

**AN ANALYSIS OF THE USE AND IMPLEMENTATION OF NEC VS
TRADITIONAL FORMS OF CONTRACT IN THE HK
CONSTRUCTION INDUSTRY**

by

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ABSTRACT

AN ANALYSIS OF THE USE AND IMPLEMENTATION OF NEC VS
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INDUSTRY

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The construction industry is often referred to as being adversarial, dispute orientated and confrontational. Traditional forms of contract have in part bred this 'culture', since they do not provide much incentive for contracted parties to work together, respect one another and trust each other.

In the UK via Latham (1994) and in Hong Kong via (Tang, 2001), the mentality of the industry has began to change and consider alternative routes to procurement and project management. One such contract is the NEC, which was launched in the UK in 1993, and since has achieved significant success and is now the most widely used contract in the UK for public works.

In recent years, the Hong Kong Government had proposed the trial of NEC3 contracts on various Hong Kong construction projects, with a view to implementing it on a larger scale and largely replacing traditional forms of contract, known in Hong Kong as the Government Conditions of Contract (GCC).

This research intended to see if the use of NEC is likely to be a success, along with whether its implementation is possible considering the different culture to the UK and the traditional mentality in the Hong Kong construction industry.

Multiple research techniques were used, including a questionnaire, interviews with key individuals and a case study on Hong Kong's first Government NEC project, Fuk Man Nullah, which was completed in 2012.

The results displayed that NEC has potential to provide significant benefits to the industry and there is a lot of enthusiasm surrounding its growing stature in the region. However, there are fundamental issues and barriers to change, predominantly the existing culture and change in mind-set that is required.

The NEC will continue to be implemented, as it has strong backing from the Government's Development Bureau, with 30+ projects now using the contract in Hong Kong. However, to some degree it remains to be seen how well the changes can be made. The Government needs to continue to drive the changes and ensure that it administers the contract in its intended form.

To be wholly successful, it will eventually require the buy-in of the majority of the industry, which it currently does not have. Much of this seems to be due to a lack of awareness, so the industry must work hard to educate professionals into understanding the processes and benefits of NEC.

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GLOSSARY

ACEHK. Association of Consulting Engineers HK
AEC Achieving Excellence in Construction
DB Development Bureau.
CE. Compensation Event.
CIB Construction Industry Board
CII Construction Industry Institute
CIRC Construction Industry Review Committee
DRA. Dispute Resolution Advisor.
DSD Drainage Services Department
ECC. Engineering Construction Contract.
EW Early Warning
GCC Government General Conditions of Contract for Building Works
HK Hong Kong
HKIA HK Institution of Architects
HKSAR HK Special Administrative Region
ICE. Institution of Civil Engineers, UK
MTRC Mass Transit Railway Corporation
NEC New Engineering Contract
OGC Office of Government Commerce (UK)
PPC Project Partnering Contract
PSC. Professional Service Contract.
SFC Standard Form of Contract
TCC Target Cost Contract
TSC Term Service Contract.
UK United Kingdom

Copyright and disclaimer page

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Chapter 1

INTRODUCTION

1.1 Rationale for Research

1.1.1 Hong Kong Construction Industry Overview

In many countries in the world, the construction industry is notorious for being very adversarial (Latham, 1994). This is particularly evident in Hong Kong (HK) (Kumaraswamy, 1997) where the relationship between contracted parties is often strained, in particular, between the client and contractor since their objectives are often very different and their primary aim is to protect their own interests.

There are many issues that compound the problems in the industry, but two of the main aspects which are often cited for the HK construction industry are the lack of collaboration between parties and the disputes that arise due to poor allocation of risk.

Clients are typically risk evasive (Ahmed, 1999) and hence their intention is to allocate potential project risks to the contractor. In contrast, contractors tend to adopt the risks whether they can manage them or not, with their commercial reliance being on post project claims. In this regard, they are often viewed by the client as thieves and the resulting relationship between the parties has little respect or trust. In this scenario, the primary source for solving disputes and conflict will be by means of the written contract and its clauses. However, these clauses are often interpreted differently (Hartman, 1997) to suit the needs of the party (Clegg 1992).

Public Works projects in HK are primarily procured using the traditional form of contract, General Conditions of Contract (GCC). The GCC typically includes clauses which omit the client from risk, placing it instead on the contractor. In addition, with the absence of a good trusting relationship between client and contractor, the tender selection criteria in HK is

often based on price. Therefore, in order to win work, contractors are likely to accept considerable risk and lower their price, relying on subsequent claims to recover their costs. At the same time, the client perceives that they are receiving best value by accepting the lowest bid, seemingly without a full appreciation of the costly and resource dependent period of claims that will be the likely result. In actual fact, the clients are fully aware of this scenario but have become comfortable with it since by allocating the risks elsewhere, they are less exposed to liabilities.

These ever increasing concerns regarding the capabilities of traditional procurement have resulted in the consideration of alternative procurement methods, both globally and within HK. As Chan et al (2002) suggests, the negative experiences of people within the industry due to its adversarial and claims culture, have resulted in the urgent need for alternative forms of procurement.

1.1.2 Awareness for Change

In the UK, similar problems existed in procurement in the 20th century following World War II. The Latham Report (1994), along with Egan (1998 & 2002) were the key drivers for recognizing and implementing major changes to the procurement approach, which focused on a need to improve the industry and the way in which:

- projects are delivered
- risks are shared
- industry participants interact, and
- ethical standards are adopted by participants at all levels in construction contracts.

In HK, the Construction Industry Review Committee (CIRC) commissioned a similar style of report to assess the state of the HK construction industry, The Tang Report (2001). This report is considered as the catalyst for change (Rahmen and Kumaraswamy, 2002) in a similar way to previous reports done by Latham and Egan in the UK. Rahmen and

Kumaraswamy (2002) also suggested that change was imminent in HK and that alternatives to traditional procurement would become more widely adopted, and would be based on relationships and collaboration between parties.

The HK Government had an interest in the general philosophy of partnering, but it wasn't until the Tang Report (2001) that the commitment for change began. The Tang Report reiterates that change was required in HK due to its very fragmented and adversarial culture. It called for dramatic changes to the construction culture, and recommended cooperation and collaboration through different teamwork approaches such as partnering and alliancing.

1.1.3 The New Engineering Contract (NEC)

It is widely considered that NEC offers solutions to the problems encountered in the construction industry and achieves practically all of the requirements for a 'modern contract' (Latham, 1994)

This research will look to ascertain how the recent use and implementation of NEC in HK is working in practice and whether there are barriers to change that will hinder its implementation such as cultural differences.

1.2 Aims, Objectives and Hypothesis

1.2.1 Aim

Determine if the use of NEC forms of Contract, over traditional forms, will benefit the HK construction industry and make recommendations for its implementation.

1.2.2 Objectives

- 1) Make comparisons between NEC and Traditional forms of contract
- 2) Assess the potential impact of 'change' due to the existing culture in the HK construction industry
- 3) Outline and discuss any other barriers to change, e.g. training needs, skills gaps and cost.

- 4) Determine whether overall, NEC Contracts will benefit the HK construction industry and should be adopted on a wider scale.
- 5) Make recommendations, if appropriate, for the continued use of NEC contracts in HK based on lessons learned from the use of NEC in the UK and HK to date.

1.2.3 Hypothesis

The HK construction industry has experienced continued success for many years whilst using traditional forms of procurement. Therefore, the first hypothesis is:

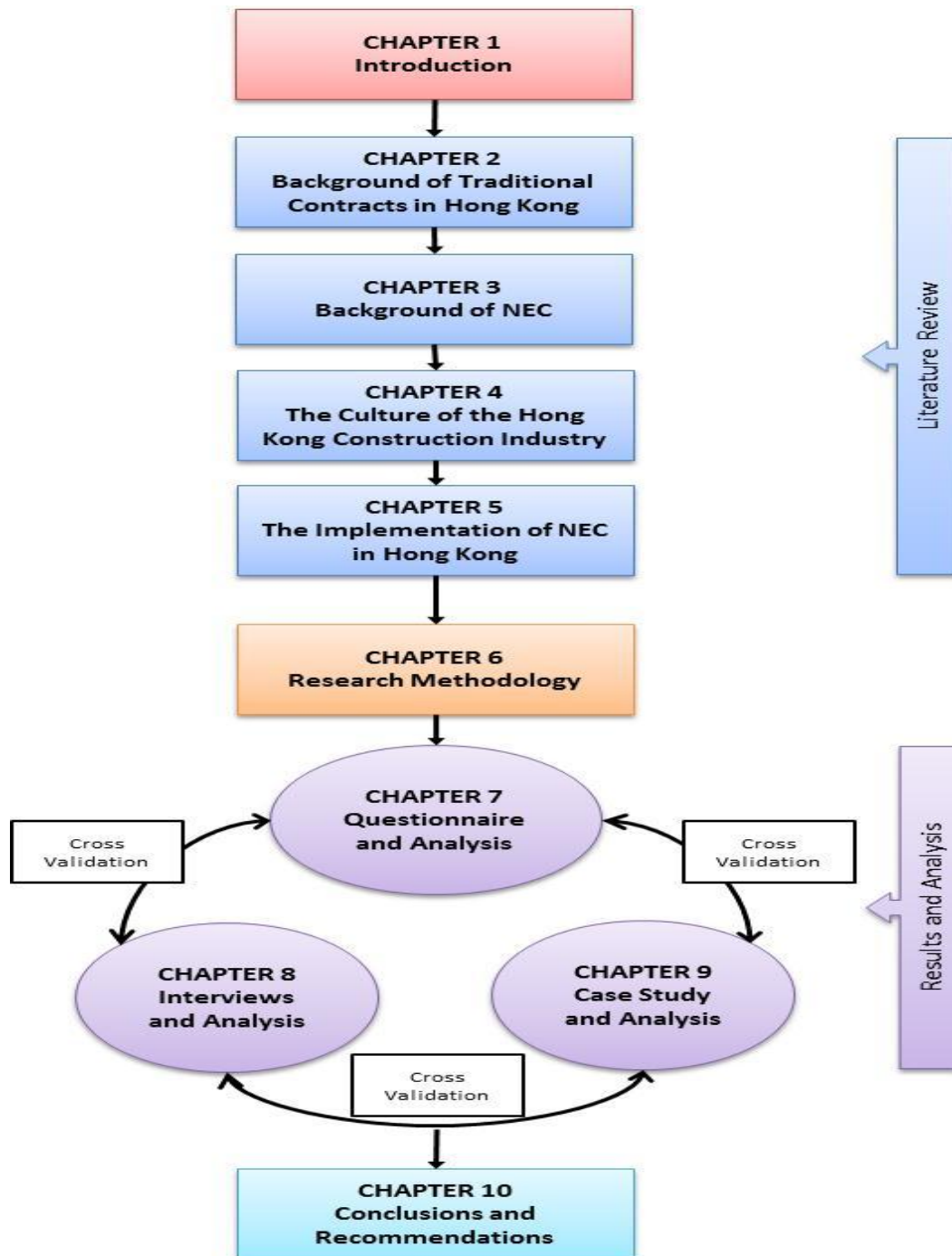
- There will be no significant improvement to the HK construction Industry by introducing the NEC alternative form of procurement.

