposers' behaviour is kept in check and knowledge of responsibility is at the forefront of members' minds when proposing capital investments. This is important because without full and frank disclosure of information for a PCA report, OL cannot be maximised or is based upon incomplete information; this is potentially a missed opportunity for OL.

By identifying the presence or absence of human barriers to OL, the findings can be examined in light of this potential factor, which can greatly influence the degree to which learning can occur.

A study into the non-adoption of PCA found that alternative capital investment controls (ACICs) exist and that they are used by non-PCA adopters, ensuring that the benefits of

PCA conduction are not lost (Huikku, 2007). Such controls take the form of organisational learning and formal and informal systems for performance measurement procedures. It was found that smaller companies were satisfied with using these alternative controls in place of PCA.

The study used the concept of equifinality<sup>12</sup> to gauge the effectiveness of ACICs as against the unused PCA. It was found that the main benefits from PCAs were also captured in the utilisation of ACICs. Although some NZX-listed companies may not conduct PCA, there could exist ACICs through which they obtain OL benefits. The focus of this dissertation is however upon formal PCA.

This chapter has outlined a literature review regarding post-completion auditing and organisational learning. This review has created a framework for the research topic which combines PCA design elements and OL. The next chapter will briefly define research methodology, the research method and present the survey instrument.

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<sup>12</sup> Means “having the same end or result” (Oxford Dictionary Online, 2014).

## **Chapter 3: Methodology**

### **Introduction**

This chapter outlines the research methodology and methods for this study. Broadly, the design consists of two stages. First, a basis for proposing a normative model of PCA practice is drawn from the PCA and OL literature above. Second, an exploratory survey of large NZ companies' PCA practices is outlined as a basis for reflecting on the extent to which the proposed model reflects and potentially enhances existing practice.

The remainder of this chapter is structured as follows. First, an overview is provided of the research methodology. This is followed by an outline of the aims of the literature review work and the approach used to identifying relevant literature in the two largely distinct areas of PCA and OL. Next, the design of the exploratory survey is described, including how it was based on Huikku's (2009) examination of PCA practices in Finland. Finally, the processes used for administering the questionnaire and analysing the results are outlined.

### **Methodology**

This exploratory research will take a positivist stance which will describe what elements of companies' PCA designs exist within New Zealand companies as compared to a normative model (Huikku, 2009) of PCA design elements that maximise OL. This is accomplished through a survey that presents a series of pre-set questions, which are derived from pre-existing literature on PCA and OL. The questions are used to find out perceptions and facts about capital investment, as communicated by the respondents, who are capital investment and PCA practitioners within the companies surveyed.



## **Method Stage One: Literature Review**

This section will focus upon explaining the importance of PCA in the capital investment process and the linkage between PCA and OL in companies.

PCA does not exist in a vacuum. It is the result of an activity occurring pursuant to a plan, and its outcomes are measured against its budget results. Its place is as the last step (Harris, 1999a) of the capital investment process (King, 1975). It is both a regulator and a part of the capital investment process (Koch, Mayper, & Wilner, 2009). PCA is designed to show variations from the plan with the aim of furnishing information on aspects of the capital investment decision process in which variations can be reduced. PCA thus improves confidence in proposals for capital investment decision-making.

The normative literature on PCA design has been led by Huikku (2009). In his work on PCA and OL, he proposes a model containing seventeen design elements for a PCA setup to maximise OL. Having such a setup is important, because inadequate or improper design is a barrier to OL. Once a design is ideally conducive for OL, the design barrier can be removed and PCA's usage in OL can be examined. This allows for the isolation of the major impediment to causation of OL. PCA is a catalyst for change because it identifies aspects of capital investment process in which variations are widest. These are the aspects which are the least predictable and which weaken confidence during decision-time.

From the literature reviewed, OL has been cited as the major benefit from PCA (Huikku, 2008). However, the process whereby OL is achieved through PCA has been barely studied, if at all. This dissertation adopts the learning loops model developed by Argyris and Schön (1978). In this model there are two types of learning: single-loop (SLL) and double-loop (DLL). The former involves changing actions to change results while the latter involves changing beliefs underlying actions to alter those actions to change the results. SLL is an evolutionary approach while DLL is a revolutionary approach to OL.

The research method used combines both PCA and OL, centralised around linkages between them. It draws upon Huikku's (2009) PCA design elements and assesses his normative model of PCA design. This model serves as the basis for assessing the sample NZ companies' PCA design barriers. Argyris and Schön's (1978; 1996) learning loops models are used for assessing OL within these companies. The SLL-DLL

distinction is used to categorise learning into the two types proposed by Argyris and Schön . Then, PCA and OL are linked via causation questions. Barriers to OL are also explored, particularly the human barriers to effective PCA (Argyris, 1991; Cheng, Schultz, & Booth, 2009). The content of PCA is further researched to isolate any possible barriers, especially where PCA lacks scope and comprehensiveness, and is poorly-focused.

## **Method Stage Two: Exploratory Survey Design**

A postal survey was mailed to 109 New Zealand-based NZX-listed public companies, inviting personnel involved in capital investment and PCA to participate via an online survey instrument.

The survey asked a total of 39 questions. It was designed to be completed online via a link to Survey Monkey. It contained a mix of closed and open questions. The open input questions served to triangulate previous closed question answers and to avoid mismatches from respondents' interpretation of survey questions. For example the question about ex-ante evaluation and ex-post evaluation of capital investments was an open question to prevent respondents from simply ticking boxes which might have not accurately reflected what was done within each company, even though it would have allowed for easy matching.

Next, the survey answers were summarised and the companies' PCA designs were assessed for elements for OL. Companies were then categorised into low conduciveness (and hence a higher barrier) to OL and high conduciveness (and hence a low barrier) to OL. Inadequate or suboptimal design can be a barrier to OL. Once PCA design adequacy had been identified, then any barriers to design insufficiency could be taken into account when discussing the findings of the questionnaire. Without such an identification, there is an assumption that such barriers are either non-existent or negligible. The presence of barriers, however, is an impediment to the usefulness of the survey results, as barriers will inevitably give false impressions and false-linkages between PCA and OL.

The companies were then divided into two groups: domestic-only operators and international operators and exporters, as identified by the respondents in the company demographics section of the questionnaire.

## **Survey Instrument**

The questionnaire consisted of four parts (see Appendix 3: The Questionnaire for a copy of the questionnaire). The first part screened respondents for PCA usage. The second part then surveyed respondents as to their use of PCA elements. The third part surveyed respondents for usage of PCA for purposes of OL. The fourth part surveyed respondents for usages involving the human element of PCA. The fifth and final part concerned demographic information on the respondent person and their company.

Part one (questions 1 to 3) screened respondents. Only those respondents who had engaged in capital investment could carry out PCA and only those which actually did PCA were qualified to answer the survey. Capital expenditure (annual) was included to gauge the size and importance of capital investment to the company.

Part two (questions 4 to 19) was an adaptation of Huikku's (2009) theoretical study of PCA elements for an OL-conducive PCA design. Its inclusion was designed to remove the factor of inadequacy of PCA setup, being a barrier, from usage for OL. The more elements present, the greater the usefulness of PCA for OL. The elements are grouped into three parts: (i) knowledge acquisition; (ii) knowledge interpretation and distribution; and (iii) organisational memory.

The second part of the questionnaire is a series of questions adapted from Huikku (2009) but was modified to find the elements of PCA design for OL within a company's PCA setup. The modifications had two aims. First, there was the aim to discover what the company actually did in practice. To this end, open questions were asked instead of giving respondents a fixed range of options. Second, there was the aim to discover how consistently the respondents approached PCA and OL. To this end, some overlapping or slightly repetitive questions were asked, so as to gauge consistency. Please *see* Appendix 1: Comparison between Huikku's (2009) research and this dissertation's questionnaire for the Huikku (2009) PCA elements questions and the equivalents asked in this dissertation's questionnaire.

Part three (questions 20 to 29) involved the respondents disclosing their purpose for engaging in PCA; the importance of aspects of PCA; the focal point of PCA; and then a series of questions about their usage of PCA for OL, i.e. models and aspect improvement. The answers to the different questions can be compared for consistency, for example, one can check that a respondent's stated purpose for PCA reporting is

consistent with what they see as the focal points of a PCA report. In turn, the focal points should be consistent with the importance attached to the same focal aspects of a PCA. Additional questions were asked concerning process changes, followed by a request for examples of process changes.

In part two, there was a mix of closed and open-ended questions. The former were used where the available options were exhaustive and the latter were used to test for the presence of an element by comparing one answer with another, e.g. evaluation methods ex-ante investment with evaluation methods ex-post investment. The approach is essentially positivist as it is assumed the respondent's responses provide a true indication of their companies' practices.

Part four's single question (question 30) was designed to indicate the presence or absence of the human element of the PCA process: the "[p]erformance review of the capital investment team", being the evaluation of one's own performance and accountability for it. The responses are then reviewed in light of this human element, which is seen as a barrier to the quality of a PCA because defensive behaviour impacts the disclosures by the people being assessed.

The final demographics questions (31 to 37) were to ascertain the capacity of the respondent to answer the questionnaire with knowledge and access to the information required.

Questions about the geographical scope of the companies' operations were asked to reveal the marketplace in which the company operates (question 38 to 39). An exporter would be in the global market place and one would presume it would have to adopt international best-practice to remain competitive. A domestic operator would only have to compete in a local economy and may not necessarily need to have international best-practices to remain competitive and viable. A domestic company will have a home advantage in its local market. In contrast, an exporter will have to compete against the domestic companies of its foreign markets, as well as international competitors.

## **Administering the Survey and Summarising the Results**

### **Recruitment of Sample**

The survey was conducted between November and December 2013. In late October 2013, a letter was sent to the CFOs of large NZX publicly-listed New Zealand companies to determine evidence for the existence of companies matching Huikku's (2009) normative model of PCA design elements for OL. All 109 of the New Zealand-based offices of the publicly listed companies on the NZX were mailed the recruitment letter. The letter included a URL link to an online survey. Each CFO was invited to participate in the online survey. Two weeks later, in mid-November 2013, a second follow-up letter was mailed in an attempt to improve the response rate.

### **Response Rate**

The total number of respondents was fifteen of which only ten were usable, the ten being the only respondents who engaged in PCA and completed the questionnaire. This gives a response rate of 9.2%. These ten responses will comprise the findings in this *exploratory research* project. The aim of this exploratory research project is to take a snapshot of a few companies in New Zealand to obtain an insight into how they use PCA and whether or not their usage of it indicates OL.

### **Analysis Approach**

Survey responses were analysed in aggregate. Only those companies which engaged in PCA were analysed further (ten in total).

OL is recognised as occurring when there is a change in an identified aspect of PCA.

Aspects of PCA which should be of prime focus are those identified as having the greatest variances.

Focal aspects of PCA should be consistent with the purpose of carrying out a PCA. The importance of each focal point is scored on a rating scale from 1 to 5, with 1 being “not important”, and 5 being “very important”. Importance should indicate the capital investment project's dependence upon such an aspect for success, as analysed by the managers responsible for PCA.

This research does not investigate the capacity of the companies to control an aspect of PCA. If there is an inability to control an aspect of PCA, then this could indicate an incapacity for PCA to alter it. These sorts of variations are the result of something outside the PCA process and beyond the control of the company<sup>13</sup>.

Survey responses are analysed in three parts. The first part scores each company for the extent to which its PCA design matches the normative model proposed by Huikku (2009). The second part analyses PCA content for its adequacy to achieve company-specific purposes. The third part of the analysis assesses links between PCA and OL. The fourth part determines the occurrence of OL. The fifth part analyses respondents' demographical details.

The survey findings will be checked against literature and commented upon. Similarities and differences from the literature will be explored, with any deficiencies in the pre-existing research commented upon.

Ultimately, it is the PCA process and OL that are being researched here. However, as the nature of this research is exploratory, it provides only a broad overview of the status quo, while identifying possible future research areas for further comprehensive and detailed research.

Finally, it is to be reiterated that in analysing only ten usable responses from a total of 109 requests for participation, this research is *exploratory*; the number of responses is inadequate for making generalisations about all of New Zealand's NZX publicly-listed companies.

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<sup>13</sup> For example exchange rates and the initial outlay of funds, in the absence of a forward contract or exchange rate derivative to lock-in or limit the exchange rate effects upon costs; similarly for an exporting company, a locked-in exchange rate can bring certainty over some time period to its revenue for sales denominated in specified currencies being the underlying asset of the derivatives contract.

## **Chapter 4: Survey Findings**

For all the information presented in tables below, answers from companies that do not use PCA have been excluded. Only the answers of PCA users that completed the questionnaire have been used and presented under each heading in this chapter.

All respondent companies were assigned a letter from A to O. Companies A, F, H, M and N did not conduct PCA. The remaining ten did so. Where company letters are absent from tables, this represents a non-PCA user.

### **Respondent Demographics – competence to respond to the questionnaire**

The respondents were asked a series of questions to establish their capacity to complete the questionnaire. The results are contained in Table 1, on page 30, below.

All PCA-users from completed surveys who answered the respondent-personal demographics section have the office or position of financial accountant or higher; academic qualifications of a university degree or two; and a professional accounting qualification. Seven of nine have worked in their current position for part of their employment with their present company. One respondent, from Company I, did not provide his or her demographic details.

The level of qualification and experience, academic and practical, establishes the respondent's technical knowledge in a theoretical and experiential context.

Time spent by respondent in their current position and the respondent's total time spent with the company indicates the amount of intimate understanding of both the company and their current role. Time in their current position also indicates the respondent's possible involvement in capital investments projects, which are long-term and last for more than a single year, viz. if they have worked only for a single year in their position, their involvement in both capital investment proposals and post-completion auditing for the *same* project is nought. They may have evaluated one proposal and post-completion audited an accepted project only, but not the same project for both processes. In this case, for the proposals they are an insider to the capital investment team unit and for PCA they would have been an outsider to the capital investment unit. The implication is that a complete understanding of how the two processes work together for the same project is essential for a holistic understating of the two processes. A lack of this

knowledge could result in the respondent missing important details in their PCA involvement, unlike a person involved in both processes. Less weight would have to be attached to respondent's answers when they have not been part of both the proposal and post-completion audit processes.

Capability to respond to the survey is also triangulated with a further question detailing the respondents' role in capital investment projects (ex-ante projects) and post-completion auditing (ex-post projects). See Table 2, on page 30, below.

The respondents' stated role in the company shows their level and scope of authority with regards to planning, control, sourcing of information, policy and procedural creation and implementation, and level of responsibility within their respective companies.

The above demographic facts are used to establish the competency of the respondent to participate in the questionnaire.

### **Findings on Respondent Demographics**

Respondents were questioned with regard to their own specific involvement within the capital investment and the post-completion auditing processes. These findings are present in Table 2, on page 30, below.



Table 1 Findings on Respondent Demographics

	<b>B</b>	<b>C*§</b>	<b>D*§</b>	<b>E</b>	<b>G</b>	<b>I</b>	<b>J</b>	<b>K*</b>	<b>L*§</b>	<b>O§</b>
<b>Position</b>	CFO	CFO	CFO	CFO	Financial Accountant	†	CFO	CFO	Group Performance Manager	Capital Planning Lead
<b>Academic Qualifications</b>	BCom	BCom	Degree	BMS (Hons)	Degree	†	BCom/BSc	BCom (Hons)	BCom	BCA (Accounting, Commercial Law)
<b>Professional Qualifications</b>	CA	CA	CA	CA	CA	†	NZICA	[Blank]	CA	CA
<b>Years in Position</b>	4.5	10	3	6	1	†	3	5	1	1
<b>Years with Company</b>	4.5	13	5	6	1	†	3	14	12	2
<b>Years (position)/Years (company)</b>	100%	77%	60%	100%	100%	†	100%	36%	8%	50%
*International operator										
§Exporter										
†Did not answer										

Table 2 Comparison between CID involvement and PCA involvement of Respondents

<b>Company</b>	<b>Involvement with Capital Investment</b>	<b>Involvement with Post-Completion Auditing</b>	<b>Capital Investment</b>	<b>PCA</b>	<b>Depth of involvement in CID</b>	<b>Depth of involvement in PCA</b>
<b>B</b>	Financial aspects of all proposals	Review of outcomes	Comprehensive	Review	Deep	Peripheral
<b>C*§</b>	Review of major capital expenditure projects before commencement.	None	Review before commencement	None	Peripheral	Nil
<b>D*§</b>	Key sponsor of some major projects, policy owner for Group	Policy owner	Sponsor (key)	Policy	Peripheral	Peripheral
<b>E</b>	Almost none	Review capital costs spent against budget, gather reporting information for collation and reporting to the board and management	None	Review	Nil	Peripheral

<b>Company</b>	<b>Involvement with Capital Investment</b>	<b>Involvement with Post-Completion Auditing</b>	<b>Capital Investment</b>	<b>PCA</b>	<b>Depth of involvement in CID</b>	<b>Depth of involvement in PCA</b>
<b>G</b>	Develop and approve	Undertake the reviews	Proposal	Review	Peripheral	Peripheral
<b>I</b>	†	†	††	††		
<b>J</b>	Review and oversee	Review and oversee	Review	Review	Peripheral	Peripheral
<b>K*</b>	Business case and project governance	Undertaken jointly with project owner and Finance	Governance	Conduct	Peripheral	Deep
<b>L*§</b>	Capital allocation responsibility , some input into past projects, implementing a structured PIR process	As above	Allocation of capital and inputs	Allocation of capital and inputs	Deep	Deep
<b>O§</b>	Owner of post-investment reviews	Leading the execution of post-investment reviews in line with policy	None	Owner and leader	Nil	Deep

\*International operator

§Exporter

†Blank response

††Unable to comment due to blank responses to this question

The results were analysed in terms of how much involvement the companies had in either the capital investment proposal or the post-completion audit side of the capital investment process. Three companies have a peripheral involvement in either side, two companies have a peripheral involvement in one side only, two companies have a deep involvement in one side but a peripheral involvement in the other side, one company had a deep involvement in one side only but no involvement in the other side; and only one company had a deep involvement in both sides. One company did not answer this question.

International companies and exporters have similar involvement in each side as do domestic-only companies. There is no discernable difference between these groups.

## Findings on Company Demographics

Respondents were asked to stipulate the geographical region(s) within which their companies operated and to state if their companies are exporters.

Table 3 Company Demographics

	B	C	D	E	G	I	J	K	L	O	Total
<i>Domestic</i>	1			1	1	1	†				4
<i>International*</i>		1	1				†	1	1	1	5
<i>Exporter**</i>		1	1				†		1	1	4
*If domestic and international areas were stated, then the company is regarded as an international trader.											
**It is possible for a company to be an international trader but not an exporter, for example if it has branches overseas and operates entirely within that market without buying goods from its New Zealand parent company.											
†Did not answer											

Four companies are exclusively domestic traders and five companies are domestic and international traders, with four of the five international companies being exporters and one operating exclusively abroad. One company did not answer this question, leaving only nine usable responses.

Two companies spent on average over the past five years, between \$1 million and \$5 million on capital investment. The other eight companies expended more than \$5 million per year over the preceding five years on capital investment.

## Findings about PCA Design Elements

Respondents were then asked a series of questions to determine the presence or absence of PCA design elements identified by Huikku (2009) as most conducive to a post-completion auditing. A summary of the categories of design elements is shown in Table 4, below.

Table 4 Summary of PCA design categories by all respondent companies

Company:	A	B	C*§	D*§	E	F	G	H	I	J	K*	L*§	M	N	O§	Yes	No
PCA carried out	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	9	4
Knowledge Acquisition		4	3	4	4		3		3	3	3	3		--	4	34	6
Knowledge Interpretation & Distribution		2	6	7	5		7		3	4	8	6		--	11	59	51
Organisational Memory		0	0	0	0		0		0	0	0	1		--	2	3	17
<b>Total</b>		<b>6</b>	<b>9</b>	<b>11</b>	<b>9</b>		<b>10</b>		<b>6</b>	<b>7</b>	<b>11</b>	<b>10</b>		<b>--</b>	<b>17</b>	<b>96</b>	<b>74</b>
<b>PCA Design Score</b>		<b>35%</b>	<b>53%</b>	<b>65%</b>	<b>53%</b>		<b>59%</b>		<b>35%</b>	<b>41%</b>	<b>65%</b>	<b>59%</b>		<b>--</b>	<b>100%</b>	<b>56%</b>	<b>44%</b>
*International operations																	
§Exporting company																	
--No information was provided by the respondent																	
NB: Lightly shaded columns are PCA-using respondent companies, which form the usable responses (10 in total) for this research; the darker-shaded columns are totals for the presence of design elements ("Yes") and absence of the same ("No").																	

This section of the research scores the respondent companies' PCA design setup, with a *yes* or *no* to each of the 17 elements identified by Huikku (2009). The steps of knowledge were based upon Huber's (1991) model of learning, which divides learning into three stages: acquisition, interpretation and distribution. The fourth OL learning component is organisational memory (OM). The percentage score out of 17 was calculated.

### Overall scores for PCA design conduciveness for OL

The overall scores ranged from 35% (Companies B and I) to 100% (Company O). Seven of the ten companies scored more than 50%.

In Huikku's (2009) research in Finland, company scores ranged from 47% to 88%, and averaged 64% with 12 out of the 14 companies scored over 50%. Compared to Finland, New Zealand companies have far less design elements present in their PCA systems.

The findings above suggest that New Zealand companies with international operations and exports have more PCA design elements (53% to 100%; all over 50%) than domestic only operators (35% to 59%; only two of five over 50%).

This makes sense because international operations and exporters are exposed to significantly more competitors who are determined to operate within the same market of the importing countries. To compete successfully, New Zealand firms would have to proactively adopt world best-practices.

The above three categories of PCA design elements will be discussed in greater depth in the discussion chapter.

## Knowledge acquisition

For findings, see Table 4 on page 33, above.

All companies scored highly in the knowledge-acquisition area of PCA design. Six scored 75% and four scored 100%, averaging 85%. As a point of comparison, Huikku's (2009) study found that companies in Finland scored, on average, higher than 75%.

The *greatest deficiency* in knowledge acquisition is the absence from the PCA of a mixture of personnel from both inside and outside the investing unit. The former are present for their contribution to the review and the latter are there for independence in the process. Five of the ten companies had their PCA conducted by staff within both the investing unit and outside of it. Two companies involved only an external unit and three companies used only investing unit staff.

There is little difference between domestic operators and international exporters - *see* Table 5, below.

Respondents were asked to identify the source of PCA staff in terms of whether they were from inside the investing unit or from outside the investing unit. Table 5, below, shows the results.

Table 5 Source of staff for PCA

Source of PCA Staff	Domestic Operator	Exporters & International Operators
Both Inside and Outside Investing Unit	2	3
Inside Investing Unit only	2	1
Outside Investing Unit only	1	1

## Knowledge interpretation and distribution

For these findings, see Table 4 on page 33, above.

Companies' scores ranged from two to eleven elements out of a maximum of eleven in total.

Companies operating internationally or exporting scored higher than domestic-only operators. The former all scored more than 50% and averaged 69% while only one of the latter scored over 50% and averaged 38% in this category.

Companies scored highly in comparable capital budgeting calculations ex-ante and ex-post PCA (nine companies), commenting upon the achievement of objectives in the report (nine companies), the usage of plain language in reports (ten companies),

Notable deficiencies were a lack of standard reporting formats (two companies had them), the inclusion of proposals for future investments (five companies), formal proposal follow-ups (three companies), an interactive primary forum for presentation of PCA reports (one company), and the presentation of PCA reports to executives and boards of directors (three companies each).

Other deficiencies with these companies included a lack of formal follow-up of PCA report recommendations and the near absence of PCA presentations and forums for open and frank discussion of PCA reports and recommendations. This communication shortfall can impact upon OL because the full PCA reports are not communicated and discussed by all who had an input into the process. Without formal follow-ups, accountability is not expected as such and can lead to reports being taken less seriously, because they appear to have minimal effective consequences for either the organisation or its staff.

Only four of the ten companies' PCA reports "sometimes" or "always" included recommendations for future investments.

### **Organisational Memory**

For these findings, see Table 4 on page 33, above.

All but two companies scored 0% in this category. Two companies, which are operating internationally and exporting, have a PCA OM scoring average of 75%. This corresponds closely to companies in Finland, of which only 2 out of 14 in Huikku's (2009) study had an OM for PCA.

No domestic companies in the New Zealand sample studied in this dissertation have an organisational memory score.

The findings suggest that there is a glaring deficiency in PCA design within New Zealand.

The only element present in the company which scored 50% (Company L) was the existence of a widely-known database of PCA reports. The access by relevant people to this database is unknown.

### PCA content per company

This section looks at the content of companies’ actual PCA in aggregate. Three parts of PCA report contents are examined for consistency: purpose, focus and importance of focal aspects.

### Purpose of PCA reports

Respondents were asked to indicate the purpose(s) for which their PCA reports were conducted. Each respondent could select as many purposes as applied to their company. Figure 5, below, presents these findings.

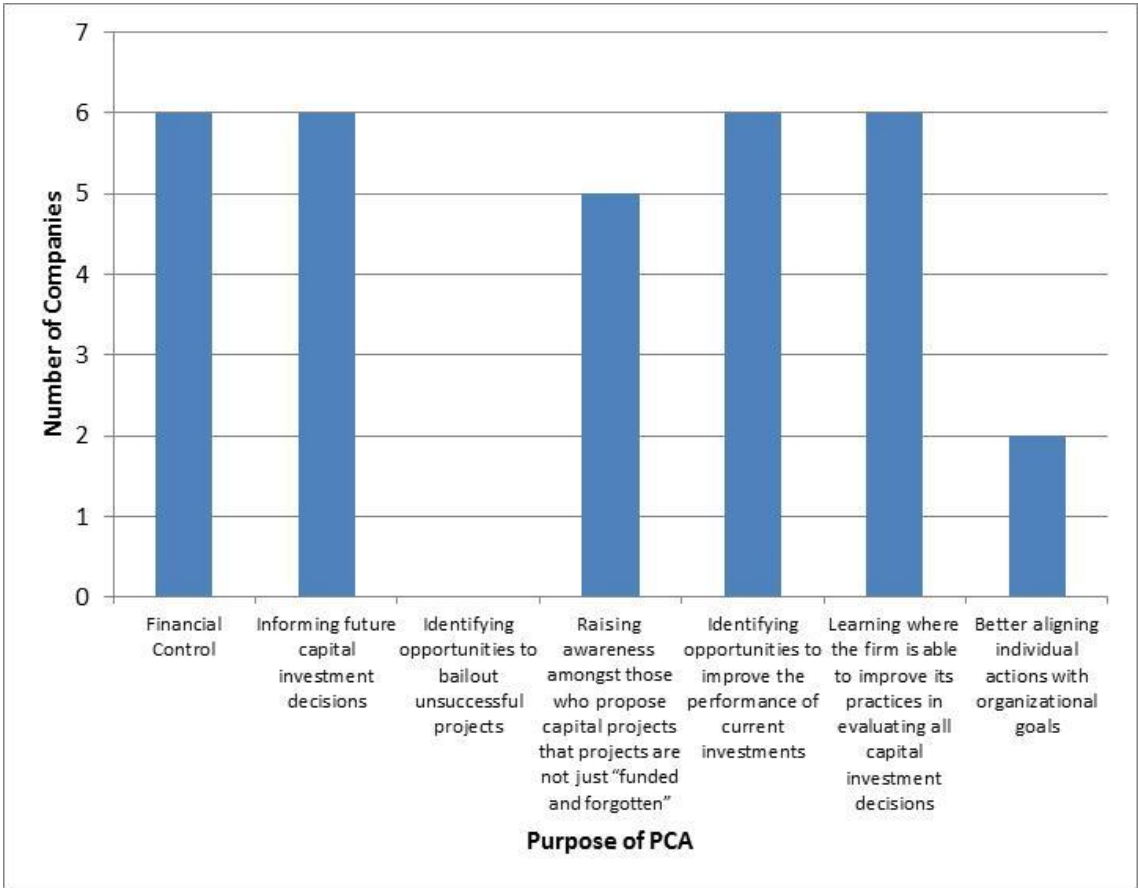


Figure 5 Purpose of PCA Reports

Four purposes were identified as being the most popular reasons for conducting a PCA: financial control, informing future capital investment decisions, identifying opportunities to improve current capital investments, and learning where the firm can improve its practices in evaluating all capital investment decisions.

Five companies identified accountability in the minds of proposers as a purpose for PCA.

Only two companies stated goal-congruence between investment proposers and the company as a purpose of PCA. This may suggest that alignment between the investment team and the company has already been achieved through a legally binding contract; the two companies use PCA for goal-congruence to ensure that capital investment teams have executed their duties in line with the overall objectives of their companies.

No companies cited the identification of opportunities to bailout unsuccessful projects as a reason for PCA. Six companies used PCA for identifying opportunities to improve current capital projects. This suggests a focus upon continuous improvement rather than a purely defensive use of PCA reports.

These findings will be discussed in detail in the Discussion Chapter..

### **Focal Point(s) of PCA reports**

Respondents were then asked to disclose the focal point(s) of their PCA reports, again, selecting as many points as applied to their company. These findings are presented in Figure 6, below.

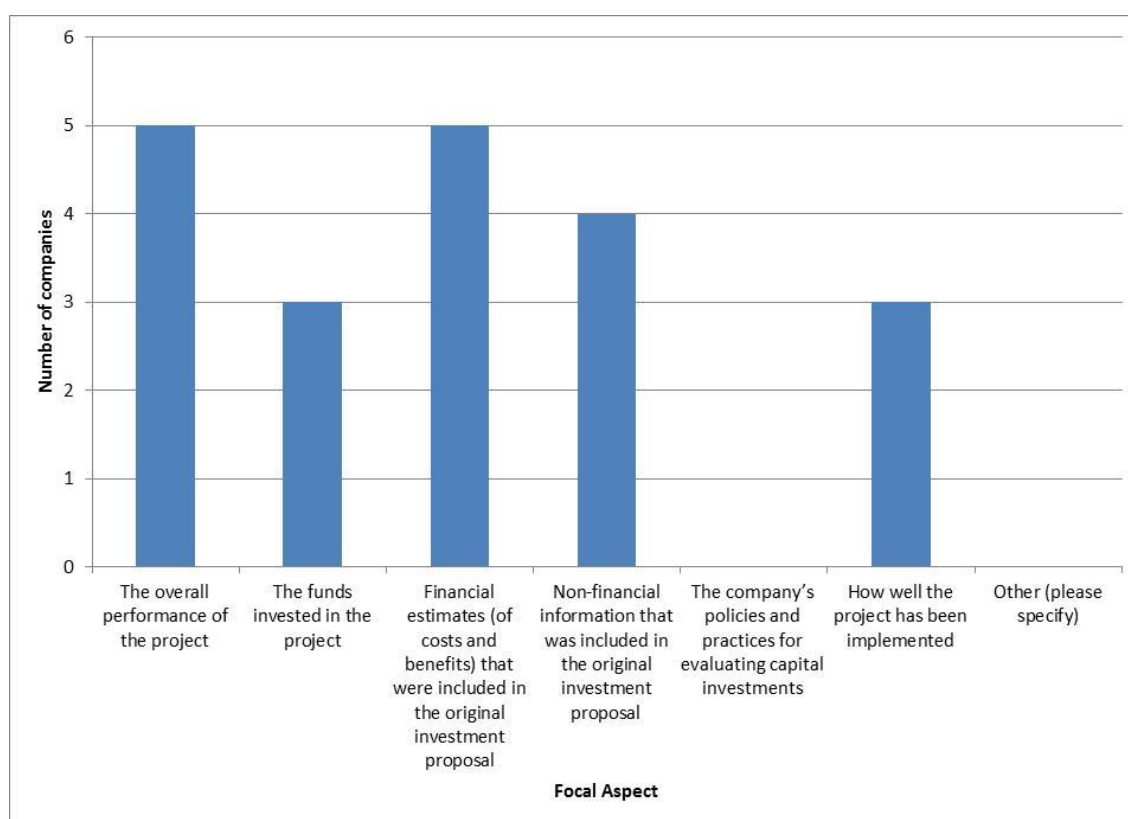


Figure 6 Focal Aspect of PCA Reports



The main focal points of PCA reports were identified as the overall performance of the project and the financial estimates (of costs and benefits) that were included in the original investment proposal (5 each). The next most common focal point was non-financial information that was included in the original investment proposal (n=4).

How well the project had been implemented and the funds invested in the project were the focal points of only four companies out of the ten respondents. No company rated the company's policies and practices for evaluating capital investments as a PCA focal point. By not paying attention to policies and procedures for evaluating capital investment decisions, these companies have missed the opportunity via PCA to assess their work-models and to capture double-loop learning by refining or overhauling them to be more applicable to their specific company.

### Importance of each Focal Point of PCA Reporting

Respondents were asked to rate the importance of each PCA focal point by using a Rating Scale numbered from 1 to 5, with 1 indicating “of little importance” and 5 indicating “very important”. The average importance score for each PCA reporting aspect is shown in Figure 7, below.