1.2.4 Sub-Hypothesis

There is evidence to suggest that in other countries such as the UK, NEC has provided the industry with numerous improvements and has become the contract of choice for public works. Despite that, it is often considered that due to the culture of HK, 'change' is difficult to administer. With that in mind, the sub-hypothesis will consider why the case for NEC may be different in HK.

- The culture of the HK society and its construction industry does not enable the large scale implementation of a procurement system that relies distinctly on the adoption of collaboration and trust between parties.

Figure 1: Structure of Report



Chapter 2

THE HISTORY OF TRADITIONAL CONTRACTS

2.1 Defining Traditional Contracts

There are various forms of what would be considered as traditional contracts. Therefore, to define the general rule, under traditional procurement, the client engages an Architect and other Consultants to develop and complete a detailed design. This will be done using drawings and a detailed set of prescriptive specifications. The construction work is carried out by a Contractor who is appointed following success in a competitive tender or some kind of negotiation.

This method of procurement rigidly separates the design and construction processes. Hence, in normal circumstances, the Contractor bears no responsibility for the design and carries out the work as shown and described in the works information provided by the Employer and their professional advisors.

Below are the Government General Conditions of Contract (GCC) used in HK for public works:

- Building Works, 1999 Edition Building Works, 1999 Edition
- Civil Engineering Works, 1993 & 1999 Edition Civil Engineering Works, 1993 & 1999 Edition
- Design and Build Contract, 1999 Edition Design and Build Contract, 1999 Edition
- E&M Engineering Works, 1999 Edition E&M Engineering Works, 1999 Edition
- Term Contracts for Building Works, 2004 Edition Term Contracts for Building Works, 2004 Edition
- Term Contracts for Civil Engineering Works, 2002 Edition Term Contracts for Civil Engineering Works, 2002 Edition

- Term Contracts for E&M Works, 1994 Edition Term Contracts for E&M Works, 1994 Edition
- Sub- -Contract for Building Works, 2000 Edition Contract for Building Works, 2000 Edition

2.2 Problems with Traditional Contracts

As suggested by Lahdenpera (2010), the main issues associated with the traditional procurement approach are regarded as cost overrun and adversarial working relationship between employer and contractor, especially in case of competitive fixed-price lump-sum contracts.

Traditional contractual arrangements call for clear and definitive allocations of risks between parties, but not all possible risks are known and quantifiable at project commencement (Macneil, 1978). Even the known risks may change in importance and could in turn influence other risks, which will require ongoing adjustment and subjective measurement. In that sense, traditional contractual arrangements are highly unsuitable for developing a usable risk management strategy.

Many sources suggest that allocating the risks in this way is the main cause of adversity between client and contractor. The focus of the client is on the short term benefit of reducing liabilities, with little emphasis on building long term relationships with their supply chain. In the worst case scenario, a contractor that inherits substantial extra costs due to poor allocation of risk may not choose to tender for works in future (Zaghloul and Hartman, 2003).

The resulting consequences to the industry for this established construction culture include increased time and cost, poor quality, customer dissatisfaction, lengthy and costly disputes, poor relationships among the contracted parties and overall lower productivity (Schegler, 2001).

The other key point to make with regards to the GCC is that it has been the Government contract of choice for many years. With that, the senior members of government organizations have been using this contract for a long time and in some cases it is the only form of procurement they know. Hence despite its limitations, it is something they know and are comfortable with, and any changes to the status quo will not be easy.

Chapter 3

THE HISTORY OF NEC

3.1 Early Beginnings

In 1985, the Institution of Civil Engineers (ICE), UK, carried out a review of civil engineering design and construction contract strategies. Then in 1986, ICE commissioned the formation of new form of contract called the New Engineering Contract (NEC), with Dr Martin Barnes (CBE) at the helm during its production. The main aims of this procurement approach were to provide:

- Clarity and simplicity – to move away from the legal jargon that typified traditional contracts.
- Flexibility of use – to enable various contract strategies for different engineering and construction disciplines, and an option to use the contract in different countries.
- A stimulus to good management – whereby the contract would facilitate and guide the management of the project.

After eight years of development, the first edition of the NEC contract was published in 1993. To date, three editions have been produced as follows:

- 1st Edition: 1993
- 2nd Edition: 1995 (ECC)
- 3rd Edition: 2005 (3rd Edition re-issued after small amendments in 2006)

3.2 First Edition

The introduction of the NEC coincided with the Latham Report (1994), which reviewed the UK construction industry and provided recommendations for improvement. In this report,

Latham endorsed the NEC 1st Edition by saying that it met 11 of the 13 principles that characterised an effective modern construction contract, and should be embraced as this was more than any other contract form available at that time.

These principles still have significant relevance and 12 are listed below:

- (1) Duty of fair dealing to all parties
- (2) Teamwork and win-win solutions
- (3) Risk allocation
- (4) Trust fund routes of payment
- (5) Integrated package of documents
- (6) Simple language and guidance notes
- (7) Separation of roles
- (8) Provision for variations
- (9) Mechanism for interim payments
- (10) Speedy dispute resolution
- (11) Incentives
- (12) Advanced mobilisation

3.3 Second Edition

The second edition of NEC was titled the Engineering and Construction Contract (ECC) to generate the theory that it was not solely for engineering projects. The term NEC became used as overarching name for the set of contracts, which included:

- Professional Services Contract (ICE, 1995) for consultants;

- Engineering and Construction Subcontract (ICE, 1995) for subcontractors; and the
- Adjudicator's Contract (ICE, 1995)

3.4 Third Edition

A third edition of the NEC was published in 2005 and is commonly referred to as NEC3. It comprises of a suite of 23 interlocking contract documents and guidance books which includes (ICE, 2005):

- Engineering and Construction Contract (ECC)
- Engineering and Construction Subcontract (ECS)
- Engineering and Construction Short Contract (ECSC)
- Engineering and Construction Short Subcontract (ECSS)
- Professional Services Contract (PSC)
- Adjudicator's Contract
- Term Service Contract (TSC)
- Framework Contract (FC)
- Guidance notes
- Flow charts for each contract.
- Guide to procurement and contract strategies.

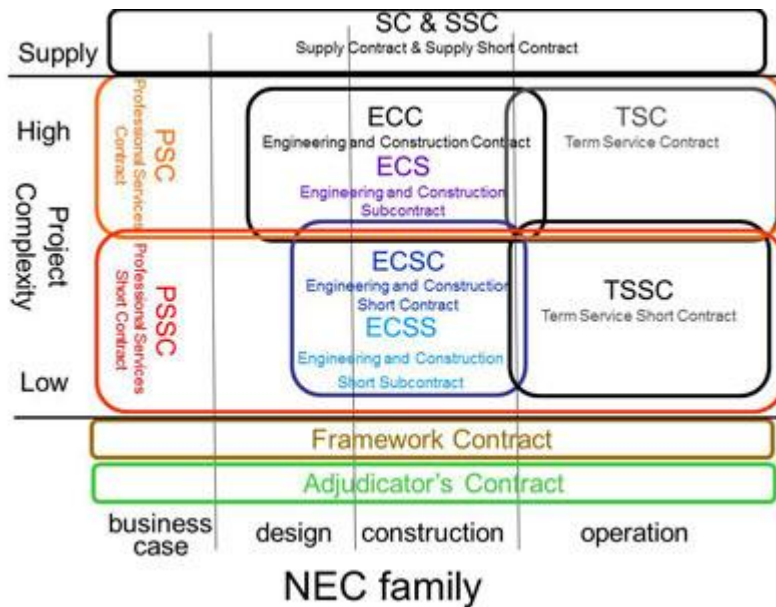


Figure 2 - The NEC3 Suite of Contracts (www.neccontract.com)

The NEC3 contract is made up of the following:

- 9 core clauses
 - General
 - The Contractor's main responsibilities
 - Time
 - Testing and Defects
 - Payment
 - Compensation events
 - Title
 - Risks and insurance
 - Termination
- 6 main option clauses
 - Option A - Priced with activity of schedule
 - Option B - Priced with bill of quantities

- Option C - Target contract with activity of schedule
- Option D - Target with bill of quantities
- Option E - Cost reimbursable
- Option F - Management contract
- 20 secondary option clauses
- Option to insert bespoke clauses ('Z' clauses)
- Contract Data, Works Information, Site Information

3.5 Assessment of NEC3

On the 14th July 2005, The Office of Government Commerce (OGC) endorsed the contract as satisfying the requirements of the UK Government 'Achieving Excellence in Construction' (AEC) principles.