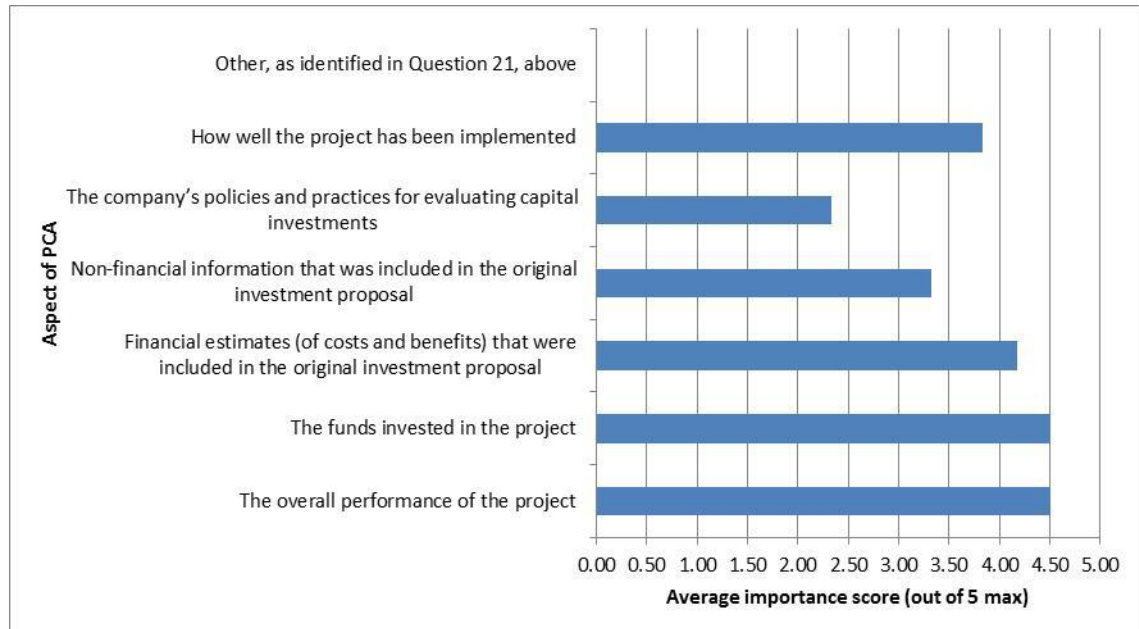


Figure 7 Importance of each Focal Point of PCA-Reporting

The most important focal points of PCA were identified as the funds invested in the project and the overall performance of the project (4.50 each), followed by financial

estimates (of costs and benefits) that were included in the original investment proposal (4.17).

How well the project has been implemented (3.83) was important.

The least important PCA aspect was the company's policies and practices for evaluating capital investments (2.33) which were rated as being of little importance.

Table 6 PCA Aspect Focal Points and Importance Ratings

<b>PCA Aspect</b>	<b>Number of companies identifying focal point</b>	<b>Focal Point Importance Ratings (average)</b>
The overall performance of the project	5	4.50
The funds invested in the project	3	4.50
Financial estimates (of costs and benefits) that were included in the original investment proposal	5	4.17
How well the project has been implemented	3	3.83
Non-financial information that was included in the original investment proposal	4	3.33
The company's policies and practices for evaluating capital investments	0	2.33
Other, as identified in Q21, above	0	0.00

The first three PCA aspects were each focal points for between three and five of the respondents. Each of these aspects was rated important (greater than 4.00).

The company policies and practices for evaluating capital investments were rated as having little importance; therefore no company had it as a focal point.

Surprisingly, less than half of the respondents had focal points which were rated above three (moderately important).

Five companies included the focal points of the overall performance of the project and financial estimates (of costs and benefits) that were included in the original investment proposal.

## Link between PCA and OL

Respondents were asked to disclose which aspects of PCA were typically included as recommendations in their PCA reports. Each respondent could select as many PCA aspects as applied to his or her company. Figure 8, below, shows the results.

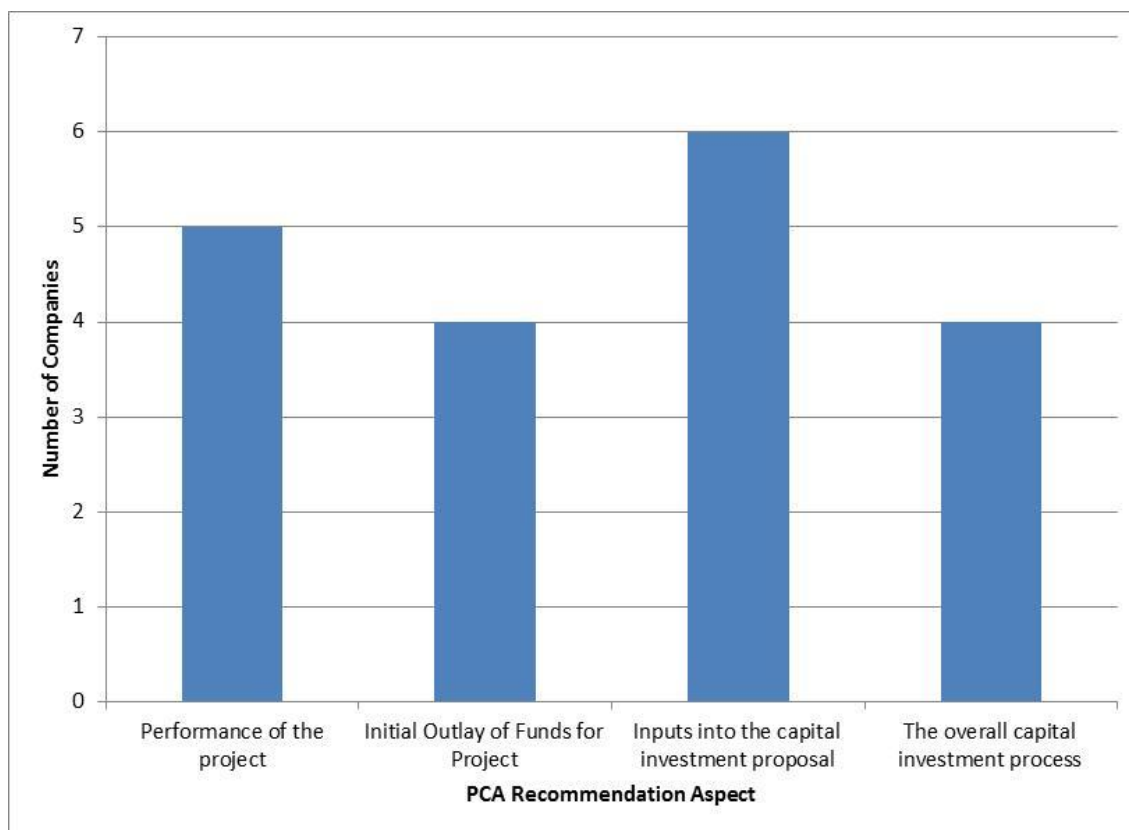


Figure 8 Aspects of PCA which are typically the subject of recommendations

Nine companies answered this question; one did not.

The most popular recommendation concerned the inputs into the capital investment process (six companies). Performance of the project was the second-most typical subject of recommendation (five companies). The initial outlay of funds for the project and the overall capital investment process were cited by four companies.

These results establish a *prima facie* link, which suggests that PCA has been useful for OL.

The occurrences of OL will be discussed next.

## Occurrences of OL

### Changes in PCA

Six companies changed their policies and procedures for capital investment projects as a result of a PCA and one did not. Three respondents did not answer this question. Again, this confirms a causal link between PCA and OL, because PCA reports were seen as a catalyst for change.

### Greatest Variations between Actual and Planned PCA Aspects

Respondents were asked to indicate which PCA aspects have the greatest variances between actual and planned results. Each respondent could select as many PCA aspects as applied to their company. See Figure 9, below, for the results.

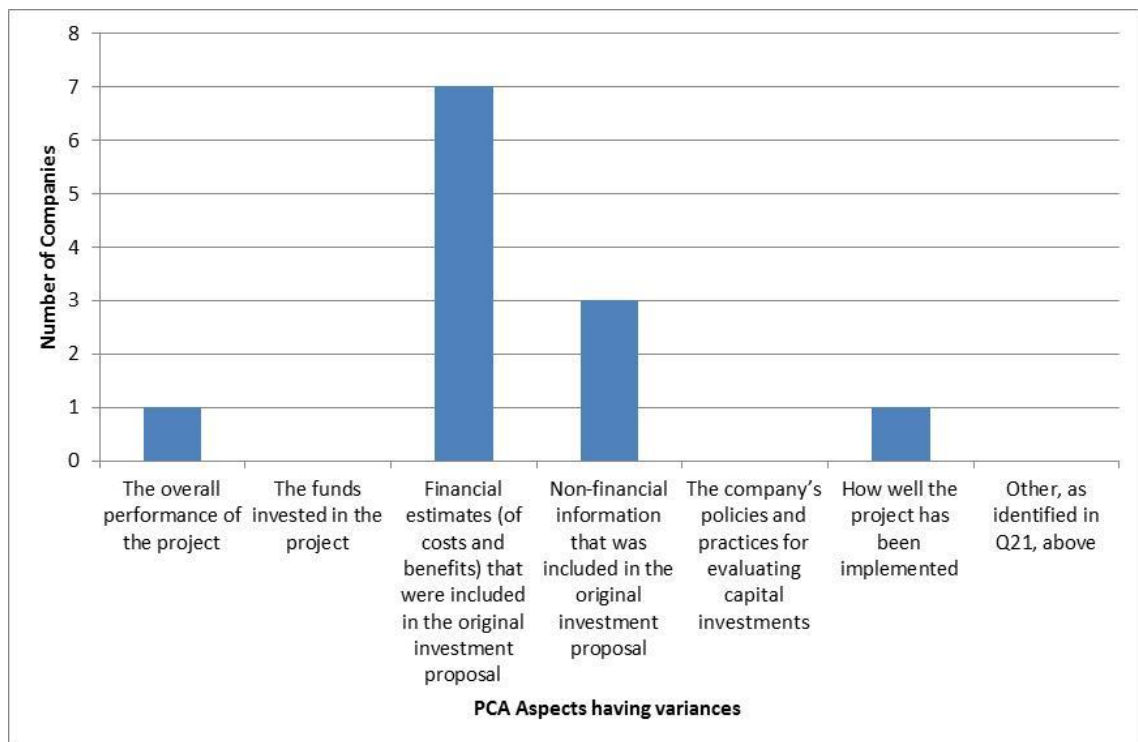


Figure 9 Greatest variance between actual and planned results by PCA aspect

The greatest variations between actual and planned results are indicative of the greatest room for improvement in capital investments. The PCA aspects identified were the overall performance of the project (one company), financial estimates (of costs and benefits) that were included in the original investment proposal (seven companies) and non-financial information that was included in the original investment proposal (three companies).

How well the project had been implemented and the overall performance of the project were each cited by one company.

Funds invested were not identified as having the greatest variations. Perhaps contracts are entered into, subject to capital investment acceptance by the company; and if the quotations and estimates change, then the projects are either not pursued or are re-evaluated. The revised and approved projects indicate the planned outcomes, which are then entered into through enforceable contracts.

### Reduction of Variances

Respondents were asked to indicate which PCA aspects have had their variances reduced. Each respondent could select as many aspects as those which had been reduced. The results are shown in Figure 10, below.

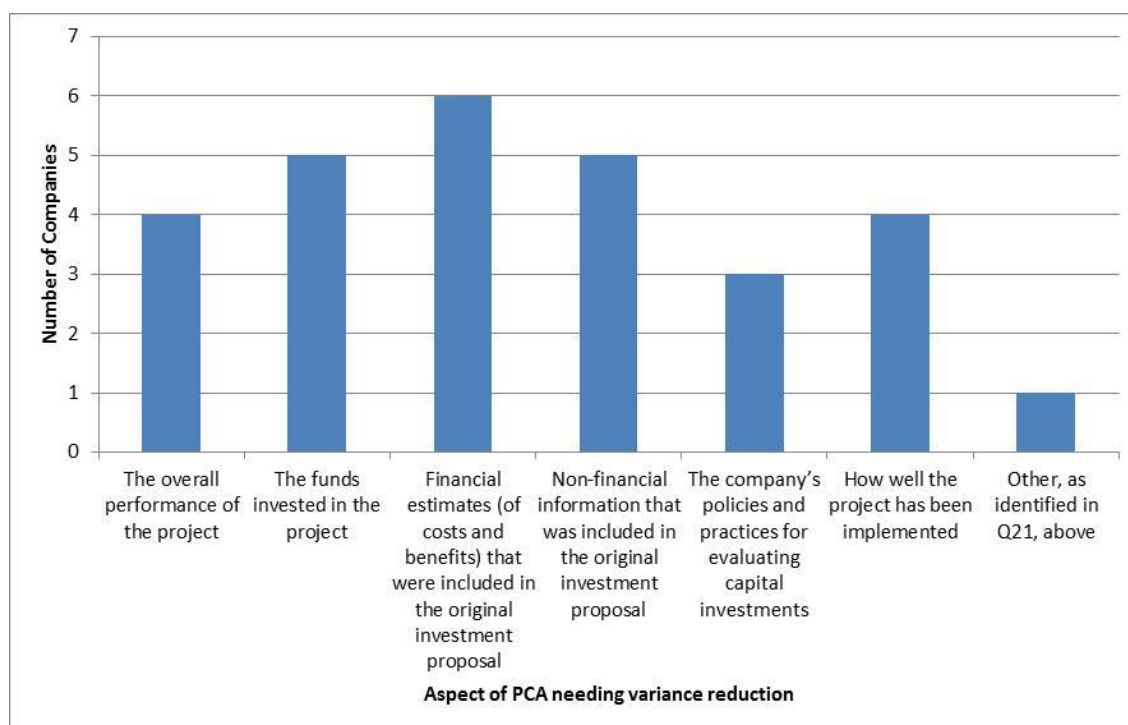


Figure 10 Aspects of PCA having their variances reduced

All aspects were identified as having their variances reduced. Most commonly, financial estimates (of cost and benefits) that were included in the original investment proposal (six) and funds invested in the project and non-financial information that was included in the original proposal (five) had their variances reduced.

One “other” PCA aspect was referred to but never identified by one respondent, and hence cannot be commented upon, other than that it was an aspect which the respondent believed was not covered by one of the pre-set PCA aspects listed in the question.

Table 7 Table of comparison between greatest variations and reduction in variations

<b>PCA Aspect</b>	<b>Greatest Variation identification</b>	<b>Reduction in variation identification</b>
Overall performance	1	4
Initial funds	0	5
Financial estimates	7	6
Non-financial information	3	5
Policies & procedures	0	3
Implementation	1	4
“Other”	0	1*

\*Not specified

### Areas of PCA which have changed due to a past PCA report

Respondents were then asked to indicate which areas of PCA have been changed due to a past PCA report, selecting as many as are applicable to their company. A rating scale of 1 to 5 was used, with 1= no change, 2=little change, 3=some change, 4=quite a lot of change, and 5=considerable change. The results are shown in Figure 11, below.

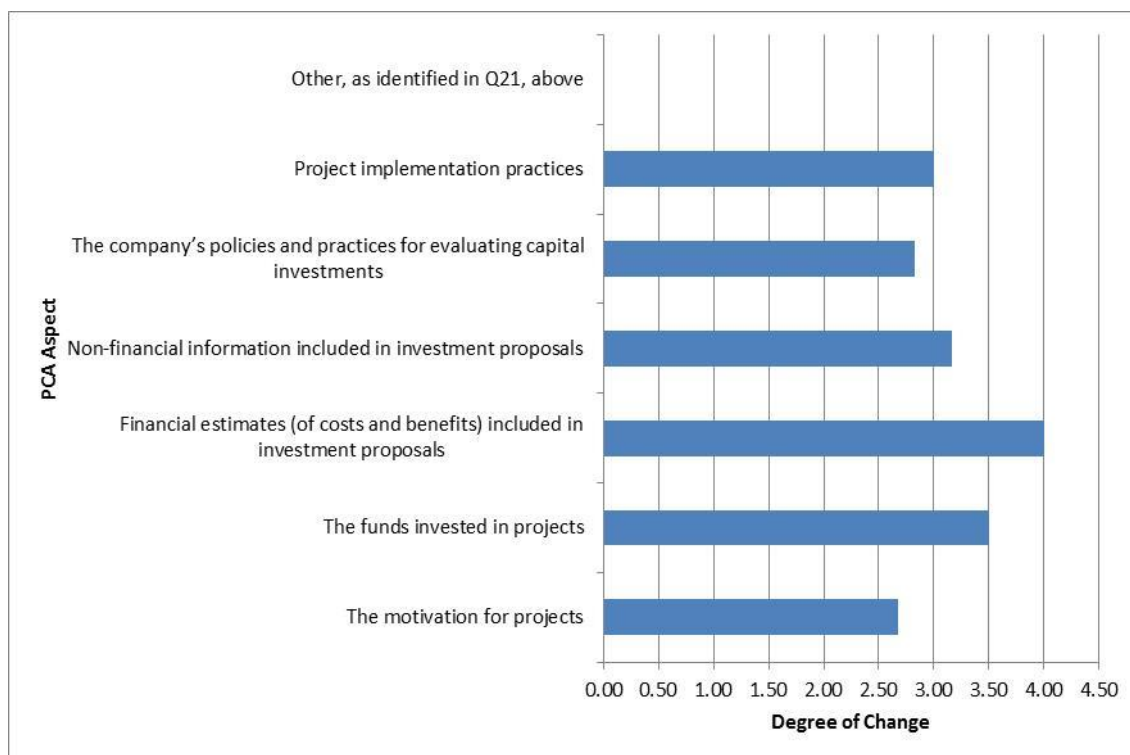


Figure 11 Changes in aspects as a result of PCA

The greatest changes have occurred in the area of financial estimates (of costs and benefits) included in investment proposals (3.88, significant change). Other areas which have changed somewhat include non-financial information included in investment proposals (3.13, some change), funds invested in the project (3.50, some change) and project implementation practices (3.00, moderate change).

Company policies and procedures have changed somewhat (2.75, less than moderate change).

### Examples of changes in PCA aspects

Respondents were next asked to disclose examples of changes made in PCA aspects. Their answers were open and are shown in Figure 12, below.

<b>Capital Investment process area</b>	<b>Example 1</b>	<b>Example 2</b>	<b>Example 3</b>	<b>Example 4</b>
<i>Financial estimates (of costs and benefits) included in investment proposals</i>	More disciplined use of financial estimates (more back up required) [Rated 4]	Modified financial modelling to ensure consistency [Rated 5]	Improved research and robustness [Rated 4]	Evaluating project lifecycle [Rated 4]
<i>The funds invested in projects</i>	Clear cash payback as a criteria [Rated 3]	Think managers are paying more attention to costs vs. budget and more accurately apportioning costs to projects [Rated 3]	Efficient capital allocations [Rated 4]	
<i>Non-financial information included in investment proposals</i>	More back up required for major operational estimates [Rated 4]	Previously overlooked, risk management and capability has been a focus [Rated 4]	Sell down profile and staging [Rated 4]	
<i>Project implementation practices</i>	Better project management and governance [Rated 5]			
<i>The company's policies and practices for evaluating capital investments</i>	Centralised business case, project Management and post reviews [Rated 4]	Implementation of a report where a written response on capital project variances of 10% or more than \$10,000 is required in the monthly report to the board of directors [Rated 3]	Initial evaluation criteria [Rated 3]	
<i>The motivation for projects</i>	Investment hurdles higher so justification needs to be better quality [Rated 3]	Alignment to strategy [Rated 3]	Changing project mix [Rated 4]	

Figure 12 Examples of changes in PCA aspects



## Barriers to Effective PCA Usage

### Scoring of a capital investment project

Only one company (Company O) had a scoring scale for its capital investment projects in its PCA reports. Nine did not. Instead they categorised projects as either “achieved”, “not achieved”. These nine companies did not score their capital investment proposals in hindsight of the results. The sole scoring company provided easy-to-understand feedback for its capital investment teams.

### Human barriers – accountability

Respondents were asked to indicate which additional uses of PCA their company engaged in: the people involved in capital investment, the capital investment process, or other uses. Respondents could select as many as applied to their companies. Results are shown below in Figure 13, below.

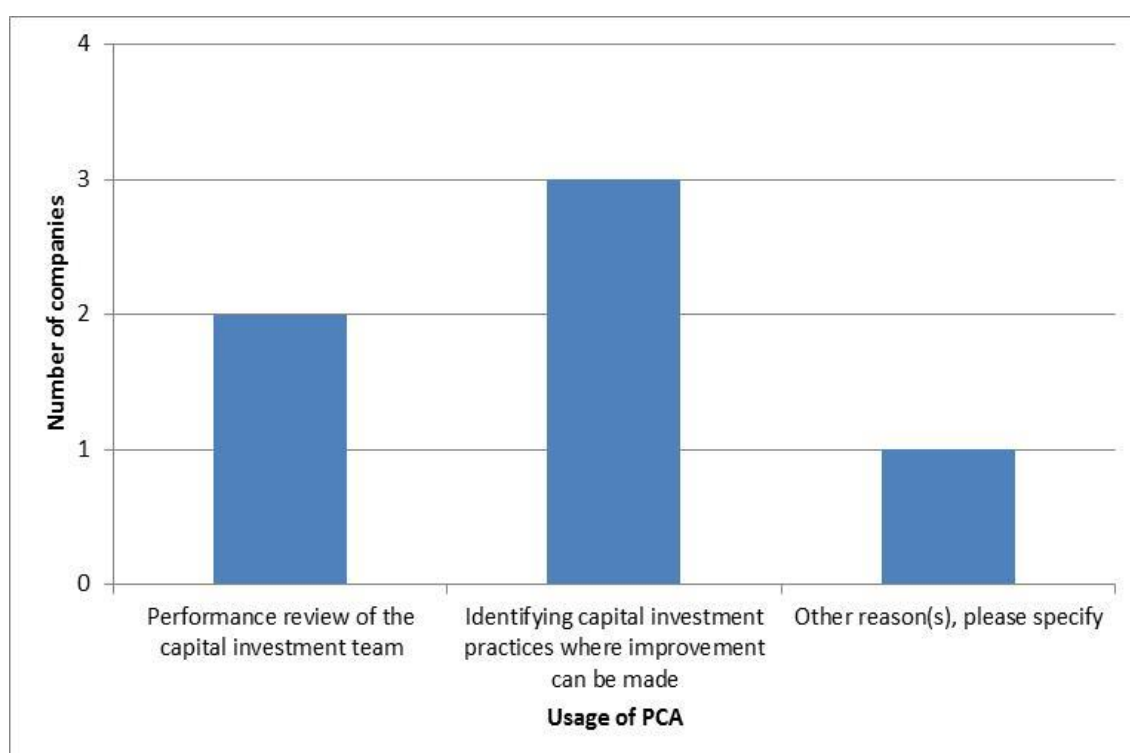


Figure 13 Usage of PCA for Specific Reasons

The most common additional usage of PCA was the impersonal identification of capital investment practices where improvements can be made (n=6). Four companies used PCA for performance review of their capital investment teams. The “other” usage related to how project managers themselves apply PCA reports for uses which they individually have identified for their teams.

## Summary of Findings

The above findings over the course of a 39-question survey of senior company officers and CFOs within large publicly-listed New Zealand companies produced six categories of information in this exploratory research.

The respondents were suitably qualified to complete a questionnaire and there were two groups of companies: New Zealand-only domestic operators and internationally operating companies.

The PCA designs of international operators have more elements than those of the domestic-only operators.

The PCA design element results were for some elements comparable but for other elements were less conducive for OL than those found in Finish companies by Huikku (2009). The actual PCA designs used by companies were congruent with the stated purpose, focus and aspect importance of their PCA-usage.

Companies showed an overall improvement in the variances across all aspects of capital investment. The linkage between those changes (OL) and PCA were clarified by PCAs' typical recommendations.

Linkages between PCA and OL, regarding causation of OL, show a *prima facie* alignment. It must be noted that the lack of organisational memory (OM) in most of the companies can indicate a disconnection with PCA, despite the respondents indicating that PCA recommendations create an opportunity for OL to occur if such recommendations are considered and implemented.

In some companies, human barriers can reduce the effectiveness PCA, namely through the fear that critical PCA reports could damage the careers or self-esteem of the staff being evaluated. This barrier has the *potential* to make PCA less effective.

A scoring scale for capital investment proposals via PCA existed in one company only. It is submitted that practices such as a scoring scale encourage a continuous improvement culture within a company by setting clear and transparent targets and progress marks.

## **Chapter 5: Discussion**

The previous chapter presented the findings of this research. This chapter will discuss those findings in relation to academic literature in five sections: PCA design, PCA contents, links between PCA and OL, the occurrence of OL and barriers to OL.

### **Demographical Information**

#### **Respondents**

It is expected that respondents are suitably knowledgeable in capital investment within their respective companies, as this was clearly stated in the recruitment letter to all companies. Responses indicate that all who answered the questionnaire are suitable due to their position, academic and professional qualifications and involvement within both capital investment and PCA. Only one respondent had worked for just a single year with his or her company, meaning that that respondent is unable to comment upon the same project with respect to capital investment and PCA. The other respondents had worked in their companies for longer.

The disclosure that a respondent is involved in either capital investment or post-completion auditing, but not both, weakens any weight attached to their responses in regards to the capital decision-making part in which they are not involved. Their knowledge of PCA can be found in PCA reports if they are indeed recipients of such reports.

The finding that most of the respondents were involved in both processes improves the creditability of the responses collected.

#### **Companies**

Geographical scope of company operations was surveyed to provide information about the competitive environment faced by the respondent companies. It is presumed that an international trading company would face greater competition from abroad, leading to a necessity to adopt international best-practices to remain competitive and improve their standing internationally; whereas a domestic-only operator is, to a large degree, subject to the local business environment, and possibly will have a less-developed PCA than their international counterparts.

Therefore, it is expected that the exporting companies and those with international operations will have greater OL from PCA and more normative PCA setups than those which are purely non-exporting domestic companies.

The findings support the above assertion that exporters and companies with international operations have greater PCA design elements present within their capital investment decision-making setup. As their market is larger and more competitive, they must be more competitive to survive and flourish (Nonaka, 1991).

### **PCA design elements**

The findings above suggest that New Zealand companies with international operations and exports have more PCA design elements (53% to 100%, all over 50) than domestic only operators (35% to 59%, only two of five over 50%). This makes sense because international operations and exporters are exposed to significantly more competitors who are determined to operate within the same market of the importing countries. To compete successfully, New Zealand firms would have to proactively adopt international best-practices.

### **Knowledge Acquisition**

This section will evaluate the findings of knowledge acquisition elements with a view to comparing them with the literature and explaining any similarities and shortcomings found.

The questionnaire's results on knowledge acquisition found that the NZX-listed respondents to this survey scored below the Finnish companies surveyed in **Huikku's** (2009) study.

All companies scored highly (six at 75% and four at 100%, averaging 85%) in the knowledge acquisition area of PCA design. The companies in Finland all scored 100% in this area (Huikku, 2009).

In theory, the criteria for selection of projects for PCA should include major projects (Mills & Kennedy, 1990), project size (Gordon & Myers, 1991) and risky investments (Kennedy & Mills, 1993), and repetitive or pilot projects (Huikku, 2009).

In practice, this New Zealand sample had selection criteria consistent with extant literature on project selection bases: large projects (Gordon & Myers, 1991) and

projects that have suffered an unfavourable development (Kennedy & Mills, 1993). This latter type of project are those that are significant but deviated significantly adversely from plan, in which case PCAs are used as a defensive measure to stop further decline, or for realignment to plan or abandonment.

Asides from project size, major criteria for selection were projects which had suffered unfavourable developments (four companies).

The finding is unsurprising. Reasons for this finding are possibly twofold: the New Zealand business environment and attitude towards risk. Because there is a perceived lack of investment capital in New Zealand, companies are always streamlining their processes and configurations to save costs in a high-cost economic environment with the aim of maximising profits. New Zealanders are believed to be generally risk-averse (NZTE, 2008). Thus, the protection of current capital investments to prevent decline and loss would be a normal reaction. A single loss of a project can be disastrous for a company because it will be widely reported in the media and investors will be dissuaded from providing capital or if they do, the conditions will be far more stringent. As stated in the introduction, New Zealand companies' capital investment on average for the financial years ended 2012 or 2013 consisted of 9.2% of their total assets. A loss of that significant proportional value would be very significant.

Five of the ten companies had their PCA conducted by staff from within both the investing unit and outside of it. Those outside can contribute an objective or independent approach (Gulliver, 1987), whilst those inside the unit can contribute detailed knowledge of the proposals (Dillon & Caldwell, 1981) and these members are critical to the compilation of PCA reports (Azzone & Maccarrone, 2001) because they can provide detail for the PCA, rationales, explanations for their proposals and the intangible elements of enthusiasm, optimism and gut feelings which motivate some of the inputs..

Three companies used only investing unit staff and two companies involved only an external unit. This may indicate *prima facie* two potential deficiencies: lack of independent valuation and thought (investing unit membership only) or lack of detailed knowledge and understanding of capital investment projects under evaluation (outside unit membership only).

It must be noted that the major concern here is the maintenance of the quality of the PCA (Huikku, 2008; 2009) not the people who carry it out.

Regarding the usage of only inside investing unit members, it should be remembered that New Zealand companies are considered to be small by international standards and due to this fact external staff with expertise in PCA reporting may not be readily available. Also, NZX-listed companies in New Zealand can consist of an entire single unit performing multiple functions. Perhaps the only people available are those who are within the investing unit itself. Research on the availability of skilled employees with the requisite skills must be conducted here to discover if it is a contributing factor.

The potential for bias is evident in the one company in which the internal units conduct their own PCA. This bias can reduce the value of PCA for OL.

Only one company involved an external unit only. The results for this question are almost consistent with Huikku's (2009) research on PCA design elements; except that the Finnish companies studied all scored 100% for this design element.

Few companies give responsibility for PCA compilation to external parties with no involvement in the projects at all (Farragher, Kleiman, & Sahu, 1999).

The presence of an outsider auditor can assist in the temperance of interference with the facts by unit insiders. This is a natural consequence of human behaviour when being held accountable – in such an environment, staff are likely to adopt defensive measures if performance has been deemed to be unfavourable in an attempt to downplay their responsibility for it (Argyris, 1991; March, 2006b). This necessitated the requirement for Q30 of the questionnaire on other uses of PCA.

Further research could usefully examine whether this result implies that strong controls on procedures and checks and balances exist to ensure that the quality of PCA reports is comprehensive and free from bias and manipulation by interested parties, and/or whether it is indicative of the high trust, low-regulation NZ business environment.

Additionally, in regards to PCA timing, it is interesting to note the polar responses from two companies. One company conducted PCA after their projects' completion, which was then indicated to be between 12 and 24 months – outside the typical time scope of a

capital investment project's lifespan. It is suggested that such projects are rolled over on a continuous basis as income-generating assets are replaced. Another company stated that it conducted PCA once a project had settled which may have two possible meanings: either one PCA is carried out at the termination of a project, which is when it has stabilised, or two PCAs are carried out, one at stabilisation and the other at the project's termination.

Three companies conducted PCAs once their capital investment projects had reached a settled state, six began their PCA process after a specified lapse of time period, and two companies conducted PCAs after their projects' conclusion. It is acknowledged that although there are nine respondents, there is some overlap between answers, as respondents could select more than one answer.

Huikku (2009) suggested from his literature review that to "satisfy its OL goals" (p. 8), a company should conduct its PCA shortly after a project has stabilised. A later PCA will diminish the ability to turnaround an unfavourably developing project. Success factors can be better discovered from conducting PCA later on in a project. This makes sense also from a logical standpoint: once a project is manifestly performing in reality as it was planned to, it can then be reviewed because it is this long-term execution that is being evaluated, rather than the setup phase of a project.

New Zealand companies tend to be small in their divisional and departmental structures with small numbers of employees, each of whom concentrates on their own job role, with little spare time for additional duties outside their occupation's contractual scope. Perhaps it is a sign that units review themselves more frequently than outside units, because of the shortage of qualified staff to conduct reviews.

These results are unsurprising as there is believed to be a lack of investment capital in New Zealand, companies are always streamlining their processes and configurations to save costs in the high cost economic environment and maximise profits and because New Zealanders are considered risk-averse generally (NZTE, 2008), the protection of current capital investments to prevent decline and loss would be considered essential reactions.

Other than the internal-external mixture of staff, knowledge acquisition is strong amongst the New Zealand companies in this exploratory survey.

## **Knowledge Interpretation & Distribution**

The distribution of knowledge is concerned with how organisations share information between their units and memberships (Huber, 1991).

What is most notable is that only two companies had a standard format for their PCA reports. Standard reports are used by companies because they are an exemplar for information gathering and processing, and are designed to be comprehensive and logical. These standard models have been tested and found to be most useful in practice. They also save time and resources and enable the development of expertise in PCA by refining and training PCA staff to perform their PCAs efficiently and comprehensively. The benefit of this is that PCA staff then become very capable at assessing the capital investment projects they review and this expertise creates a knowledge bank that can be applied to future assessments of projects. Standardisation also enables comparability and due to staff familiarity with the reports, they are understood by their readers.

Another element to note is that formal proposal follow-ups took place in only four companies. In one company there was an ad hoc follow-up, in another there was an informal follow-up (“cultural”). Informal follow-ups carry less weight and urgency than do formal follow-ups because the latter have enforceability and accountability attached to their issuance. This finding implies that the PCA follow-up is rather informal and executed upon a one-to-one basis. This is consistent with pre-existing research literature, which reports that few companies include proposals in the PCA process (Azzone & Maccarrone, 2001). Two companies had no follow-up. Two companies did not answer this question.