".....OGC recommends the use of NEC3 by public sector construction procurers on their construction projects." (OGC, 2005)

This endorsement was renewed in May 2009 and April 2013 following the 2013 updated version of NEC3 (See Note at the end of Chapter 3).

Below is a list of the key benefits of the NEC3 which have been presented as a result of a detailed literature review. The endorsements have been placed into twelve categories and each includes examples, which were given at various stages of the NEC life. The list is not exhaustive but gives an indication of the positive attitude towards the NEC concept.

1. Establishment with client and contractor

NEC has been successfully adopted by both client and contractor (Fox, 2006).

2. Simple and plain English which is easy to understand

The language of the contracts is simple and easy to understand. It can be easily translated and promotes understanding between contractual parties (Fox, 2006).

3. Better clarity in comparison to traditional contracts

In the study shown in Broome and Hayes (1997), it was concluded that the clarity of the ECC had taken significant steps forward in comparison to traditional contracts.

4. Flexibility of design

ECC offers a flexible design and performance specification which can allow any combination of contractor or employer (Broome, 1999).

5. Contractual Flexibility of construction / engineering discipline and payment options

The NEC suite of interlocking contract documents is comprehensive enough to be used on virtually any engineering and construction project as it is not specific to the discipline and eliminates the traditional need for different discipline-based forms of contract on a single project (Cox, 1996) (Bennett and Baird, 2001) (Kennedy-Grant, 1999 (1996) stated).

In addition, the contract also includes a number of ‘add on’ or secondary options. This aims to reduce the need for re-drafting of clauses to meet the needs of a project or client (Broome, 1999).

6. Payment Options

There are six different payment options including fixed price lump sum, target-cost, cost reimbursable and management contract option (Mitchell, 2005). It also matches recent developments in construction procurement whereby payment is based on progress as opposed to the quantity of work done (Broome, 1999).

7. Incentives for good performance

In an Option C target cost contract (TCC), there is an incentive for a contractor to minimize the programme and final target cost when the pain / gain mechanism has been exercised. The price savings will be a variable percentage (depending on the saving) agreed and included in the contract documents (Forward, 2002).

8. Reduced disputes

Baird (1995) suggests that project disputes have turned from stubborn adversity to reasoned argument based on fact, resources and actual cost. This drastically improves contractual relationships and is much less reliant on the legal profession for help to resolve disputes which would be much more apparent on a traditional contract (Fox, 2006).

The realistic forecast of completion and strict time provisions for contract events ensures regular updates of an accurate programme (Bennett and Baird, 2001). This again encourages collaborative problem solving and reduces disputes (Cox, 1996) (Barnes, 2002).

9. Solution orientated partnering and collaborative working ethos between parties

The emphasis of the contract is on solving problems as opposed to a backwards stance as may be expected in a traditional contract, which provides little incentive for teamwork and collaboration. (Bennett and Baird, 2001).

The ECC also provides a simple framework which is conducive to collaborative working relationships. The National Audit Office (NAO, 2005) report remarks that the contract encourages early issue resolution and has a cooperative tone and spirit.

10. Effectiveness of project management

As Wright (2005) suggests, it was the intention of ICE to devise a contract that would encompass good project management into the contractual arrangement. Therefore, core to the values of NEC is that:

“Every procedure has been designed so that its implementation should contribute to rather than detract from the effectiveness of management of the work.” (Barnes, 2006) (Perry, 1995)

Clear division of roles and responsibility helps to empower people and motivate them to take initiative. Unlike traditional contracts, where the system focuses on the obligations and liabilities of the parties, with reference often made directly to the contract clauses. Bennett and Baird (2001) state that;

“If people carry out the actions which the contracts say they are to take, then the obligations of the party they serve will have been met.”

11. Clear guidance and procedures for changes to cost and programme including early warning and compensation events.

The contract includes an ‘Early Warning’ procedure which obligates any party to provide a notification to the other party if they foresee a potential issue that ‘could’ impact on the project, leading to for example; increased cost, a delay to the programme, or reduced performance. Shaw (2002) states that this is a valuable tool for both parties, because it provides them with an understanding of the likely outcome of the project, and it’s proactive response allows action to be taken early.

In addition, the practicalities of the Compensation Events (CE) mean that valuation is done at an early stage and so there is visibility on their cost and time implications. This helps to reduce typical post contract disputes which can remain ongoing for many years after the project (Thompson et al, 2000) (Cox, 1996) (Barnes, 2002).

12. Earlier close out of project accounts

Primarily as a result of the early approval of EWs and CEs, the contract can typically be finalised faster than other contract forms, since the issues that may lead to claims in a typical traditional contract have been resolved already (Thompson et al, 2000) (Cox, 1996).

3.6 Issues with NEC

The literature regarding NEC is often positive, but there are some criticisms of NEC3.. The key problems cited are discussed below:

1. Language

The use of simple language has not met with universal approval Cornes (1996).

Valentine (1999) suggests that the plain simple English could be a source of confusion in legal matters. However, (Herga (1995) responds to this by suggesting that it makes logical sense to make the contract understood by those using it, and Lloyd and Wightman (1996) continues to imply that all good lawyers could pick holes an any contract if they so wished.

2. Implementation

Fox (2006) recommends caution in at least three key areas for the implementation of NEC:

- Due diligence must be given to the selection of the appropriate options and the allocation of responsibilities due to the various options available.
- The contract places the employer, via the project manager, in a strong position to control the project and ensure its objectives are met. However, the cost of the employer's interventions will be bared by themselves, even when the responsibility lies with the contractor.
- Increased professionalism is required from the parties in comparison to traditional contracts

3.7 Recent Use

In recent years, the NEC3 has been used on major projects in the UK including:

- 2006 to 2012 - London 2012 Olympic Games, London, UK for client Olympic Delivery Authority (ODA)
 - £7.3 billion / \$88 billion (HKD)
 - NEC3 contracts used: ECC, PSC, FC and TSC
 - Completed within budget and ahead of schedule
- 2009 to 2018 - Crossrail project, London, UK
 - £14.5 billion / \$175 billion (HKD)
 - NEC3 contracts used: ECC, PSC, FC
 - Ongoing

3.8 Conclusion

It is generally accepted that reports by Latham (1994) and Egan (1998 and 2002) paved the way for change in the engineering and construction industry, with the NEC playing a part in its transformation.

The evidence for the success of NEC3 in the UK is substantial and generally the literature presents a positive view. In addition, the contract meets essentially all the requirements of Latham's modern contract (Barnes, 1996; Latham, 1994).

A University of West England study (Sun, 2006) of 85 clients, contractors and consultants, of which 97% had used the ECC contract, found that 88% of all parties rated the contract as excellent or good, and 94% clients rated it as excellent or good.

Similar success stories are also apparent in other countries including New Zealand, South Africa, along with its emergence in HK.

However, there is some literature which is less convinced, citing legal issues with the style of the language used, and cautionary advice about implementation. It also seems evident that

the use of the NEC3 increases the degree of management and hence is likely to increase in start-up costs as compared to traditional contracts. Although, the general feel is that these costs would be outweighed by the increase in project value and overall projects savings.

Overall, there are contrasting views about NEC and the debate will continue, but whether you think it's good or bad, there is indisputable evidence to suggest that NEC3 is fast becoming the contract of choice in many parts of the world. Mitchell (2005) claimed that at the time, ECC was the most frequently used form of contract for civil, transportation infrastructure and utilities works in the UK. Today, this remains the case and it's use is increasing worldwide, as according to the NEC website, it is now in use in 16 countries.

Note: In April 2013 a new edition of the NEC3 Suite of Contracts was published. To keep up with industry evolution, this includes a consolidated version of the 2005 NEC3 forms, with some new additions in response to industry developments since 2005. The new developments will not be discussed in this paper.

Chapter 4

THE CULTURE OF THE HK CONSTRUCTION INDUSTRY

4.1 Introduction to Culture

“the collective programming of the mind which distinguishes the member of one human group from another.”
(Hofstede, 1980)

Hostede (1980) emphasizes that culture is learned, not inherited. It derives from ones social environment, not from ones genes.

Similarly, Kempner (1987) defines culture as:

“The sum total of beliefs, knowledge, attitudes of mind and customs to which people are exposed during their social conditioning.”

4.2 Culture in Construction

Whilst culture is commonly used to describe societies, nations or ethnic groups, it can also be used to describe organizations, a profession, or groups. An organization’s culture is derived from various aspects including; markets, national roots, ownership, style of leadership, and it’s people. Therefore, for a given construction project, the culture can be described as the combined culture of the project team comprising of different contracting parties, individual sub cultures, the supply chain, professional and operational subcultures, and essentially anyone that makes a contribution to the completion of the project. (Kumaraswamy, 2001).

Hancock et al (2004) indentifies that the nature of construction consists of 6 kinds of cultures. They are the cultures of:

- Conflict:

Conflict and disputes are almost inevitable in the construction industry and throughout the duration of a project (Hellard 1988; Campbell 1997; Fenn et al. 1997; Langford et al. 1995). Disputes between parties harbor significant time and money, whilst also jeopardizing relationships (Gould et al. 1999; Fenn 2007).

In addition, the construction industry incorporates a wide variety of professional and workers, each with different skills. The various cultures, principles and styles of interaction between them can sometimes cause conflict (Handy, C., 1976, 1993).

- Fragmentation:

A project team consists of many complex characteristics and the differences between the various aspects of a team give rise to fragmentation (Hancock et al. 2004)

- Labor mobility:

Project teams often move to new geographical locations for a project (Hancock, et al 2004).

- Sub-Contracting and casual employment

The construction industry is constantly encountering two situations: Uncertainty of workload and unstable demand (Hancock et al, 2004).

- Crisis management:

Gale (1992) identifies that Crisis is a factor of the construction industry, which includes the sub-factors of conflict and masculinity. However, the human mind is able to overcome crisis and the pressure or challenge can often be rewarding (Hancock, et al 2004; Barthorpe et al, 2000).

- Masculinity

Gale (1992) suggests that conflict and crisis in a male dominated construction industry exists because men want it that way. Therefore it is in their interests to keep it that way.

4.3 The Culture of the HK Construction Industry

The culture of the HK is very competitive and high-risk (Chan, 2002). Chapter 2 discussed how traditional procurement methods have been damaging, with many problems existing such as poor communication, minimal collaboration and lack of trust, resulting in an adversarial relationship between project parties. Moore (1992) suggests that this creates an environment where projects are delayed, over budget, and often result in disputes, claims and litigation.

Hancock et al (2004) suggests that the different parties involved in a project have different organisational cultures, yet they form into a temporary team, often for a single project. Culture will be a major factor within this temporary group.

With the increase of collaborative contracts and working styles, there is a strong suggestion that the parties involved in a contract will no longer understand their historical role, which despite the adversity that it entails, it is something they are familiar with.

The adaptation of NEC may create role confusion, e.g., clients typically will pass more control to the contractors for ensuring project innovation and performance. Whilst this may give contractor's a greater opportunity to express their capabilities, it may leave client's uncertain about their roles and control of the project.

4.4 Hofstede's 5 Dimensions of Culture

Hofstede originally described Four Cultural Dimensions (Hofstede, 1980, 1983, 1984), and these have been used extensively to explore the effects of culture on the construction

industry in western countries, with remarkable results (Hancock, M. 1999). However, Hofstede's (1980) early findings of Four Cultural Dimensions is considered insufficient on studying Chinese societies where the Confucian trait is missing (Robertson, 2000) and as Yeung and Tung (1996), this is highly relevant since economic growth and industrial success in HK has been largely attributed to Confucianism. Hofstede and Bond (1988) determined that people from HK are high in Confucian Dynamism values, which lead them to develop a fifth cultural dimension, with appreciation to Chinese culture, known as Confucian Dynamism. Hence, for a conclusive cultural assessment of HK, the 5 Cultural Dimensions are as follows:

Power Distance Index - The degree of the interrelationship and interaction between a boss and his/her subordinate(s).

High power distance societies tend to distribute power unequally, which is accepted by the less powerful members. Low power distance cultures, less powerful members are less likely to accept the hierarchy and tend to be more democratic with higher levels of internal harmony (Pagell, Katz and Sheu, 2005, p.376; Hofstede, 1980).

Uncertainty Avoidance Index – A societies tolerance of uncertainty

A low uncertainty avoidance score refers to higher tolerance for uncertainty and therefore is more flexible when dealing with problems. A high uncertainty avoidance score suggests formal actions, following rules and a step by step procedure for implementing change (Hofstede, 1980; Trompenaars, 1994).

Individualism vs Collectivism Index - The degree to which individuals are integrated into groups

An individualistic society tends to focus on personnel achievements and can more self-centered and loosely connected to the group. Collectivist societies tend to be more cohesive and connected to other group members (Hofstede, 1984).

Masculinity vs Femininity: The orientation of gender in a society.

Masculine cultures are more competitive, aggressive and assertive, with the focus on power. (Gale, 1992). A feminine society puts more value on relationships and quality of life.

Long-Term vs Short-Term Orientation (Confucian Dynamism) - A societies emphasis on history and tradition.

A Long-Term Orientated society values the future and evolves to meet its demands. Short Term Orientated cultures have respect for tradition and history, fulfilling social obligations and preservation of one's 'face' (Hofstede and Bond, 1988).

4.5 Comparing UK and HK Cultures

Since the main sources for success of NEC are from the UK construction industry, it would seem wise to discuss the difference in culture between the UK and HK.

Rowlinson & Root, (1996) used Hofstede's Five Cultural Dimensions and the Value Survey Model (VSM) to investigate the impact of culture between the UK and HK on construction project management. Hofstede (1984) recommended his approach as appropriate for comparing two or more countries or regions at national or regional levels. However, Hancock (1999) suggests that this approach is also suitable for international comparisons since borders were essentially false anyway.

Rowlinson et al (1996) suitably adapted the VSM questionnaire to compare the cultural differences between the HK and UK construction industry. The study showed that HK professionals scored highly on Hofstede's power distance index, indicating an established hierarchy and status in HK working culture.

In addition, HK professionals scored relatively low, compared with a UK sample, on Hofstede's individualism index, implying that they have predominantly collectivist attitudes and values.

The findings indicated a difference in the decision-making styles, with the west adopting a problem-solving style and HK using a consensus based approach. This is reinforced by the finding that in HK, being consulted by one's direct superior was not seen as important.

Rowlinson and Root (1996) also established that HK professionals are more likely to accept a situation, rather than employing a problem solving approach which is more apparent in the west. This is compounded by the findings that HK professionals tend to fear expressing disagreement with leaders.

In summary, the HK Construction Industry could be summarized as per below:

- High Power distance
- High Uncertainty Avoidance
- Collectivist
- Masculine
- Short Term orientated

4.6 Change in HK Culture

Rowlinson's (1999) study investigated the impact of change on a government organization in HK. His findings were as follows:

- Cultural barriers to change exist at both management and worker level.
- Power distance and individualism were key issues that impacted upon the change process. These issues could be attributed to core traditional cultural values.

- The concept of 'face' has an impact on the way people perceive themselves, their roles and others' roles.
- The need to develop commitment in order to facilitate change appears to be important.

This concept of change is particularly important with regards to the implementation of NEC, because it requires a major shift in 'mind set' that has been formed over many years. Rowlinson (1999) suggested some key points that would need to be addressed for change to be successful in HK:

- Change requires sensitivity and must ultimately be culturally acceptable
- Commitment needs to grow via the gradual establishment of relationships
- The role of the group is of significant importance in bring about change;
- Colonial values derived from another culture are still present in HK, which further complicates the implementation of change

4.7 Limitations of Research into HK Construction Industry Culture

Hancock M. (1999) highlighted that there is much debate around methodology when researching the culture of the construction industry.

For this research, the author has decided to limit the research of culture since within the literature there exists some evidence to enable the adoption of certain stereotypes to the HK construction industry, such as the studies carried out by Rowlinson.

The emphasis on cultural research in this study will be on clarifying these stereotypes using both quantitative and qualitative research methods.

Chapter 5

THE IMPLEMENTATION OF NEC IN HK

5.1 Past NEC Projects in HK

It is worth noting for arguments sake that NEC has previously been used in HK on projects for two private clients, The Construction Projects Department of the Royal HK Jockey Club (4 projects first trialed in 1991) and the South China morning Post (1 project). Based on available information, these projects were successful in terms of the NEC adoption. The HKJC used different options including the conventional activity schedule contract for constructing the Beas River equestrian facilities, and the target activity schedule contract for constructing the Kau Sai Chau public golf course..

According to J. Halliday (1995), the lack of uptake of NEC since these projects was due to the lack of external and internal drive. The UK was in a state of change driven by the Latham Report (1994), but HK was missing governmental or external over-riding pressure. This has now changed since the Tang Report (2001), but goes some way to explaining why the adoption of NEC has taken time.

5.2 Pre-NEC

As Chapter 3 generally displayed, much of the literature about NEC is based on its use in the UK. A number of overseas cases (i.e. outside the UK) are cited, but for HK, published literature for NEC is minimal.

There are some related papers or industry documents which have been published and these will be discussed in this section, on various elements which form part of the NEC. It must be remembered that the NEC encapsulates good practice, rather than it necessarily being the founder, especially in HK. For example, there has been literature in HK on aspects such

as partnering and target cost contracts (TCC), which are both important elements in the NEC.

In fact, partnering has been on the agenda of the HK construction industry since 1994 and has been used on several projects. Some private employers such as MTRC have adopted a contractual partnering approach, but prior to NEC, this had not been done on Government contracts.