This means that for the majority of PCA reports, no recommendations are followed up. For these companies, does the OL which occurs take place due to other influences and not PCA reports? If that is so, then what is the use of devoting time and resource to PCA within such companies? Are PCA in that case reports that are completed as a matter of course without regard to their usage, and filed? Few companies also have formal mechanisms for following up PCA proposals (Azzone & Maccarrone, 2001).



The usage of the same ex-ante and ex-post calculations for the planning and evaluation of PCA is necessary to make valid comparisons. To do otherwise, would be to shift the goal posts and undermine the staff making the proposals. Ex-post calculations would ideally be an updated version of ex-ante calculations, with ex-post calculations containing actual values for proposed inputs (Huikku, 2009).

One company indicated a verbal exchange as one of its dissemination methods to its project managers and project leaders. The remainder indicated only written computer-based formats for its PCA reports to be distributed. Eight companies sent e-mails and written communications (including reports) and one company did not answer this question. The exchange of ideas resulting from e-mailed reports is likely to be lower and less immediate, if at all.

Two out of ten companies did not circulate the PCA report to all members involved in the PCA. Two were circulated only to internal PCA members and five were circulated to both members of the capital investment team and outsiders. One company did not answer this question. If the membership of the capital investment project team does not read such reports, how will they identify areas in which they will learn or improve? If they do not see their evaluations, unless specifically mentioned, they will continue as always believing that all is well – commonly known as ‘management by exception’ – and will only focus on improvements in areas that are most obviously defective.

PCA report findings were disseminated to members of capital investment project groups in over half of the cases. In one case the findings were sent only to executives and in another case they were sent only to directors. None of the seven respondents had a face-to-face forum for the presentation of PCA reports and recommendations. This lack of open face-to-face communication is a serious deficiency and may be a missed opportunity for in-depth dialogue and discussion upon capital investment projects. This type of communication method is useful because questions and answers can be exchanged in one sitting. In contrast, written reports might be read, but they might not be read, or they might not be read as thoroughly as an engaging dialogue. Face-to-face reporting and accountability is a powerful tool because there is nowhere to hide and queries can be resolved on the spot.

PCA reports did not often involve recommendations. Only two of the seven companies’ reports made recommendations more than “sometimes”. This may indicate that their

capital investment processes are excellent, or may reflect a gap in PCA scope or inadequacy in PCA depth.

Four of the companies disseminated PCA reports to all within their PCA group, two did not and one company supplied a blank response. Those evaluated who do not receive PCA reports about their work will not read them; instead their PCA reports will be read by only executives and directors, who are generally outside the PCA teams<sup>14</sup>. Consequently, they will not read the recommendations for improvement. Early research of PCA suggested that the distribution of PCA reports is limited and routine dissemination amongst divisions is rare (Kennedy & Mills, 1993). The New Zealand companies surveyed had limited distribution, with some distributing PCA to directors and executives who are outside the capital investment proposal process. One company distributed to only project members and to no other personnel. Huikku (2009) suggests that PCA reports be distributed at least to “*everyone involved in planning, approval, implementation, and PCA phases of a reviewed investment project.*” (p. 13). The approval phase of a project will often include senior managers and even directors. The former will be within the unit and the latter will be external to the unit with overall oversight within the company. If reports only go to the directorship, then the investment unit will not benefit from the reports directly. In this scenario, the reports could only improve the investment unit indirectly, if changes were made to the PCA process by the directors and imposed upon the investment units, leading to change in the company’s policies and procedures.

### **Organisational Memory (OM)**

For the most effective usage of PCA reports for OL, a company should have archives - a form of organisational memory (OM) - that are known to staff and that are retrievable by relevant persons. None of the companies surveyed had an OM of PCA. In Finland, Huikku (2009) found that only 14% of companies surveyed had an OM for PCA

An organisational memory serves learning through containing records of past projects, their successes, and their deficiencies, the outcomes of changed processes and procedures, and refinement of evaluation processes over time. The success of such changes is evident in future PCA reports.

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<sup>14</sup> It should be noted that some executives and directors are part of the capital investment teams, but this is not always the case. Where they are not part of the capital investment team, the distribution of PCA reports to teams is limited.

Eight companies scored 0% for organisational memory of PCA, one scored 50% and another 100%.

The lack of effective OM is a glaring deficiency. If there is no database for PCA reports, then how are the PCA reports archived, and who can access them and who will know about their existence and contents? This is indicative of a lack of importance attached to PCA reports and their usefulness. The OM of PCA reports will then be confined to those present at the time reports are distributed, not the organisation itself, i.e. no centrally held database of PCA reports accessible by office and position holders within the company. The organisation's memory and individual knowledge of PCA then will move on with the individuals and not be stored within the company, where it might otherwise have been passed on and be utilised by future capital investment teams.

In summary, the results can be read as follows: the NZX-listed New Zealand companies that participated in this study (ten usable responses) have an excellent system for knowledge acquisition, some elements of interpretation and distribution of this acquired knowledge, but lack organisational memory to make optimal use of it in the future.

According to Walsh & Ungson (1991), OM means stored historical information stored in an organisation, which can be used to aid present decisions. They assert that mistakes are repeated because of an organisation's malfunctioning OM. Staff turnover and organisational forgetfulness are major threats to learning lessons from past projects.

The New Zealand respondent companies have no organisational memory, and because it does not exist, no one can access PCA reports to learn from them. This has serious potential for repetition of past mistakes, especially if personnel have left as a result of past errors but without the remaining personnel understanding these errors. Also, new policies and procedures might be implemented on the basis of flimsy evidence, because there is no organised system for recording errors and their causes.

Without an organisational memory knowledge gained from PCA reports could be lost or fail to be communicated to the capital investment project teams and their units. Indeed, the company as a whole could not benefit from the very purposes of conducting PCA reports.

If no database exists, then personnel will not know of past reports and relevant personnel will not have access to this knowledge. The following will discuss the consequences of an absent OM as a missed opportunity for OL.

The distribution of a PCA report occurs after a short time following its completion and it will be received by employees involved in capital investment proposals. New personnel and external units will not receive such reports necessarily and so, without an OM, this knowledge cannot be captured and stored for use outside of those receiving the knowledge. Thus, it is suggested that the distribution of this knowledge throughout the company is lacking. The barrier to OL evident in this finding is that companies without an OM lack an important resource to enable future capital investment project team members to engage in learning. Instead, they potentially commence each new phase of learning without any organised knowledge of the companies past projects. If OM is missing the organisation's historical and empirical knowledge cannot be readily accessed and used by employees. Unless memorialised, important lessons can be lost as employees leave (Levitt & March, 1988) and the company forgets (Carmona & Grönlund, 1998). Huikku's (2009) research in Finland found that one possible reason for the absence of an OM of PCAs is the commercial sensitivity of the information contained within the reports. There may be policies of the company which restricts access to only the investing unit and then only to capital investment employees and no one else.

Retaining only the PCA reports within a single unit allows only that unit to learn from its PCA. As employees move between units, they may transfer some of that knowledge with them to their new units. However, only a portion of that overall knowledge is taken; most of it is left behind.

The lack of an OM, it is suggested, undermines the application of a PCA to a company because learning is restricted in access and without record. Those who receive the communication will have knowledge, but not retain all of it. Employees, who conduct future capital investment projects after the PCA reports are completed, will have no knowledge of their contents, unless the information is communicated to them or unless recommendations have been incorporated into the policies and procedures which they are using.

Only one company, an international exporter, scored 100% for the OM section. That company had a database for PCA reports. Employees knew of the database and relevant employees had access to it. Another company, an international operator, scored 50% for OM, as its employees knew of the database containing the OM. All of the domestic-only operators scored 0% for OM. The extent of OM in Finland was similar, being two out of fourteen companies scoring 100% for OM (Huikku, 2009).

Technology and database management are advanced and cost-effective in contemporary times. Previously, the cost of creating, administering, storing and retrieving information was costly and time-consuming in the paper-based record days. In modern times, computers and electronic searches enable information to be located and retrieved in accordance with the specifications required by the retrieving party. This information can be updated often in real-time and duplication of work has been reduced. The only time-consuming factor now would be educating employees on the databases' content.

Other factors which may possibly explain the low presence of OM, it is submitted that they are the perceptions about the size of New Zealand companies and the longevity of employees in senior positions. As companies have fewer senior employees than abroad, and because these employees remain in their positions for many years, the OM exists in these employees and that OM is used by them in the capital investment activities on behalf of the company. As they are employed for a long period, creating an OM probably never occurred to anyone because the personnel and their memories are expected to remain in place.

This is a missed opportunity to incorporate the learning from review (PCA) into the company's frameworks and *weltanschauung*<sup>15</sup> (Kim, 1993). The reports seem to be prepared for a particular limited audience (executives of capital investment project team members) and for a limited distribution within the companies, i.e. to those within the actual project and not across the company. This is a lost opportunity because the knowledge could be applied to other company units for the benefit of improving those units' capital investment project proposals.

The absence of an OM database suggests that PCA reports are not stored centrally, but on the computers of those who receive them and who conducted them. This dissemination is narrow and too specifically targeted. Capital investment projects will

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<sup>15</sup> A German word meaning "a particular philosophy or view of life; the world view of an individual or group." (Oxford Dictionaries, 2013).

have certain fundamental features which are common to all and where a deficiency exists in one within the same organisation, it is likely that this deficiency also exists elsewhere. How then, does OL happen in such companies? Or is the OL limited to just the investing unit which receives the PCA report?

### **PCA itself as used by NZ companies**

This section of the questionnaire (questions 20–22) was designed to establish the actual content of the PCAs in New Zealand's publicly-listed companies.

In PCAs there should exist a consistency between purpose and focal points, with the latter being derived from the former. The importance rating of the various focal aspects should result in similar importance ratings being given the matching focal points. Those aspects which rate highly, but are not a focal point of the PCA shall be examined further.

If PCA purposes are achievable through focal points and points are included in the PCA because they are rated as important, then the PCA used by companies is useful.

### **Purposes**

The purposes for PCA listed in the survey questionnaire were those found by Gordon and Myers (1991) and Azzone & Maccarrone (2001). In those studies, they were called 'objectives' of PCA. Gordon and Myers (1991) surveyed large US companies and found much agreement amongst their executives in regards to PCA objectives. Azzone and Maccarrone (2001) found that the objectives of PCA influenced the design of a PCA system (performance control vs. learning objectives). It is to be noted that although both studies included a large number of respondents, neither study produced any numbers or percentages in regards to objectives of PCA in the resulting journal articles. Thus, the relative prevalence of each objective identified by the authors cannot be matched against the frequency counts in this research.

The findings from this survey agree with three of four of the Gordon and Myers's (1991) objectives and all three of the Azzone and Maccarrone (2001) objectives. Financial control features strongly as an objective, indicating that accountability for the use of a company's resources is a primary aim. Another objective is information for future capital investment decisions. This suggests a future-focussed use for the PCA reports, applying after the projects being post-completion audited. Another objective is

the encouragement of due diligence. Companies hope that when investment teams know that their proposals and plans will be audited, that they will be more diligent in their submissions.

On these three points there is consistency in the findings from the United States of America (Gordon & Myers, 1991) and Italy (Azzone & Maccarrone, 2001). However, there are some objectives in New Zealand which were less used or not used at all.

No companies cited the identification of unsuccessful projects for bailout as a PCA objective. This is surprising, given that New Zealanders are viewed as risk-averse investors (New Zealand Trade & Enterprise, n.d.). A risk-averse investor will avoid investment in any projects which appear to be uncontrollably risky. Once a project is underway, one would presume that New Zealand companies would also monitor projects closely, especially identifying those which are unsuccessful, as a defensive measure.

This suggests that perhaps other mechanisms are used to identify such shortcomings, which preclude a PCA, and at a micro-level enable real-time changes to be made step-by-step. Modern technology can provide real-time information as transactions occur. In contrast, a report deals with the project's performance overall. It might also suggest that PCAs are conducted well after the point-of no-return for projects. In that case, the findings of such PCA reports can only be used for future projects and not current ones.

Around half of the companies conduct PCAs on a project after a specified period of time, most commonly between 12 and 24 months after a project has commenced. With projects operating for more than one year, it is surprising that the identification of projects requiring bailout was not selected as an option by the respondents, because at this early stage, audits could provide indications of the project's future success. It appears then that the time period helps the identification of current projects for improvement which, at a period between one and two years after commencement, would be early on in the lifecycle of many projects.

Goal congruence deals with the alignment of management and company objectives and operates in tandem with the identification of opportunities to bail out unsuccessful projects as identified above. 'Bailing-out' deals with assessing projects while they are in progress still and either rescuing or abandoning them. Successful projects will benefit both management and the company; failed projects will harm both, with management

experiencing the fallout personally. It is in the best interests of both management and the company to have their goals aligned so they work with one another rather than work for goals which at the expense of the company (the agency problem). The paucity of companies which having goal congruence as one of their PCA objectives suggests that it is not as important a consideration as the success of projects and a focus upon future project successes. Further, goal congruence has perhaps already been achieved through other procedures, policies and processes within the company.

## Focal Points

The focal points of PCA reporting were derived from the PCA process as identified by King (1975) and by applying capital investment valuation methods, notably the Net Present Value (NPV) method.

As PCA compares actual with planned results, the results are derived from the capital investment method and encompass initial outlay, recurring cash flows, overall performance (valuation), non-financial information or actual performance, implementation ease and the policies and procedures of the capital investment decision model. See Figure 14, below, for a pictorial illustration of the temporal nature of the focal points and their scope during the project lifecycle.

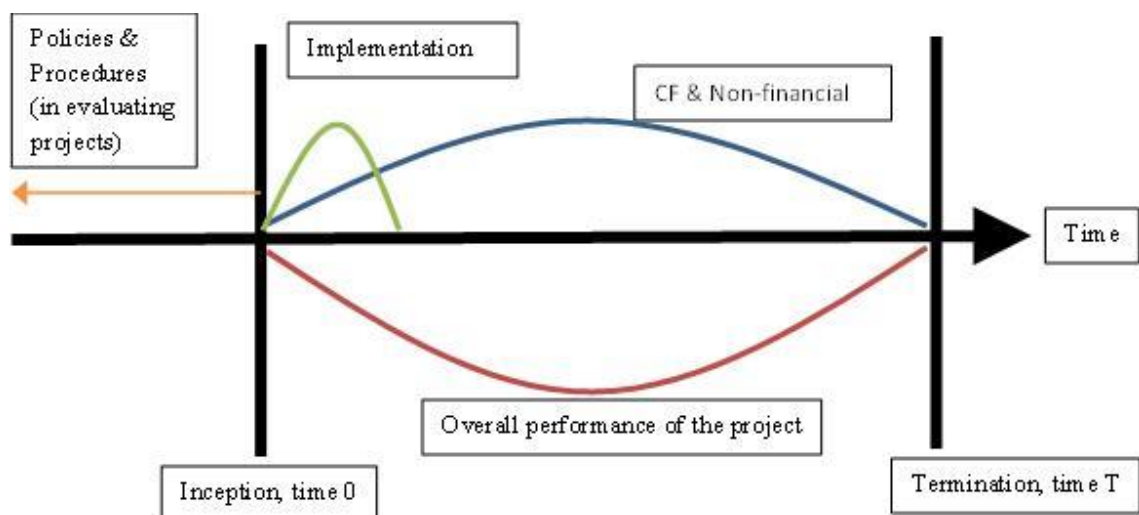


Figure 14 Focal points of PCA reports by temporal scope

Policies and procedures pre-exist the capital investment proposal and are applied during and after it – policies and procedures are in permanent existence and they are independent of any specific project. Initial and recurring cash flows take place immediately prior to, during the life of the project and at its termination.



Implementation of the project occurs between proposal acceptance and commencement of business operations. Non-financial information refers to actual practical performance of the project, including quantity and quality assessments of outputs. The overall performance of the project is assessed and known at the termination of the project.

The findings indicate that policies and procedures used in the capital investment process are not focal points of PCA reports. It can be inferred that the models are taken for granted and it is the application of the capital investment models (single-loop learning) which are under scrutiny via PCA. It is suggested that the capital investment models have been accepted and are working adequately to achieve their aims. The focus of the companies is very much on single loop learning.

The initial outlay of funds and implementation of the projects occur at project initiation and are restricted in scope to that time frame. Together they form the foundation of the project. The entire lifecycle of a project is much longer than its implementation phase. Hence, what happens after these phases shapes the success or failure of a project.

Financial measures driving value (recurring cash flows) were more often reported upon than those that were unrelated, such as policies and procedures. Non-financial measures were reported upon, because although profitable, a project can still fail if it does not perform as planned, for example if the quantity of outputs is insufficient or if the quality of the same is substandard.