5.3 TCC

The main relevance of TCC in this research is related to the potential adoption of NEC Option 3 - TCC in HK, as this is a particularly popular contractual option in the NEC suite. In addition, like NEC, TCC tends to promote a partnering spirit, require fair risk allocation, facilitate the early involvement of contractors to provide buildability advice and incentive mechanisms to save costs.

The main objective of a TCC is to reduce the cost for the client and maximize the contractor's profitability, by means of mutual benefits and without adversely affecting the overall quality or delivery of the project (Ingirige and Sexton, 2007).

It is suggested by Lahdenpera (2010) that the pain-gain mechanism provides an incentive for the employer and contractor to bare one another in mind and hence collaborate, to together achieve the best project results for themselves.

In HK, the use of TCC contracts has increased in recent years, especially for public works (Chan et al., 2007a) and MTRC projects. The evidence for success of TCC projects in HK does indicate that the NEC Option C procurement route could be popular.

5.4 Partnering

Partnering is a technique which attempts to enhance the project management process between multiple parties. This helps avoid problems and disputes which can ultimately lead to litigation (Moore et al., 1992).

The concept is for all contracts to act in good faith, and for parties to establish good working relationships and 'win-win' scenarios.

It aims to create an environment of trust, open communication and employee involvement (Sanders & Moore, 1992) and is achieved by developing a project culture (Chan et al., 2002b).

Although there are many benefits to partnering, it is not easy to successfully implement a partnering process, especially when the traditional approach is essentially the opposite style. It is not easy to change old habits and develop trust based relationships (Cowan et al., 1992).

Chan et al (2002) studied several clients, contractors and consultants in HK, to ascertain their thoughts about the benefits of partnering. The results concluded that partnering principles would enhance project performance and should be adopted wherever possible.

Bayliss (2000) asserted that MTRC promote the use of partnering on their projects as they strive for excellence.

The use of partnering so far in HK has lead to success on projects and importantly the concept is not new, which will no doubt facilitate the implementation of NEC, which incorporates partnering in the contract.

5.5 Background to NEC3 in HK

In 2001, the HK Government's CIRC recommended a wider adoption of partnering and the integration 'contractual partnering', with the aim to change the culture of the

construction industry, from that where traditional contracts form adversarial mindsets between parties, to a more collaborative set of relationships based on the partnering ethos (Tang, 2001). The overall intention was to improve the construction industry as a whole, in terms of its ability to provide innovative and quality solutions and an enhancement of project delivery for the client and the end users.

In response, the governments Development Bureau (DB) opted to try non-contractual partnering in public works projects. Then in 2006, the HK Government decided to trial the NEC and in 2009, the Fuk Man Road Nullah project was awarded as the first Government NEC pilot project.

The HKD\$76million Fuk Man Nullah improvement project used the NEC Option C (TCC) form of contract with a pain/gain mechanism and was substantially completed in May 2012, with final contract sum at 5% below the target cost and 6 month reduction on the construction programme (See also Case Study in Chapter 6, 9 and Appendix A).

Since then, several projects from various Government departments have been allocated the NEC form of contract to use on a trial basis, using several variations of the contract and at different stages. There are now over 30 projects that have adopted various forms of the NEC.:

The range of works includes capital works contracts (varying from building contracts to civil engineering infrastructure contracts), maintenance contracts and consultancy agreements. Recent awards also include the biggest NEC contract by value to date, at HK\$2.97 billion for the design and build of Tin Shui Wai Hospital.

To measure the success of implementing NEC, The DB said that:

“As part of the policy making process, it has established six key performance indicators including dispute avoidance, cost control and time management.” (www.construction-post.com)

The eventual goal of DB is to establish an NEC procurement policy, where by 2015 it will be the contract of choice by HK Government departments.

5.6 Details of the Use of NEC in HK

At present, the projects using NEC have primarily adopted the Engineering Construction Contract (ECC) between client and contractor. However, some projects are utilizing other forms of the contract including the Professional Services Contract (PSC) between client and consultant and the Term Service Contract (TSC) also between client and contractor for maintenance style contracts. Recent developments indicate that HK's first Subcontractor Construction Agreement (SCC) has been used for the contract between the contractor and one of the main subcontractors on the DSD, Happy Valley Underground Stormwater Storage Scheme. This is a groundbreaking change because as is suggested by Kumaraswamy (2002), the subcontractors carry out major parts of the works, whilst Lownds (1998) emphasizes that consultants, suppliers and other stakeholders are also important members of the project team. Hence, for a full shift in mindset, all parties need to form part of the collaboration concept. This will create the right project culture, changes to approach and adapted attitudes of different contracting parties, with the end goal being optimised project delivery (Kumaraswamy, 2001) (Rahman, 2002).

5.7 Change in Mind-Set

As suggested previously, two of the fundamental differences between the GCC and NEC are the allocation and management of risk, and the emphasis on collaboration. To emphasize the magnitude of the change in mind-set required, they will be briefly discussed below:

5.7.1 Risk

The issues regarding risk allocation were previously described, and the focus with NEC is on allocating the risks to the party most suitable to manage that risk. This is important

because it requires a major cultural change, primarily on behalf of the client who is now likely to own more risks going forward than previously. In addition to the contractual risk allocation, the nature and extent of construction risks usually change as a project progresses. As Rahman & Kumaraswamy (2002) suggest, not all the risks are foreseeable at the outset. This provides a good link to the issue of collaboration, since the NEC concept of risk management aims to provide significant benefits by combining the efforts of various project parties in the management of risks.

Surprisingly, many clients accept that the party most able to manage the risk should own the risk (Thompson & Anders, 1998). In addition, following research carried out by Rahman and Kumaraswamy in HK, the results indicated that a considerable percentage of 41 identified common construction project risks were perceived to be more suited for combined risk management, in particular for risks allocated in GCC contracts. In this regard, the practices in HK seem to contradict the theory.

5.7.2 Collaboration

The lack of trust between parties in HK led Rahman & Kumaraswamy (2002) to suggest that a collaborative approach based on relationship contracts will help improve the relationships and corresponding understanding of each parties needs. This will result in a combination of many organisational cultures and the need for continuous and cooperative learning. The extent of the change in mindset will depend on the collection of cultures and the complexities of real life events (Pitman, 1989). Such a complex change in mindset will require a procurement approach which is flexible and enables change. Whilst the same could also be said for the organizations involved, since they will need to be flexible internally to accommodate the shift in cultural attitudes.

5.8 The cultural problems with NEC3

It is well documented that clause 10.1 forms a major aspect of NEC and is inherent to its collaboration ethos.

“The Employer, the Contractor, the Project Manager and the Supervisor shall act as stated in this contract and in a spirit of mutual trust and co-operation.” (ICE, 2005)

This concept in construction is relatively alien to HK, where traditionally the case has been the opposite. Whilst the intention is to provide a platform for collaborative working, the main problems associated with this clause will be how it is interpreted by law. Since the UK has very little case law for NEC3 to refer to, the enforceability of this provision will be a major topic of debate. The little case law in the UK could well be due to the fact that the increase in collaboration has significantly reduced dispute resolution. However, there is one major difference between the UK and HK with regards to current dispute resolution techniques. Since 1996, statute adjudication was introduced in the UK and it seems that this has become the preferred route of resolving many disputes on projects. The nature of adjudication means that the outcomes are not disclosed, so whilst it may be an effective form of dispute resolution, it is very difficult to learn from the cases and relate them to HK. The main form of dispute resolution in HK at present is mediation and with no statutory adjudication available at present, disputes that can't be resolved in this way are more likely to resort back to the traditional adversarial methods of arbitration or litigation.

5.9 Issues with Implementation

Great care is required for such a major change, to ensure that potential gaps due to less committed parties can be resolved (Rahmen and Kumaraswamy, 2002)

There is little data which successfully compares NEC with Traditional forms of contract, mainly due to the logistically and practical problems with carrying out almost identical projects using two different contract forms. However, this was achieved to a degree by

Meridian, who let two very similar projects out using the two contract forms. These projects were carried out in New Zealand and actually compared the NEC2 with the 1999 edition of FIDIC.

The comparison was overall a success and compared with a traditional form of contract, the NEC ECC contract delivered improved business benefits to Meridian in terms of project management, contract clarity and contract relationships. This encouraged Meridian to continue to use the NEC and from 2004 to 2008, they carried out a total of 74 projects using NEC, stating:

“Meridian remains firmly committed to the continued use of NEC as a means of achieving, with its supply chain partners, improved project performance.” (Wright, 2009)

They are now the biggest users of NEC in New Zealand.

RESEARCH METHODOLOGY

6.1 Introduction

Any research methodology should reflect the wisdom of the researchers in order to extract valuable results of studies using various methods available, in single or combination form, or even from scratch. However, "...research must avoid bias" (Fellows, R. and Liu, A. 2003).

The research was carried out to determine the successes and failures of the recent introduction of NEC into HK Government works contracts. The research will focus on 3 main aspects as follows:

- The perceptions associated with the use of NEC in relation to traditional HK government contracts, GCC.
- The construction culture in HK
- The implementation of NEC in HK so far, and the key barriers to change

In choosing an appropriate methodology for the study, the author considered:

1. The limited number of industry professionals with NEC experience
2. The existing NEC literature available from the UK
3. The limited project data for Government NEC projects in HK
4. Selecting and appropriate method for interpreting quantitative and qualitative data
5. A method to explain the inter-relation between the quantitative and qualitative data
6. Choosing an appropriate method in studying the cultures of HK construction professionals

6.2 Approach to Research Design

6.2.1 Research Strategy

Fowler (1998) suggests that there are three concepts of research, these are; reliability, validity and representiveness. Since there is a strong link between reliability and validity (Oliver, 1997), it would seem sensible adopt a research strategy which uses a multitude of techniques, to enhance the findings and conclusions. To that effect, Fellows et al (2003) propose two styles of research strategy, 'quantitative research' and 'qualitative research'.