These findings also suggest that initial outlay are accepted as granted and that it is the subsequent recurring cash flows which are the real focus of reports, perhaps because they drive project value.

The absence of focus upon the policies and procedures of PCA at first sight precludes double-loop learning, as only single-loop learning is involved in the form of evaluating the usage of the existing models only.

To ensure that the actual PCA used by companies can enable OL to occur, there must be consistency between PCA purpose and the focal points of the report. For example, if the purpose is control yet there is no focus upon compelling the company to achieve financial targets, then the PCA report will not achieve control over financial resources.

There appears to be no focus upon policies and procedures in actual PCAs carried out by the respondents in this survey. Policies and procedures examine the beliefs

underlying the capital investment process and are hence a double-loop component. This consideration appears to be disconnected from PCA usage, although it is identified as a purpose of the PCA report. It is suggested that this may indicate that the capital investment process is taken for granted and is reviewed through other mechanisms.

### **Focal Point Importance**

This question is designed to ascertain the importance of each focal point to the company undertaking PCA reporting. An important focal point should ideally be a focal point of a PCA report, which should serve to achieve an identified purpose of the PCA report.

An important focal point should have a high level of presence in PCA reports and conversely an unimportant focal point should have a low level of presence in PCA reports.

Monetary focal points (i.e. overall performance, initial funds invested, financial estimates of costs and benefits) were rated more important than non-monetary focal points (i.e. policies and procedures, implementation, and non-financial information).

The most common focal aspects rated more than four and the least common focal aspects rated less than three. Consistent with its absence as a focal point, policies and procedures rated 2.33 (of little importance), the lowest focal aspect. Monetary focal points (the non-policy and procedure focal points) were rated higher.

Overall performance was rated highest (4.50). The overarching consideration of any capital investment is the amount of profit it will earn the company over a project's lifetime. Overall performance is the ultimate indicator of success or failure of a project and is the source of wealth creation. Consistent with this are drivers of wealth creation, viz. recurring cash flows throughout a project's lifecycle netted against initial funds invested. These were all rated as important. This finding emphasises that wealth creation is the most important consideration and reason for capital investment, as *certeris paribus*, a practically sound or a necessary safety improvement project may be rejected by businesses if it is deemed to be economically unprofitable<sup>16</sup>.

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<sup>16</sup> An example is the Pinto car which would explode if rear-ended in an accident. An analysis of the cost of making the rear stronger outweighed the benefits to the company, so making the car very much safer was unprofitable, albeit highly beneficial to their passengers. The cost of recalling the cars and replacing the flawed design was \$137 million set against the cost of paying off victims only being just under \$50 million (Drayton, 1968).

Each of these items are part of the single-loop learning cycle, that is, they are inputs in capital investment models and are the actions identified in the Argyris and Schon (1978) model of OL.

The identification of initial funds outlay as very important is consistent with existing research literature. The variance in initial outlay can be as high as 43% (Soares, Coutinho, & Martins, 2007, p. 27), the highest variance category in PCA. The rating of non-financial information below that of monetary focal points is consistent with capital investment being primarily concerned with wealth creation.

However, non-monetary focal points were rated as less important.

Policies and procedures seem have been excluded because they were rated as of some importance only. If policies and practices are not part of OL, the potential for double-loop learning is lost. This learning enables the models of capital investment to be reassessed, refined and improved to achieve greater accuracy in results. For example, if the payback period evaluation method was used by a company (its model) and it was identified in a PCA that better models were available to the company, then without reviewing policies and procedures, the payback period could continue being used. This would preclude the discovery and usage of evaluation methods such as Net Present Value (NPV) and the most recent improvement, Real Options NPV, which reflects reality closer because in practice, projects are rarely fixed or unable to be changed throughout their entire lives and options refer to choices that can be made during the course of a project's life to improve it. It is suggested that this single-loop focus could be used to assess the usefulness and applicability of the capital investment models used by the companies through showing the project variances, without explicitly critiquing the models used.

The focal points selected are concerned primarily with the control function of accounting, e.g. financial estimates of costs and benefits, initial funds outlay, non-financial information, and implementation of the project. Other focal points are concerned with the capital investment model used, e.g. policies and procedures.

Aside from policies and procedures, there seems to be no disconnection between purpose and focal points. The most important focal point is the overall performance of the project which is only a focal point for some companies, whereas financial estimates were important and non-financial information was somewhat important also.

Less than half of the companies have funds invested in projects as a focal point of their PCA, despite rating it as more than important. This could suggest that the funds invested could be taken as a given over which the company has little control, or perhaps because the companies receive quotations which are live and conditional upon acceptance of the projects by the company. At that point the contracts become signed and enforceable at law. In this case, the proposals closely match reality unless project scope changes.

It appears that the companies' PCA setups have a consistent linkage between purpose and focal points and the purpose appears, on the face of it, to be single-loop learning.

### **Links between PCA and OL**

This question serves to establish a *prima facie* causal link between PCA report recommendations and OL.

If a PCA aspect is a typical recommendation from a PCA report, then the report is capable of being used for OL. If a PCA recommendation is absent then the PCA report cannot be said to be a cause of OL affecting a PCA aspect as without a report recommendation, that aspect of PCA cannot be changed.

The four typical aspects of PCA report recommendations were cited with equal frequency by the respondents.

The four aspects are:

- (a) Performance of projects (includes PCA aspects of outcomes and implementation);
- (b) Initial outlays of funds (includes initial capital expenditure and implementation);
- (c) Inputs into the capital investment process (includes figures and values and non-financial and financial estimates); and
- (d) Overall capital investment process (includes model and motivations and policies and procedures).

Recommendations about (a) could be the design of the capital investment project and the projects' business models; about (b) could be the completeness and timing of capital expenditures; about (c) the forecast values, including those calculated and raw; and

about (d) the capital investment evaluation model and the formulae used, established processes, the refinement of such models and their modification into novel ones.

If the above aspects are not improved, then it is suggested that the usefulness of PCA is absent for that aspect.

Since all four aspects were typical recommendations in the PCA reports of the NZ firms that participated in this study, a *prima facie* causal link has been established for OL arising from PCA reports.

### **Occurrence of OL**

Organisational learning (OL) is a positive change in the stock of an organisation's knowledge between two time points (Bontis, Crossan, & Holland, 2002). Regarding capital investment decision-making, the change sought after is that of variance reduction in a single area or multiple areas, such as in revenue forecasts, cost forecasts, initial outlay budgeting and output specifications. In the capital investment context, the most desirable forms of learning are the improvement in the forecasting of cash flows and their timing, because they significantly influence the value of a proposal. Single-loop and double-loop learning are both desirable, with double-loop learning being the most desirable because of its revolutionary effect upon an organisation (Huikku, 2008).

The companies have not been divided by their demographics, but instead are treated as a single group in this discussion.

### **The potential for OL**

Respondents were asked to assess their companies' PCA aspects in terms of the greatest variations in each between actual and planned results. The greater the variations, the more potential that exists for OL – some factors may be beyond the control of the company while others can be influenced to some degree by the company. It is in the latter that OL can be the manifestation of improvement. The former, once acknowledged, can be then noted and put aside.

Soares et al. (2007) studied Portuguese companies which submitted proposals for government contracts found that the variances between actual and planned results were significant and existed regardless of company size, industry or region. The authors discovered that on average sales were overestimated by 9%, operating costs (excluding personnel costs) were almost accurate at 0.5% overestimated and personnel costs

underestimated by 3%. The greatest variance existed in the initial funds outlaid: fixed asset spending was underestimated by 50% and initial working capital was underestimated by 40%.

In this research, the most cited greatest variation aspects are the financial costs and benefits and non-financial information. Overall performance of projects was mentioned, covering all estimates. However, initial funds outlaid were not cited as having the greatest variances by any companies. This is in stark contrast with the findings of Soares et al. (2007). It is perhaps suggested that New Zealand companies receive quotations and estimates which are valid for a fixed time period and are fixed during the proposal submission stage. If they change afterwards, then the proposals are re-assessed in light of the changes. Alternatively, perhaps quotations are received and contracts are conditional upon acceptance by the proposer's company.

From the findings it is not clear whether revenue forecasts or expenditure forecasts are the most significant items of variance in the financial costs and benefits, although financial costs and benefits are identified as having the greatest of variances by most of the respondent companies, even more so that the initial funds invested in projects.

Funds invested were not identified as having the greatest variations. Soares et al. (2007) found that there is a "high degree of volatility" (p. 36) in the funds invested, of which delay in investment was cited as a possible reason for such difference.

Perhaps, as stated above in the focal points section (page 61), contracts are entered into, conditional upon acceptance by the company and if the quotations change, then the projects are either not pursued or re-evaluated to reflect the changes. The revised and final approved plans indicate the planned outcomes for the projects, which are then entered into by enforceable contracts, thus ensuring certainty in the planning process.

Hence, with the two aspects of financial costs and benefits and non-financial information being identified as having the greatest variances and thus greatest potential for OL, the next section shall examine these areas for the occurrence of OL, as evidenced by the reduction in variances.

## **Evidence of OL**

From Table 7, on page 43, above, it can be seen that at least three companies stated a reduction in variation for each aspect, regardless of the number of companies which stated which aspects exhibited the largest variances between actual and planned results.

Despite initial funds invested and policies and procedures identified, there was a reduction in the variances of each of these two factors by several companies. The question regarding the reduction of variances was asked in isolation of PCA involvement in those reductions. Therefore, actual reductions, regardless of impetus, were surveyed. All of the aspects had involved some OL.

All variances are considered to be changed by single-loop learning, primarily. Changes in policies and procedures can be said to be a form of double-loop learning. These were changed by three companies but not recognised by any as having the greatest variances.

It was expected that reduction in variances would occur for financial costs and benefits because they were identified by seven companies as having the greatest gap.

## **Learning Loops**

There are two types of OL under the Argyris and Schön (1978) model: *single-loop learning* (SLL) and *double-loop learning* (DLL). Questions were asked of respondents to determine: (i) the variations-gap to establish space for learning; (ii) to establish the incidence of learning; and (iii) to discover the type of learning, be it SLL or DLL.

In this dissertation, SLL refers to changes in the inputs into the capital investment decision model; DLL refers to changes in the capital investment model. The inputs are the actions and the model is a representation of the beliefs behind those actions. A change in the model will reflect a change in the belief about how results will be achieved. A change in inputs only changes the results.

SLL occurs when actions are changed to arrive at the desired results; DLL occurs when the beliefs underlying the actions are changed, leading to changes in actions, resulting in the desired results.

Learning occurs because the organisation is better off as a result of the change. Negative consequences can result, but learning has still taken place – the organisation knows that a course of action or a change produced adverse consequences for it.

OL is highly desirable because it can assist a company in retaining its lasting competitive advantage (Nonaka, 1991). A reduction in variances between actual and planned results will increase confidence in project valuations with respect to wealth creation and relative to other projects, so that the optimal combinations of projects are selected for the long-term prosperity of the company. OL can also occur if the capital investment process is made more efficient and accounts for more significant factors or inputs. OL can also improve through the identification of barriers to OL or the identification of shortcomings in a company's policies and procedures. In all of these cases, there is a change in the stock of knowledge about capital investment. This knowledge might be reactive and aimed at improvements in current operations, or it might identify and acknowledge areas for future change. In both scenarios there is more knowledge about the capital investment process than existed prior.

The actions executed are those which are carried out to achieve the result of an approximately correct project evaluation.

The beliefs are the processes and models upon which the actions are entered, with the confidence that such processes and procedures are accurate and reliable at forecasting a project's evaluation. Such confidence is necessary to choose the correct alternatives for capital investment.

The remainder of this section will ascertain the type of OL which materialised.

### **Single-Loop Learning**

Single-loop learning involves the altering of actions to arrive at the desired results (Argyris & Schön, 1978). Changing an input in the capital investment model (action), e.g. sales forecasts, if more accurately able to be calculated, can result in an evolutionary change in the accuracy of the forecasted value of a project (results). It is these deviations that PCA seeks to reduce and their reduction can indicate the occurrence of OL as variances are diminished.

The financial estimates of costs and benefits experienced significant change from PCA as well as high overall reduction. This is consistent with financial estimates of costs and benefits having some of the greatest variances. The influence of PCA reports is significant, suggesting that PCA has contributed a great portion of the SLL. PCA reports have clearly shown the differences in magnitude and lead to them being targeted for refinement. As a result, it is suggested that the variance reductions have been caused



significantly by their identification through PCA reports being acted upon. This is consistent, as seven companies have cited this as a focal point for PCA reporting.

Non-financial information was stated by some companies as having amongst the greatest variations, having undergone large reductions, influenced more than moderately by PCA reports.

The implementation of projects was cited as having less than a great variance. However many cited it as having undergone a lot of reduction in variances, on which PCA reports had a moderate influence. This is not surprising as only three companies had cited it as a PCA focal point.

In this research, SLL refers to changes in the inputs into the capital investment model.

### Double-Loop Learning

Double-loop learning (Argyris & Schön, 1978) occurs by changing an evaluation model (belief), e.g. shifting from NPV to Real Options NPV, which changes the inputs into a model (actions), to then arrive at a more accurate forecast of value (result). If one is more accurately able to process the inputs into the model, this can also result in a revolutionary change in the accuracy of the forecasts. Depending upon the capability of the capital investment valuation model for its usefulness in forecasting the value of a proposed project, although theoretically sound, may result in significant deviations in reality.

In this research, DLL refers to changes in the capital investment project models used.

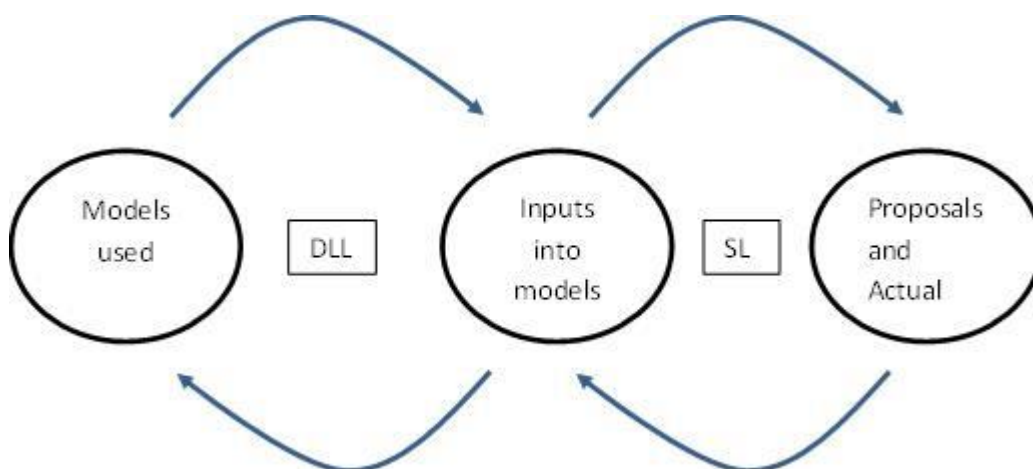


Figure 15 Learning Loops for this research

The findings on the potential for OL (greatest variations), organisational learning occurrence (reduction in variances) and the influence of PCA upon learning (changes resulting from PCA) can be examined together. Reduction in variances is due to the sum of PCA and other factors. The rating of changes due to PCA indicates the influence which PCA reports have impacted upon OL.

The *monetary* item variances were rated by more companies as having the greatest variances, the most reduction in those variances and as being an area in which PCAs had a higher influence in reducing variances.

The *non-monetary* item variances rated by fewer companies as having the greatest variations, a lower reduction in variances, and as being an area in which PCAs had a lesser influence in reducing variances.

Financial costs and benefits were cited by most as having the greatest variations and a reduction in variations, and as being an area in which a great deal of change was as a result of PCA. This is indicative of single-loop learning. Inputs, such as sales and variable costs, are refined with each capital investment proposal iteration until such forecasts are more accurate. These are essential to predict, because these repetitive long-term cash flows are determinative of a project's success. This is inconsistent with the literature (2007), which indicates that except for sales forecasts, these variations are minute (between -0.5% and +3.0% for non-personnel operating and personnel costs).

The initial funds invested were not identified as having the greatest variances. However, many companies cited it as having undergone variance reduction on which PCA had a moderate influence.

Policies and procedures were not cited by any company as having amongst the greatest variations; however they policies and procedures were cited as having had their variances reduced. This is supported by the finding that this category had undergone less than moderate changes (scoring 2.75/5.00) as a result of PCA reports. This implies that the causal link between PCA reporting and change in policies and procedures is incomplete and that changes are as a results of other influences. It is suggested that PCA usage in this sample is used to assess the monetary and non-financial information outputs for predictability at the proposal stage. The models appear to be taken for granted and some influences outside the PCA process lead to changes in policies and procedures. Perhaps the PCA reports here serve only to bring attention to possible

shortcomings with the models used so that capital investment project teams might adopt new models as they are created by academics and in-house experts.