6.2.2 Quantitative Research

Quantitative approaches are typically based on the gathering of factual data, using science as a means to obtain measurements (Fellows and Lui, 2008).

Naoum (1998) defined quantitative analysis as the testing of a theory or hypothesis. The analysis is carried out using numbers and evaluated using statistical procedures. This method of research is often criticized because it is rigid, in that it usually begins with a clear direction and ending in sight. This doesn't allow much deviation from the main concept, nor is it likely to provide other themes and avenues for further research and exploration.

Shipton (2001) expands by suggesting that research that applies too much emphasis on these methods, run the risk of discrediting their findings. Since quantitative analysis is only likely to offer a general understanding, without painting the whole picture.

Howe (1999) suggests that research that has a social angle should include some form of qualitative research, a view which is also matched by Johnson et al (1997) and Shipton (2001).

6.2.3 Qualitative Research

Kumar (1996) posed that when the aim of research is to describe a situation, phenomenon, problem or event, then it is considered as a 'qualitative' methodology.

Qualitative approaches seek to gain insights and to understand people's perceptions of the world (Fellows and Lui, 2008). Therefore, the reasons for adopting a qualitative research method are to collect evidence of people's experiences.

It relies on reasoning to generate ideas from the data and provide reasons which test or confirm a hypothesis. Creswell (1994) cited in Naoum (1998) supports the above view and suggests that a hypothesis should not be tested when undertaking qualitative research, rather it should be molded and developed throughout the entire research process.

However, since the sample sizes are usually quite low and the research is subjective, qualitative research is often criticised as being “unscientific, unrepresentative, open to bias and even manipulation, conscious or unconscious” (Preece 1994).

6.3 Research Proposal

The general consensus in the literature is that quantitative and qualitative research compliment each other.

“When qualitative and quantitative methods are coordinated, the whole is often greater than the sum of the parts.” (De Paulo, 1999)

Furthermore, Hancock (1999) suggests, that

“the future development of construction management will depend, in part, upon a willingness to see quantitative and qualitative research as complementary rather than competitive and mutually exclusive”.

Therefore, the author aimed to achieve this harmony using a combination of data collection techniques as described in the four stages below:

- Stage 1 - Desk study literature review of published material
- Stage 2 - Electronic (online) questionnaire (Quantitative Research)

- Stage 3 - Semi-structured face to face interviews (Qualitative Research)
- Stage 4 - Case Study (Quantitative and Qualitative Research)

6.4 Stage 1 – Review of Literature

The initial stage was to revisit the literature review as discussed in Chapters 2, 3 4 and 5, to ascertain the overall feel of NEC and the culture in HK. This would help the formation of the questions and angle of research for Stages 2, 3 and 4.

6.5 Stage 2 – Quantitative Research (Questionnaire)

6.5.1 Questionnaire Design

For the quantitative research, a questionnaire was adopted using structured and specific questions. The aim of the questionnaire was to provide an insight into the perceptions of NEC vs Traditional contracts in HK. It was considered that the questionnaire would provide an initial feeling from the industry, which would test the hypotheses and help achieve the objectives set out in Chapter 1.

The disadvantage of a questionnaire is that the questions need to be relatively simple and straightforward and do not allow the probing of new issues. Also, it is difficult to acknowledge any problems that respondents had with the questions and so the responses that are received back may be misleading.

The questionnaire was first created in electronic form using Microsoft Word (See Appendix C) to be sent out by email or post. However, following advice during the pilot study, this was turned into an online questionnaire.

The questionnaire, entitled ‘NEC vs Traditional Contracts in the HK construction Industry’ was divided into sections, so that all the aspects of the hypotheses and objectives could be addressed. The sections were as follows:

Part 1 – Background and Experience of NEC and Traditional Forms of Contract.

Part 2 – Perceptions about NEC vs Traditional Contracts

Part 3 – Thoughts on the culture of the HK construction industry

Part 4 – Thoughts about the implementation of NEC in HK

6.5.2 Types of Question

The next step was to adopt a style of questioning to reduce ambiguity and bias in the answers. To do this, the questionnaire followed several principles where the questions should be (Naoum and Coles, 1997):

1. Clear and easy to understand
2. Open or Closed
3. Factual or opinion based
4. Short but comprehensive
5. Non leading
6. Arranged into suitable categories
7. As objective as possible
8. Logical in sequence, i.e. general to specific, simple to complex
9. Attractive in their appearance

Since the main objective of this research was to gain a general understanding of the issues for comparison, it was decided that all questions would be in a ‘closed’ style.

Fellows et al (2003) describe how closed questions typically have a set number of responses as determined by the researcher. The author ensured that this questionnaire would be quick to answer, but acknowledges its limitations and potential bias since in essence the respondent is forced to answer a defined answer. The final questions were completed following a pilot test and minor adjustments.

6.5.3 Type of Data

There were a number of ways to do the ‘closed’ questions which were asking for the ‘opinions’ from the respondents (Noaum, 2008).

- Checklist
- Grid
- Rating Scale
- Likert Scale
- Numerical Rating Scale
- Ranking
- Semantic Differential Scales

Fellows et al (2003) stated the most widely used approach for measuring opinions is the Likert scale. The Likert scale is a way of interpreting qualitative data into quantitative values, by determining both the direction and strength of the respondents’ opinion about a topic. The scale of measurement is typically based on a 4-point, 5-point or 7 –point scale. For most of the opinion based questions, a 5 point Likert Scale was used with the categories as follows:

- (1) Strongly Disagree
- (2) Disagree
- (3) Neither Agree nor disagree
- (4) Agree
- (5) Strongly Agree

The reason for the selection of 5 point scale was because the author wanted to allow the choice of a neutral answer, so not to force judgement one way or the other.

Also used in the questionnaire was the checklist approach as this was a simple data collection technique for fact based and simple opinion based questions, such as industry experience and simple Yes / No questions.

6.5.4 Pilot Studies

Bell (1996) describes a pilot study as a way to get the ‘bugs’ out of the instrument. It’s primary reasons are to carry out a preliminary analysis on the wording and types of questions, whilst also ensuring that the recipients of the questionnaire will experience no difficulty when completing it.

Therefore, a pilot questionnaire was sent out to a small select group (three), to assess its ambiguity and appropriateness. The following questions were asked to each person (adapted from Bell, 1996):

1. How long did it take?
2. Was the instructions and questions clear? If so, which ones and why?
3. Were any questions controversial and prevented you from answering?
4. Were the necessary topics covered?
5. Was the layout clear and appropriate?
6. Any other comments?

Based on the feedback, minor adjustments were made to the questionnaire before the final version was sent out. The major change at this stage was to abandon the idea of sending a word document either electronically or by post, and instead doing an online survey. However, the questions themselves did not alter due to this change.

6.5.5 The Research Sample

Sampling is the process of ‘selecting’ units with the aim to provide a practical means of collecting data for the research. Naoum (2008) describes the term ‘sample’ as:

‘A specimen or part of a whole (population) which is drawn to show what the rest is like.’

Naoum (2008) explains that the selection of the research sample is critical and that the researcher has to ensure that the ‘characteristics’ of the sample will be valuable representatives of the population (Fellows and Lui, 2008).

Sampling can be either random or non-random. Random sampling may be appropriate where the population is significantly large. However, due to the nature of the research, it is anticipated that there will be a relatively low number of professionals that have either used or at least have some experience of the processes and in particular, the use of NEC and traditional forms of contracts. Therefore, the questionnaire participants will be based on purposive or judgemental sampling. This method is used primarily when there are a limited number of people that have expertise in the area being researched, which is currently the case for the use of NEC in HK.

The intention was also to select individuals who are in a position to substantially influence their organization in the HK region, such as Directors, Regional Managers, Partners, Contract Administrators and Procurement specialists.

To justify the sample, the selection criteria was based on the level of which the samples aligned with the following aspects:

- Knowledge or Experience with NEC contracts
- Knowledge or Experience with traditional forms of contract
- Academic knowledge of procurement
- Preferable involved in the HK Construction Industry
- Influence within their organisation

The details of the professionals were obtained from internet searches, the author’s personal contacts, publications and through contact with the NEC Users Group for Asia Pacific. The sample group was 76 professionals with the aim to achieve a response of 50% or more, to

ensure the results would be as credible as possible. Each person was contacted via email or the professional database 'LinkedIn'. The actual number of responses was 30, which was 39.5 % of the sample. Of the 76 selected, the breakdown of professions was as follows:

- Contractor = 21
- Consultant = 19
- Client = 17
- Legal = 7
- Academia = 4
- Management Consultants = 6
- Quantity Surveyors = 2

6.5.6 Method of Analysis

Naoum (2008) suggests that there are two principle methods of analysing raw quantitative data:

- The Descriptive Statistics Method - provides a general overview of the results that presents the statistical data typically in percentages or actual numbers depending on the sample size.
- The Inferential Statistics Method - compares the results of different parts of a research sample.

The adopted method was the 'Descriptive Statistical Method', since the primary aim of this research was to get a general feel for the perceptions of the HK professionals. The other key aim was to make comparisons of the results between the research done in Stage 3 and 4.

The method of statistical analysis adopted was the ‘measure of central tendency’ which provides a measure of the average strength of opinion for each question. Naoum (2008) describes this method of analysis as that which ‘represents the average of all the values in a set of data’. Hence the ‘mean score’ method will be used to analyse the data collected from the questionnaire using the five point Likert scale.

The mean scores (MS) for Questions using the Likert Scale were calculated by using the following formula:

$$MS = \Sigma(f s) / N$$

$$1 \leq MS \leq 5$$

Where;

s = score given by the respondent with the ranges from 1 to 5, where 1 is ‘strongly disagree’ and 5 is ‘strongly agree’;

f = frequency of response to each rating (1–5),

N = total number of responses to the question.

In addition, the number and percentage of respondents was used to calculate the results of the ‘checkbox’ questions.

All of the results of the questionnaire are recorded in a summary in Chapter 7.

6.6 STAGE 3 – Qualitative Research (Interviews)

6.6.1 Interview Design

Qualitative research is especially effective in obtaining culturally specific information about the values, opinions, behaviors, and social contexts of particular populations. This is very appropriate for NEC contracts because the style of the contract is largely relationship based and hence could be deemed as a social type of contract which will be judged subjectively by its users.

Put another way, attitudinal research is a method used to subjectively evaluate the opinion, view or perception of a person. (Nauom, 1998)

To support the results of the questionnaire, the interviews aimed to provide a deeper insight into an individual's experiences of the use and implementation of NEC contracts and traditional procurement techniques in HK. The interviews were face to face as this can increase the diligence and care with which interviewees answer questions (Thomas and Brubaker, 2000).

The interviewer also controlled the pace, question order and level of exploration into certain areas, and ensured that the interviewee understood the questions by clarifying uncertainties.

6.6.2 Types of Question

The questions were all 'open' style questions and were delivered through a semi structured, one to one interview process, with the focus on providing a set of consistent questions for each interviewee, but also allowing 'freedom of speech' so that answers could be expanded, developed or explored as appropriate. Fellows et al (2003) recommends that the answers to open questions should be recorded in full and hence transcripts were produced for analysis.

6.6.3 Type of Data

Qualitative research is often some way between exploratory and explanatory research (Fellows and Lui, 2008). The exploratory method is useful when there is limited knowledge on the subject and further investigation into the phenomena is required. It may be used for diagnosing a situation, for screening alternatives or to discover new ideas. (Nauom, 1998). This was partly appropriate for the interview process, since the aim was to help explain some of the hypothesis and objects from Chapter 1, whilst remaining open to new ideas and hypotheses.

6.6.4 Pilot Studies

The selected questions were discussed with someone that had knowledge of the subject and also carrying out interviews. It was suggested that the time of the interview was kept to between 30 – 45 minutes.

It was advised that the questions asked to each person would be the same to enable a more effectiveness analysis or coding. However, it was stressed that the interviewees could deviate from this and that the overall aim was to gain open insight from them.

6.6.5 The Research Sample

Whilst there are no set limits for qualitative research, a large sample would be impractical due to the time required for the researcher to conduct, record, analyse and interpret the data. In addition, the main objective of the qualitative methodology is to seek explanations and this was deemed achievable with a target number of 10 interviews.

The selection process maintained flexibility so that it could be based on the individuals who decided to respond to the questionnaires in Stage 2, since a response suggested engagement with the subject and hence potential for detailed elaboration. The number of questionnaire respondents was 30, so there was a sufficient number to select for interview to discuss the topic in more detail. In fact, further purposive sampling was required on the basis of their

direct involvement with NEC and Traditional contracts and also the timely response of the questionnaires and agreement of a meeting.

The target was achieved and interviews were conducted with 10 professionals from different backgrounds. The 10 interviews conducted were with the following professionals:

- 1) Ivan Cheung (Partner, EC Harris)
- 2) Ronnie Thomson (Regional Director, URS)
- 3) Mark Lomas (Project Director, MTRC)
- 4) Andrew Keir (Technical Director, Kier Infrastructure and Overseas)
- 5) Anthony Tsang (Senior Engineer, DSD)
- 6) C L Leung (Engineer, DSD)
- 7) Richard Patterson (NEC and Procurement Specialist, Mott Macdonald)
- 8) Kevin Ng (Finance Manager, Chun Wo Development Group)
- 9) Bryan Clifford (Director, JCP International)
- 10) Wai Tsui (Deputy Director, DSD)

6.6.6 Method of Analysis

Naoum (2008) explains that analysis of open questions is generally more complicated than closed questionnaires. The logical approach is to group all the answers together and systematically code them in terms of ideas and themes.

Coding is the process of converting questionnaire data into meaningful categories to facilitate analysis. Therefore, the data was reduced into a select set of categories, and then furthermore into sub-categories. These categories were coded selectively based on the theme of the research, in order to make sense of the results and draw conclusions. Since the

interview questions were mainly about NEC, traditional contracts and culture in the HK construction industry, these were considered as the main categories as shown below:

Main Categories:

- 1) NEC
- 2) TRADITIONAL
- 3) CULTURE

Based on the further examination of the interview transcripts, 7 sub-categories were incorporated into the main categories as follows:

Main and Sub-Categories

- 1) NEC
 - 1A - Positive response to NEC
 - 1B - Barriers to change
 - 1C - Advisory comments
- 2) TRADITIONAL
 - 2A - Positive response to GCC
 - 2B - Negative response to GCC
- 3) CULTURE
 - 3A - Positive response to culture

3B - Negative response to culture

Using this set of main and sub-categories, the data was recorded by looking for the concepts and themes that were raised by the interviewees. In order to remove bias and maintain openness, the initial scan through of the transcripts included most of the information recorded. This was narrowed down in to the most relevant information based on the frequency of the comments occurring. Some themes were combined, but generally even similar themes were kept separate because the researcher felt that the differences between them warranted separate interpretation in the results.

Figure 3 shows the categories, sub-categories and main themes from the responses. It is considered that the three main categories are interlinked, since the success of NEC will be largely dependent on the scrutinisation of traditional contracts and the culture in the industry. To the same effect, the traditional contracts are largely responsible for the existing industry culture, whilst there are also other holistic elements of HK culture which will influence the success of NEC.

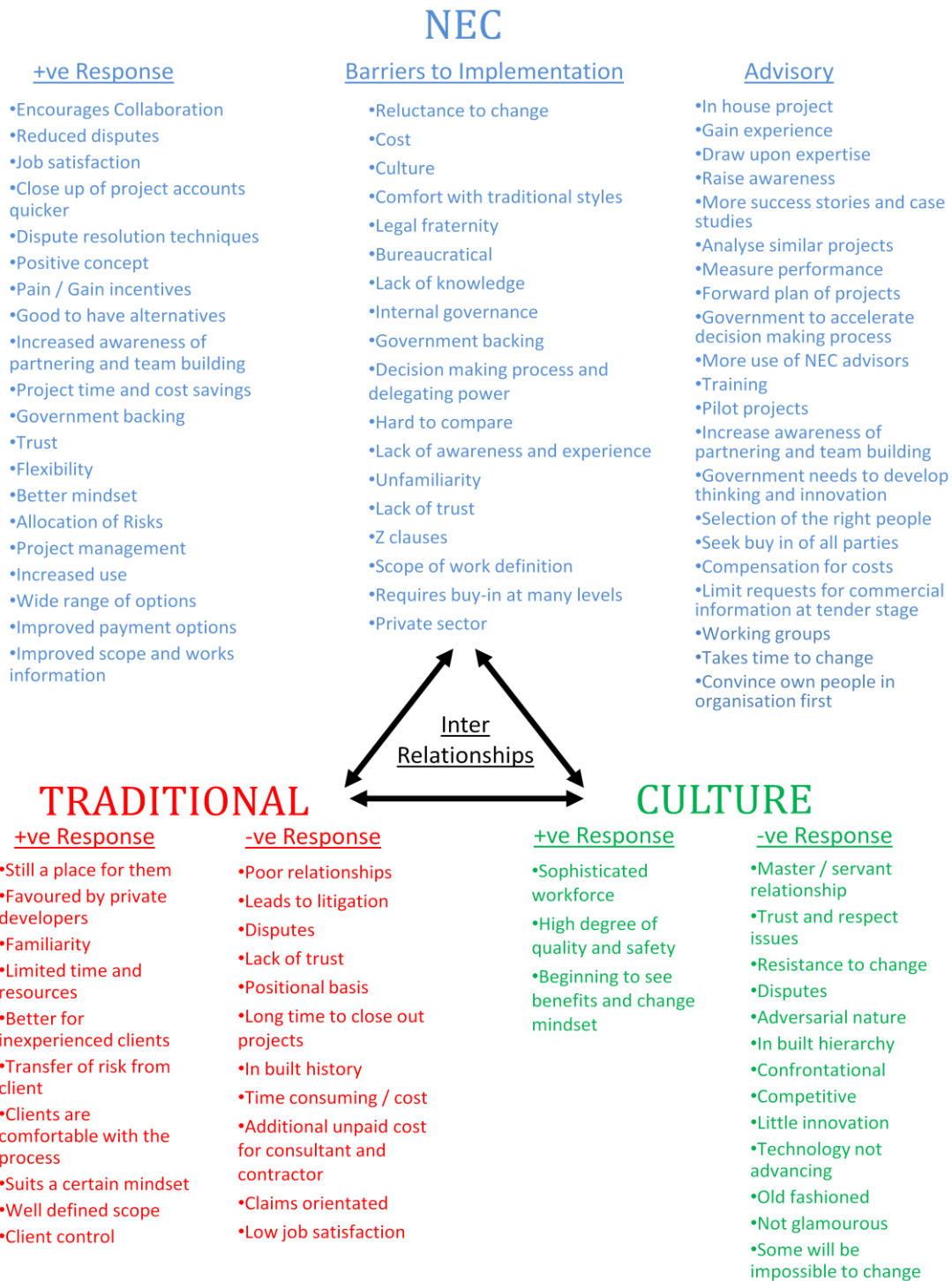


Figure 3: Coding of Interviews into Categories, Sub-Categories and Themes

The analysis of the codes was done by recording the frequency of the responses related to a particular theme in each of the sub-categories, in a tabular form.