It is submitted that the question about policies and procedures may have been taken to mean the application of policies and procedures to the capital investment process. How closely they are actually applied as compared to the company's rules, is the subject of examination here.

It is difficult to separate out the SLL and DLL influences upon all aspects of capital investment, because the measure of the contributory effect of each upon the variances is unknown.

The findings from this NZ survey suggest that both types of learning are taking place. DLL is evident in the open-question responses given to examples of changes in process which is a change in the beliefs underlying the actions taken by staff. Changes in the processes are revolutionary and arise from exploration into new methods of operating (March, 2006a). Process changes are not merely exploitation of the contents of the existing capital investment decision-making regime; they add something new to it. Single-loop learning encompasses exploitation of existing knowledge in an effort to maximise its application to the organisation – efficiency, streamlining, etc. are typical examples of such learning (March, 2006a).

The examples cited indicate DLL. One respondent cited the alignment of capital investment motivation with strategy as a belief which underlies actions. That respondent's company may have been engaging in profitable capital investments which were drifting away from its core strategy. The presence of a core strategy is a clear example of a belief on how a company should conduct itself to achieve its goal.

When PCA aspects change as a result of past PCA reports this can be indicative of OL because changes are indicative of an improvement which results from an increase in knowledge. Financial estimates of costs and benefits are long-term and recurring, so they must be more accurately forecast.

### **Examples of OL**

This question triangulates the previous one: if changes have been made, with PCA reports being the catalyst, then any examples given will provide details of such changes.

This is compared with the degree of change indicated. Examples will indicate such degrees of change.

The answers indicate that the changes in the capital investment system are a form of double-loop learning because they indicate a fundamental and process change in the capital investment process itself.

### **Barriers to effective OL**

Human barriers to effective OL exist in the form of defensiveness (Argyris, 1991) in the face of accountability (Cheng, Schultz, & Booth, 2009). These can be overcome if the capital investment process is the unit of examination under a PCA, independent of the actors within the process. A score instantly establishes position and performance rather than no score. An A- grade is more understandable and commonly understood than a score of “very good”. In a similar vein, a score of 7 out of 10 provides focus for improvement; given such a score, one knows that only 3 more points are required for the optimal achievement of one’s work. This is an objective understanding of a subjective assessment/ level of achievement.

Other uses included are those determined and set by the project managers (PMs). No further details were given by the respondent. This implies that PMs have the power / authority to apply PCA reports to any purpose they deem necessary to achieve their objectives.

A question in the survey was used to discover if the PCA personally evaluates capital investment team members or the capital investment processes applied by them, or both. These twin foci improve the model to make it more useful, better suited, practical and relevant and adjusts those human actors who act for the inanimate and legal fiction that is their company, to better use the model with goals, behavioural alignment and inputting of information and data into the model(s) used.

In using these two performance evaluations, companies may encounter a human barrier to the quality of their PCA. This barrier inhibits the company’s acquisition of information from capital investment project staff. This barrier compromises the PCA report’s validity, particularly in respect to adverse and underperforming areas of PCA. Performance evaluation effects may include pecuniary and promotional concerns by staff. Also, the element of pride may be tarnished by PCA reports exposing the poor or exaggerated performance evaluations.

Variations may be due to human elements or capital investment model elements.

However, this research did not capture much information on these human-element barriers. Four companies used PCA for both performance evaluation and identifying capital investment process areas for improvement and two companies used PCA for identifying capital investment process areas for improvement only, with the one of the latter group not responding to parts of the survey. Thus, this research can only comment on the barriers collectively.

## Chapter 6: Conclusion

This dissertation set out to examine how publicly-listed companies on the New Zealand Exchange (NZX) use post-completion auditing for organisational learning.

A literature review was conducted into two broad areas: post-completion auditing (PCA) and organisational learning (OL). The research method was drawn from these two areas, notably from the research of Huikku (2008; 2009) for PCA, and Argyris & Schön (1978) for OL.

A survey questionnaire was sent to the persons most knowledgeable about capital investment within each of the NZX-listed public companies. The response rate was small, perhaps due to the time of year the questionnaire was mailed.

In regards to PCA design elements, the results were broadly consistent with those found in Finland by Huikku (2009). The New Zealand companies surveyed are comparable to Finnish companies in regards to knowledge acquisition, knowledge interpretation and distribution. However, there was one New Zealand company which scored 100% in PCA design elements.

The respondent companies were then divided into domestic-only operators and international operators/ exporters and their PCA element presence analysed. It was found that the latter have greater PCA design elements than the former group.

Notably, regarding elements of knowledge acquisition, respondent companies often did not have both an inside and an outside staff member in their PCA teams. Knowledge interpretation and distribution elements lacked a standard PCA report format and wide circulation to PCA team membership. Significantly, organisational memory is patently lacking within most of the companies which responded.

PCA itself as used by the companies was examined for purpose, focus and importance. The purposes were consistent with their focal points which were also consistent with the importance attached to the focal points. Thus, the actual PCAs used were themselves not found to be a barrier to OL.

Links between PCA and OL scored very highly, meaning that PCA recommendations are made in all areas, raising the strong possibility that OL occurs from PCA. There was no apparent disconnect to interfere with OL.

The occurrence of OL was suggested in the fact that variations in PCA aspects had been reduced all around. OL occurs when changes are made. In this case, the reduction of variations between actual and proposed capital investment project outcomes. OL occurred due to a mixture of influences from PCA and other sources. The degree to which PCA influenced change was compared to the degree of change in PCA aspects indicated. The findings suggest the PCA ranged from a minor to a significant possible influence on OL amongst the various PCA aspects.

Barriers to OL were found to potentially exist in some companies, i.e. those which stated that PCA was also used in performance evaluation of staff. However, as the division into performance evaluating companies and model only improvement companies contained incomplete answers, this analysis was not pursued in this dissertation.

New Zealand firms' PCA design systems are comparable to those in Finland with the glaring absence of organisational memory evident in the Finnish studies and this exploratory research conducted in New Zealand. Another area in which PCA design could improve is in the knowledge and distribution aspect, of which a PCA report database is very important.

Future research areas could explore the impact of accountability for performance and capital investment model upon OL within the New Zealand context, as was conducted in Australia in 2009 (Cheng, Schultz, & Booth, 2009).

The New Zealand companies studied in this exploratory research appear *prima facie* to obtain single-loop learning benefits from their PCA report usage. From the responses given, double-loop learning is inconclusive and the platform for it appears absent. The main reason for this is because practices and policies for capital investment evaluation are excluded as a focus of PCA.

However the reduction in variances was used to indicate organisational learning. Analysis of results found that OL occurred due to both PCA and non-PCA influences. The magnitude of the impact of PCA upon OL (reduction of variances) was unable to be measured quantifiably, but found to be a contributing factor in some aspects of PCA.

Exploratory research only grants the researcher an overview or a topic without the ability to draw generalisations from any results. This research has shown areas which

could be researched further. Such as why do New Zealand's publicly-listed companies not use PCA for evaluating the effectiveness of their policies and procedures in regards to forecasting capital investment outcomes?

Future studies could investigate why organisational memory is non-existent. This study could also be replicated with a larger sample (perhaps mid-sized New Zealand companies instead of only NZX-listed ones). Additional research could also be conducted about the absence of the evaluation of policies and procedures in PCA report and an explanation of the rationale for their exclusion by the practitioners of PCA.



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## Appendix 1: Comparison between Huikku's (2009) research and this dissertation's questionnaire

Questionnaire comparison between Huikku (2009) and this research's questionnaire

Table 8 Matching of the Huikku (2009) Questionnaire of Finnish Companies with the Survey used in this dissertation.

Huikku (2009) Question No.	Huikku's (2009) PCA design element	Questionnaire No	Dissertation	Reason for modification/ change in type of question
<b>SCREENING QUESTIONS</b>				
N/A	Absent	1	Has your company carried out any capital investment projects in the past FIVE years?	Screens out companies which have not engaged in capital investment projects in recent times.
N/A	Absent	2	Approximately how much does your company spend per annum on capital investment (please indicate an average figure over the past 5 years)?	Discovers the size of capital investment within the respondent company.
N/A	Absent	3	Does your company carry out post completion audits on any of its capital investment projects?	Screens out companies which do not engage in PCA.
<b>PCA ELEMENTS</b>				
1	Repetitive, pilot and complex investments selected to PCA	4	What type(s) of capital investment projects is your company most likely to select for post completion audit?	A range of options were given, sourced from answers given by the companies surveyed by Huikku (2008), with the aim of matching the NZ answers with those to find repetitive, pilot and complex investments.
2	PCA conducted after, but not long after, an investment is stabilised	5	At what point in the capital investment project's lifecycle is the post completion audit conducted?	A range of answers were given, ranging from phases to time periods. Respondents were asked to tick as many as applied. This revealed if the respondent was focused upon phase or time as a guide to PCA timing.

3	Both investing unit and outside staff involved in making a PCA report	6	Which units of the company are involved in compiling the post completion audit report?	Respondents were given the choice of investing unit, outside unit and mixed when answering this question. "Both" requires inside and outside units to be involved in PCA to qualify for this element.
4	Division or corporate HQ responsible for PCA activities	7	Which unit of the company is responsible for post completion auditing?	The unit responsible for PCA activities must be either the division investing or the corporate HQ to score this element.
5	The same capital budgeting calculation methods used ex ante & ex post	8	What financial and/or non-financial evaluation methods do you use for: (a) Pre-evaluation of capital investment projects; and (b) Post completion audit of capital investment projects?	This was an open question. The respondent must answer with the evaluation methods used. This was designed to determine firstly the methods used, and secondly for consistency between ex-ante and ex-post evaluation of capital investments. Both pre and post had to be the same to score this point.
6	Detailed comparisons of ex-ante and ex-post calculations in PCA reports	9	What comparisons are made of pre- and post- capital investment project calculations?	This question was included to reveal the actual items compared in a PCA report. The level of detail indicates the extent to which the company undergoes in its analysis of the variances between actual and budgeted performance.
7	Comments on the achievement of objectives included in PCA reports	10	Does the post completion audit report comment on how well a capital investment project has achieved its objectives?	This is important because without knowing how a project has performed, it is unknown how well its planning has been, let alone its performance. How well would mean the degree to which objectives have been achieved, this is deeper than an achieved/ not achieved comment. There is always an achievement or non-achievement, but in isolation of a measure of degree, it cannot be determined the presence of variances and area(s) for improvement.



8	Common language used in PCA reports (at least in summaries)	11	Does the post completion audit report tend to use technical language or plain, everyday language?	There were two answers: technical language would have results in the absence of an element and plain language would indicate the presence of an element. Common language is necessary for effective communication.
9	Standard report format for PCA report	12	Does your company's post completion audit report have a standard format?	Standard formats are important for comparability of reports and understandability. A common format guides the preparers and the reporting staff. Standard reports are easier to follow and easier to prepare than non-standard reports. However non-standard do permit creativity. Standard reports score for this element.
10	PCA report included always or often proposals for future investments	13	How often do your company's post completion audit reports make recommendations for how future capital investment projects should be carried out?	Frequency must be at least sometimes or above to score for this element. Those that never or seldom include proposals indicate low usefulness. This could be either due to the PCA being process being inadequate or the CI system being excellent. If proposals for the future are never included, then the PCA report appears to be only a routine report with no use; seldom implies that it is not often used for future improvement. Sometimes or more frequently are needed for this point because this shows that PCA reports are a useful tool.
11	Formal proposals follow-up takes places	14	What mechanisms are in place for following-up a post completion audit report's recommendations?	This question should elicit two indicia: the presence of formal follow ups of proposals and the type of mechanism which follows up.
12	Interactive primary forum	15	How do you disseminate your	This question will establish two things: (1)

	for presentation of PCA report exists		post completion audit reports, and to whom are they sent?	the method of disseminating a PCA report which addresses Huikku's (2008) presentation mode and (2) to whom the PCA reports are sent, which addresses Huikku's (2008) second part to the Huikku questions 12-14, the recipient of the PCA reports.
13	Presentation of PCA reports to executive group			
14	Presentation of PCA reports to board of directors			
15	Final PCA reports disseminated to all people involved in the project			Both dissemination methods and importantly the recipients are vital to determining
16	Widely known archives or databases of PCA reports exist	17	Does an archive or database exist of post completion audit reports?	If a database does not exist, then the questions that follow won't need to be asked.
		18	Who has access to the database?	Those who are involved in proposals and decision-making on CI are relevant because they will reap the benefits from PCAs directly in their work. If they do not have access to the reports then they cannot learn from them.
17	Relevant people have convenient access to PCA reports	19	Do people involved in deciding on capital investment proposals refer to the database of past post completion audit reports to inform their decision-making?	Deciders of CI are relevant people. If they can access the PCA reports for decision-making then they can
<b>PCA ITSELF</b>				
		20	What is the company's purpose for conducting a post completion audit?	This question identifies the motivation for the respondent company ("respondent") conducting post completion auditing in the first place. The answer(s) given will then shape place the subsequent answers in context.
		21	What aspects of the capital investment decision does the post completion	The purpose sets the focus of the PCA report, which becomes the specific areas targeted

audit report focus upon? for review to achieve the purposes stated previously. Q21 sets the focal point(s) of the post completion audit with a view to discovering what the company actually earnestly investigates or intends to investigate by conducting such a report.

22

On a scale of 1 to 5, how important do you perceive each aspect of the post completion audit to be?

Q22 is used to triangulate Q21. It achieves this by the fact that whatever foci are identified in Q21 should also appear in Q22. The relative importance of each should be indicative of the effort and depth of investigation. This question will also identify the relative importance of such aspects which are deemed to be the most investigation worthy by the company. If one ranks 5, it could be said that that aspect is highly important and this could be because it drives the company's value or performance or because of its affect upon project value.

Inconsistency between identified focal points and aspect importance may need further examination because a focal point may be rated unimportant yet receive attention.

23

Has your company changed its capital investment policies and/or procedures in response to findings from a post completion audit report?

A change of policies and procedures can be indicative of OL taking place. In this case a change in policy and procedure affects the CI model, which is an example of DLL.

24

What aspects of capital investments tend to exhibit the greatest variations between actual results and planned

PCA calculate and investigate variances between planned and actual results. The greatest variations need the greatest attention to

	results?	have them reduced. This should be consistent with focal points and importance ratings. Q24 is about the <i>actual</i> variations. The response here indicates the magnitude of the variation being investigated and post audited by the company.
25	Based on the information gained from post completion reports, has your company been able to reduce these variations in future investment projects?	This question should provide information about the successful use of PCA reports to reduce variances. Q25 aims to find the success of actual PCA recommendations by enquiring as to whether or not such information gained has been able to be applied to future investment projects – that is, there is a link between PCA recommendations from past capital projects
26	What aspects are typically the subjects of recommendations in post completion audit reports?	This should triangulate Q25, because an improvement from a PCA report must be from a subject of recommendation from a PCA.
27	Do your company's post completion audit reports assign a score or a grade to capital investment projects?	The reason behind a score or grade is to motivate CI project members to improve and they can do so if their work is being measured in some meaningful way.
28 & 29	Have the following areas of the capital investment process changed as a result of past post completion audits? Please give examples of such changes, where possible.	This question deals with the CI model/ process and would indicate DLL. Changes are asked to be ranked on a 5-point Rating Scale. Examples that follow are used to triangulate their answers. Based upon those example(s) supplied, it can be determined firstly the presence of changes and secondly the significance of the changes, to

compare with the ratings given in the previous example. It is thought that if a 5 is scored for an area of CI process change, then the example that follows would demonstrate significant change. Q29 is used to triangulate Q28.

HUMAN BARRIERS TO PCA RELIABILITY		
30	Does your company use post completion audits for any of the following reasons?	
DEMOGRAPHICS		
31	Your current position title	Establish the respondent's own position within the company, which is indicative of that respondent's capability and suitability to complete the survey. This is to establish the authority of the respondent and his access to and input into the post completion audit.
32	What is your involvement with capital investment proposals?	Indicates the person's capacity to answer the survey with knowledge. This is to determine if the respondent-person is too close to the proposals himself, and whether his involvement as a reviewer of capital investments is compromised by his work in proposals.
33	What is your involvement with post completion auditing of capital investments?	Establishes the respondent's input(s) into post completion audits. This can be compared to the previous question which indicates a connection or separation between proposal and audit – can be indicative of potential of inherent bias.
34	Number of years in current position	The amount of experience with PCA

35	Number of years with the company	Indicates the proportion of time spent on PCAs and non-PCA activities, which could indicate the breadth of the respondent's knowledge of the company.
36	Your academic qualification(s)?	Theoretical capacity – technical theoretical knowledge of business and capital investment
37	Your professional qualification(s)?	Practical capability – practical experience in business and capital investment
<b>DEMOGRAPHICS - COMPANY</b>		
38	Geographical extent of company operations	Determines the competitive market place in which the company operates. Exporters will have a global market place with global competitors. The importing country to which the exporters sell to will have their own laws and policies on international trade and domestic production. Hence, the exporter, it is submitted, will have to use worldwide best practices to succeed, more so that domestic companies.
39	Is your company an exporter of goods or services	This question can be indicative of the possible range of the company's capital investment project purposes and the geographical scope of the company and the importance of capital investment to the company for maintaining or acquiring a competitive advantage.

## Appendix 2: Summary of survey results from the 17 PCA Design Elements of Huikku (2009)

Summary of Survey Results – Each of the 17 PCA Design Elements, adapted from Huikku's (2009) Finnish study

<i>DESIGN PROPERTY</i>	<b>A</b>	<b>B</b>	<b>C*§</b>	<b>D*§</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K*</b>	<b>L*§</b>	<b>M</b>	<b>N</b>	<b>O§</b>	<b>YES</b>	<b>NO</b>
<b>Company Conducts PCA?</b>	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	11	4
<b>KNOWLEDGE ACQUISITION</b>																	
1 Repetitive, pilot and complex investments selected to PCA		X	X	X	X		X		X	X	X			--	X	9	1
1 PCA conducted after, but not long after, an investment is stabilised		X	X	X	X		X		X	X		X		--	X	9	1
3 Both investing unit and outside staff involved in making a PCA report		X		X	X						X	X		--	X	6	4
4 Division or corporate HQ responsible for PCA activities		X	X	X	X		X		X	X	X	X		--	X	10	0
<b>Subtotal</b>		4	3	4	4		3		3	3	3	3		--	4	34	6
<b>(Knowledge Acquisition)</b>																	
<b>Score (% out of 4)</b>		100%	75%	100%	100%		75%		75%	75%	75%	75%		--	100%	86%	14%

<b>DESIGN PROPERTY</b>	<b>A</b>	<b>B</b>	<b>C*§</b>	<b>D*§</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K*</b>	<b>L*§</b>	<b>M</b>	<b>N</b>	<b>O§</b>	<b>YES</b>	<b>NO</b>
<b>INFORMATION DISTRIBUTION &amp; INTERPRETATION</b>																	
5 The same capital budgeting calculation methods used ex ante & ex post			X	X	X		X		X	X	X	X		--	X	9	1
6 Detailed comparisons of ex-ante and ex-post calculations in PCA reports			X	X	X		X			X	X			--	X	7	3
7 Comments on the achievement of objectives included in PCA reports		X	X	X			X		X	X	X	X		--	X	9	1
8 Common language used in PCA reports (at least in summaries)		X	X	X	X		X		X	X	X	X		--	X	10	0
9 Standard report format for PCA report					X									--	X	2	8
10 PCA report included always or often proposals for future investments			Z				Z				Z	Z		--	X	5	5
11 Formal proposals follow-up takes places							X				Q			--	X	3	7
12 Interactive primary forum for presentation of PCA report exists														--	X	1	9
13 Presentation of PCA reports to executive group				X								X		--	X	3	7
14 Presentation of PCA reports to board of directors				X							X			--	X	3	7
15 Final PCA reports disseminated to all people involved in the project			X	X	X		X				X	X		--	X	7	3
<b>Subtotal</b>		2	6	7	5		7		3	4	8	6		--	11	59	51
<b>(Information Distribution &amp; Interpretation)</b>																	
<b>Score (% out of 11)</b>		18%	55%	64%	45%		64%		28%	36%	73%	55%		--	100%	54%	46%



<b>DESIGN PROPERTY</b>	<b>A</b>	<b>B</b>	<b>C*§</b>	<b>D*§</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K*</b>	<b>L*§</b>	<b>M</b>	<b>N</b>	<b>O§</b>	<b>YES</b>	<b>NO</b>
<b>ORGANISATIONAL MEMORY</b>																	
16 Widely known archives or databases of PCA reports exist												X		--	X	2	8
17 Relevant people have convenient access to PCA reports														--	X	1	9
<b>Subtotal</b>		0	0	0	0		0		0	0	0	1		--	2	3	17
<b>(Organisational Memory)</b>																	
Score (% out of 2)		0%	0%	0%	0%		0%		0%	0%	0%	50%		--	100%	0%	100%
<b>GRAND TOTAL OF “Yes” ANSWERS PER COMPANY</b>		6	9	11	9		10		6	7	11	10		--	17	99	71
<b>Total Score</b>		35%	53% *§	65% *§	53%		59%		29%	41%	65%*	59% *§		--	100%§	58%	42%

--No information was provided by the respondent

NB Lightly shaded columns represent companies which conduct PCA. The sole darker-shaded column for Company N, indicates that that company furnished no answers to this part of the survey.

## Appendix 3: The Questionnaire

### Questionnaire

#### **How do companies in New Zealand use capital investment post-completion audits for organisational learning?**

I would like to invite you to participate in this short survey about your company's capital investment post completion auditing. The purpose of the research is to discover how, and to what extent, post completion audits are used in organisational learning and whether there are any practical barriers to achieving this aim. This survey should take no longer than 20 minutes to complete.

Please note:

- This survey is anonymous and your answers cannot be linked to you or your company.
- By completing this questionnaire, you are consenting to participate in the research.

=====

1. ***Has your company carried out any capital investment projects in the past FIVE years?***

*(See the end of this survey for a definition of 'capital investment project'.)*

Yes

No

[If 'No', then there is no need to answer any further questions. Please return your survey with only Question 1 completed.]

2. ***Approximately how much does your company spend per annum on capital investment (please indicate an average figure over the past 5 years)?***

*[Choose one only]*

- a. Less than or equal to \$500,000
- b. More than \$500,000 but less than or equal to \$1,000,000
- c. More than \$1,000,000 but less than or equal to \$5,000,000
- d. More than \$5,000,000

3. ***Does your company carry out post completion audits on any of its capital investment projects?***

*(See the end of this survey for a definition of 'post completion audit'.)*

Yes

No

[If 'No', then there is no need to answer any further questions. Please return your survey with only Questions 1 to 3 completed.]

4. ***What type(s) of capital investment projects is your company most likely to select for post completion audit?***

*[Tick as many as apply]*

- a. Large projects (in terms of their overall cost);
- b. Projects that have suffered unfavourable developments;

- c. 'Ordinary' projects of the sort the company is likely to invest in again in the future;
  - d. Projects that increase or widen your company's operational scope;
  - e. Strategic projects;
  - f. Other, please specify
5. ***At what point in the capital investment project's lifecycle is the post completion audit conducted?***  
*[Tick as many as apply]*
- a. Immediately the project has finished;
  - b. Once the project has reached a settled state;
  - c. A set period
    - i. Within 6 months (inclusive) after commencement;
    - ii. Between 6 to 12 months (inclusive) after commencement;
    - iii. Between 12 to 24 months (inclusive) after commencement;
    - iv. Between 24 and 36 months (inclusive) after commencement;
    - v. Between 36 and 48 months (inclusive) after commencement;
    - vi. More than 48 months after commencement
6. ***Which units of the company are involved in compiling the post completion audit report?***  
*[Tick as many as apply]*
- a. Staff within the investing unit;
  - b. Staff outside the investing unit
7. ***Which unit of the company is responsible for post completion auditing?***  
*[Tick as many as apply]*
- a. Headquarters
  - b. The unit in which the capital investment project takes places
  - c. Mixed (both headquarters and the unit)
  - d. Other (please specify)
8. ***What financial and/or non-financial evaluation methods do you use for:***
- a. Pre-evaluation of capital investment projects; and
  - b. Post completion audit of capital investment projects
9. ***What comparisons are made of pre- and post- capital investment project calculations?***
10. ***Does the post completion audit report comment on how well a capital investment project has achieved its objectives?***  
*[Choose one only]*
- Yes
  - No
11. ***Does the post completion audit report tend to use technical language or plain, everyday language?***  
*[Choose one only]*

- a. Technical language;
- b. Plain, everyday language

12. ***Does your company's post completion audit report have a standard format?***

[Choose one only]

Yes

No

13. ***How often do your company's post completion audit reports make recommendations for how future capital investment projects should be carried out?***

[Choose one only]

- a. Never
- b. Seldom
- c. Sometimes
- d. Often
- e. Always

14. ***What mechanisms are in place for following-up a post completion audit report's recommendations?***

15. ***How do you disseminate your post completion audit reports, and to whom are they sent?***

Dissemination method –

Recipients -

16. ***Does an archive or database exist of post completion audit reports?***

[Choose one only]

Yes

No

If 'No', then proceed to Question 20; if 'Yes', continue to Question 17.

17. ***Who knows about this archive or database?***

18. ***Who has access to the database?***

[Tick as many as apply]

- a. People involved in developing past capital investment proposals
- b. People involved in past capital investment decisions
- c. People involved in developing future capital investment proposals
- d. People involved in future capital investment decisions
- e. People who will carry out post completion audits of future capital investment projects

19. ***Do people involved in deciding on capital investment proposals refer to the database of past post completion audit reports to inform their decision-making?***

[Choose one only]

Yes

No

20. ***What is the company's purpose for conducting a post completion audit?***

*[Tick as many as apply]*

- a. Financial Control
- b. Informing future capital investment decisions
- c. Identifying opportunities to bailout unsuccessful projects
- d. Raising awareness amongst those who propose capital projects that projects are not just "funded and forgotten"
- e. Identifying opportunities to improve the performance of current investments
- f. Learning where the firm is able to improve its practices in evaluating all capital investment decisions
- g. Better aligning individual actions with organizational goals
- h. Other (please specify)

21. ***What aspects of the capital investment decision does the post completion audit report focus upon?***

*[Tick as many as apply]*

- a. The overall performance of the project
- b. The funds invested in the project
- c. Financial estimates (of costs and benefits) that were included in the original investment proposal
- d. Non-financial information that was included in the original investment proposal
- e. The company's policies and practices for evaluating capital investments
- f. How well the project has been implemented
- g. Other (please specify)

22. ***On a scale of 1 to 5, how important do you perceive each aspect of the post completion audit to be?***

*1 = of little importance; 5 = very important*

- |                                                                                                       |   |   |   |   |
|-------------------------------------------------------------------------------------------------------|---|---|---|---|
| a. The overall performance of the project                                                             | 1 | 2 | 3 | 4 |
|                                                                                                       | 5 |   |   |   |
| b. The funds invested in the project                                                                  | 1 | 2 | 3 | 4 |
|                                                                                                       | 5 |   |   |   |
| c. Financial estimates (of costs and benefits) that were included in the original investment proposal | 1 | 2 | 3 | 4 |
|                                                                                                       | 5 |   |   |   |
| d. Non-financial information that was included in the original investment proposal                    | 1 | 2 | 3 | 4 |
|                                                                                                       | 5 |   |   |   |
| e. The company's policies and practices for                                                           | 1 | 2 | 3 | 4 |

evaluating capital investments	5				
f. How well the project has been implemented	1	2	3	4	5
g. Other, as identified in Q21, above	1	2	3	4	5

**23. *Has your company changed its capital investment policies and/or procedures in response to findings from a post completion audit report?***

Yes                      No

If 'Yes', please outline below the sorts of changes that have been made.

**24. *What aspects of capital investments tend to exhibit the greatest variations between actual results and planned results?***

[Tick as many as apply]

- a. The overall performance of the project
- b. The funds invested in the project
- c. Financial estimates (of costs and benefits) that were included in the original investment proposal
- d. Non-financial information that was included in the original investment proposal
- e. The company's policies and practices for evaluating capital investments
- f. How well the project has been implemented
- g. Other, as identified in Q21, above

**25. *Based on the information gained from post completion reports, has your company been able to reduce these variations in future investment projects?***

[Select either yes or no for each]

- |                                                                                                       |                |
|-------------------------------------------------------------------------------------------------------|----------------|
| a. The overall performance of the project                                                             | Yes    /<br>No |
| b. The funds invested in the project                                                                  | Yes    /<br>No |
| c. Financial estimates (of costs and benefits) that were included in the original investment proposal | Yes    /<br>No |
| d. Non-financial information that was included in the original investment proposal                    | Yes    /<br>No |

- |                                                                            |             |
|----------------------------------------------------------------------------|-------------|
| e. The company's policies and practices for evaluating capital investments | Yes /<br>No |
| f. How well the project has been implemented                               | Yes /<br>No |
| g. Other, as identified in Q21, above                                      | Yes /<br>No |

**26. What aspects are typically the subject of recommendations in post completion audit reports?**

[Select either yes or no for each]

- |                                                |          |
|------------------------------------------------|----------|
| a. Performance of the project                  | Yes / No |
| b. Initial Outlay of Funds for Project         | Yes / No |
| c. Inputs into the capital investment proposal | Yes / No |
| d. The overall capital investment process      | Yes / No |

**27. Do your company's post completion audit reports assign a score or a grade to capital investment projects?**

Yes                      No

If yes, what grade(s) are used and what is the meaning of the assigned grading points?

**28. Have the following areas of the capital investment process changed as a result of past post completion audits? Please give examples of such changes, where possible.**

Please rate each item on the scale of 1 to 5, provided below:

[1= no change, 2=little change, 3=some change, 4=quite a lot of change, and 5=considerable change]:

- |                                |   |   |   |   |   |
|--------------------------------|---|---|---|---|---|
| a. The motivation for projects | 1 | 2 | 3 | 4 | 5 |
|--------------------------------|---|---|---|---|---|

Example(s)

- |                                   |   |   |   |   |   |
|-----------------------------------|---|---|---|---|---|
| b. The funds invested in projects | 1 | 2 | 3 | 4 | 5 |
|-----------------------------------|---|---|---|---|---|

Example(s)

- |                                                                                 |   |   |   |   |   |
|---------------------------------------------------------------------------------|---|---|---|---|---|
| c. Financial estimates (of costs and benefits) included in investment proposals | 1 | 2 | 3 | 4 | 5 |
|---------------------------------------------------------------------------------|---|---|---|---|---|

Example(s)

- |                                                                            |   |   |   |   |   |
|----------------------------------------------------------------------------|---|---|---|---|---|
| d. Non-financial information included in investment proposals              | 1 | 2 | 3 | 4 | 5 |
| Example(s)                                                                 |   |   |   |   |   |
| e. The company's policies and practices for evaluating capital investments | 1 | 2 | 3 | 4 | 5 |
| Example(s)                                                                 |   |   |   |   |   |
| f. Project implementation practices                                        | 1 | 2 | 3 | 4 | 5 |
| Example(s)                                                                 |   |   |   |   |   |
| g. Other, as identified in Q21, above                                      | 1 | 2 | 3 | 4 | 5 |
| Example(s)                                                                 |   |   |   |   |   |

**29. *Contains the examples of changes made***

**30. *Does your company use post completion audits for any of the following reasons?***

*[Tick as many as apply]*

- a. Performance review of the capital investment team
- b. Identifying capital investment practices where improvement can be made
- c. Other reason(s), please specify



## Demographic Information:

31 Please state your current position title \_\_\_\_\_

\_\_\_\_\_

32 What is your involvement with capital investment proposals?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

33 What is your involvement with post completion auditing of capital investments?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

34 Number of years in current position \_\_\_\_\_

\_\_\_\_\_

35 Number of years with the company \_\_\_\_\_

\_\_\_\_\_

36 Your academic qualification(s) \_\_\_\_\_

\_\_\_\_\_

37 Your professional qualification(s) \_\_\_\_\_

\_\_\_\_\_

38 What is the geographical extent of your company's operations? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

39 Is your company an exporter of goods or services? Yes No

\_\_\_\_\_

***Thank you very much for your time and assistance.***

## Appendix 4: Ethical Approval Letter



AUTEC  
SECRETARIAT

23 October 2013

Deryl Northcott  
Faculty of Business and Law

Dear Deryl

Re: Ethics Application: 13/282 How do companies in New Zealand use capital investment post-completion audits for organisational learning?

Thank you for providing evidence as requested, which satisfies the points raised by the AUT University Ethics Committee (AUTC).

Your ethics application has been approved for three years until 23 October 2016.

As part of the ethics approval process, you are required to submit the following to AUTC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 23 October 2016;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 23 October 2016 or on completion of the project.

It is a condition of approval that AUTC is notified of any adverse events or if the research does not commence. AUTC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

All the very best with your research.

A handwritten signature in black ink, appearing to read 'Kate O'Connor'.

Kate O'Connor  
Executive Secretary  
Auckland University of Technology Ethics Committee

Cc: Darryl Wilford-Denby [darrylwilforddenby@gmail.com](mailto:darrylwilforddenby@gmail.com)