6.7 STAGE 4 - Case study

“One important use of case studies is to provide a source of insights and ideas in the early stages of investigating a topic.” (Fellows and Lui, 2008)

In the case of recent use and implementation of NEC in HK, this statement is highly appropriate. Hence since there was only one completed NEC project to date in HK, a case study was done on the DSD, Fuk Man Road Nullah project. The aim of the case study was to validate the research done in Stage 2 and 3 and provide a deeper insight into the subject area.

Case studies commonly employ the collection of data through interviews of key participants in the subject of the study and documentary data.

The case study included quantitative and qualitative research as shown below:

- Meetings and interviews with two members of the client’s project team
- An interview with the Deputy Director of DSD
- Interviews with an NEC advisor and a management advisor from the project
- Review of published and non-published material about the project
- Results from the data recorded on the project
- Conclusions of the findings

When providing the results of the project, a descriptive method was employed to identify and record phenomenon. However, as the case study was also be accompanied by interviews, it enabled participants to draw on their own experiences and perspectives, so

that a greater insight into varying viewpoints was obtained. In that sense, the research was both exploratory and explanatory.

6.7.1 Method of Analysis

Analysis of the results was based on the results of the two interviews with members of the client's project team, the interviews with the two advisors and the interview with the Deputy Director of DSD, who gave more holistic insights about the progress of NEC within DSD. However, since the information from these interviews has already been coded for Stage 3, instead, the interpretation of the interviews was based primarily on the actual thoughts and quotes from the five interviewees and was generally specific to the Fuk Man Nullah project

In addition to the interviews, there was a substantial amount of data collected during the Fuk Man Nullah project which has been quantified and discussed in Chapter 9.

Chapter 7

ANALYSIS AND RESULTS OF QUESTIONNAIRE

7.1 Introduction

In the interests of time, the respondents were given only two weeks to complete and return the questionnaires. However, at the end of the two weeks, the author made the decision to extend the final date by another two weeks, so to ensure a healthy number of replies was received.

A total of 76 questionnaires were sent out, and 30 valid responses were received which is a response rate of 39.5%. Appendix D shows the answers tabulated from the received questionnaires.

The questionnaire was split into 4 parts as described in Chapter 6. The rationale for each question and the corresponding data analysis will be described:

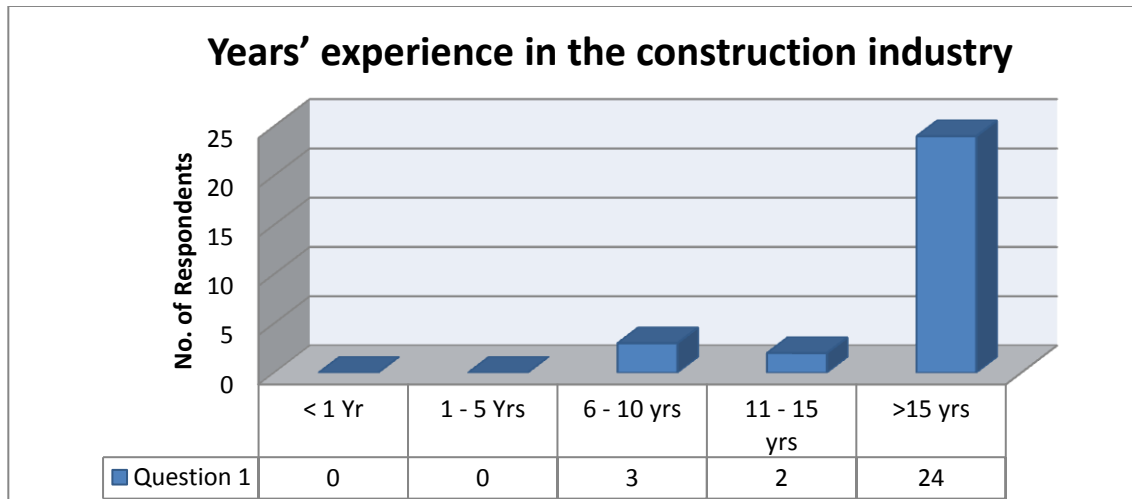
7.2 Part 1 – Background and Experience (Questions 1 to 7)

7.2.1 Questions and Rationale

Questions 1 to 7 were aimed at determining the background and experience of the individual, in particular with regards to their experience with NEC and Traditional contracts and their cultural backgrounds. Furthermore, it gives an indication of the likely knowledge that the respondent will have and some bearing on the credibility of the respondents answers.

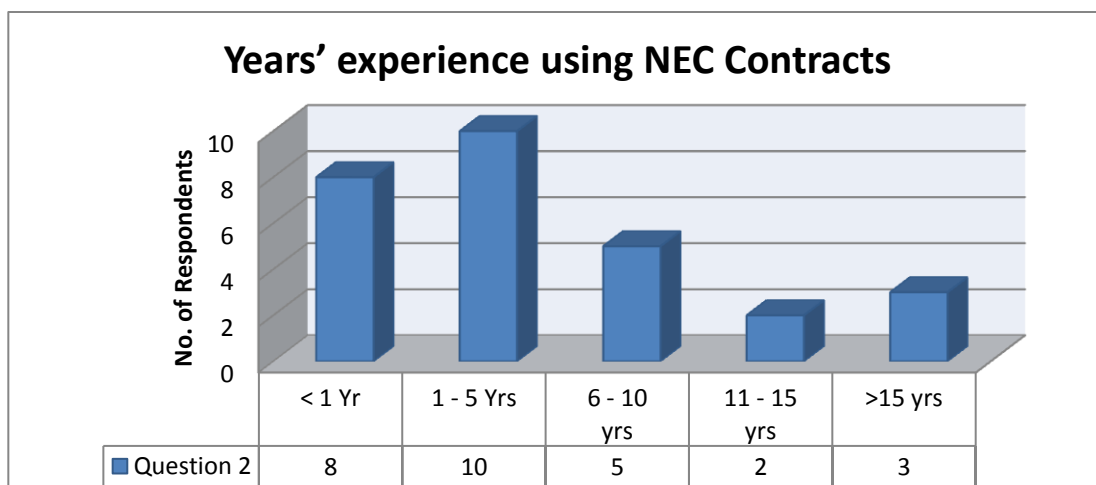
7.2.2 Results and Analysis

Question 1



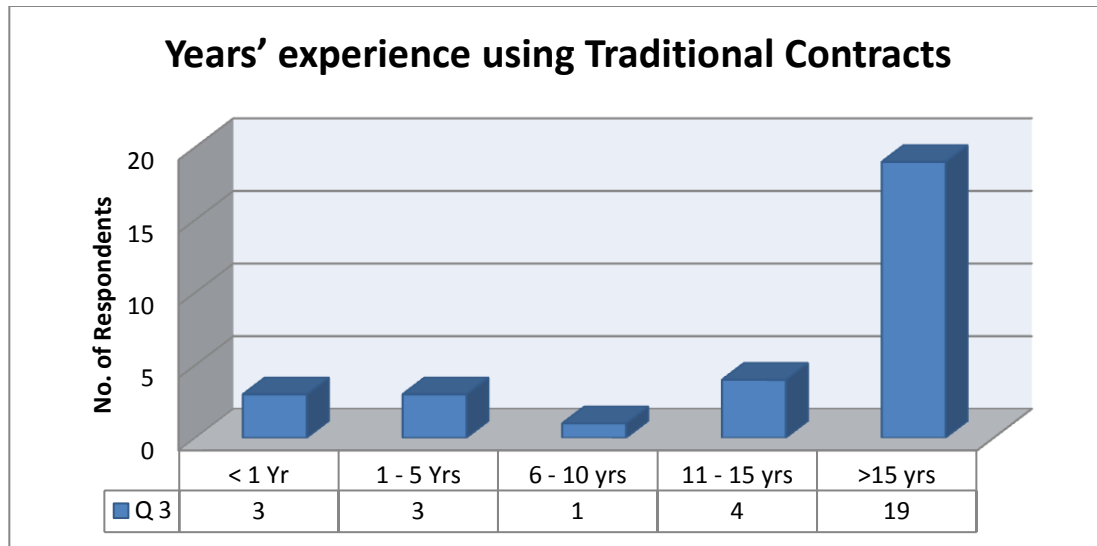
As expected due to the purposive sampling undertaken, all the respondents have over 6 years of experience and in the majority of cases over 15 years of experience in the construction industry. Therefore, the sample is highly experienced.

Question 2



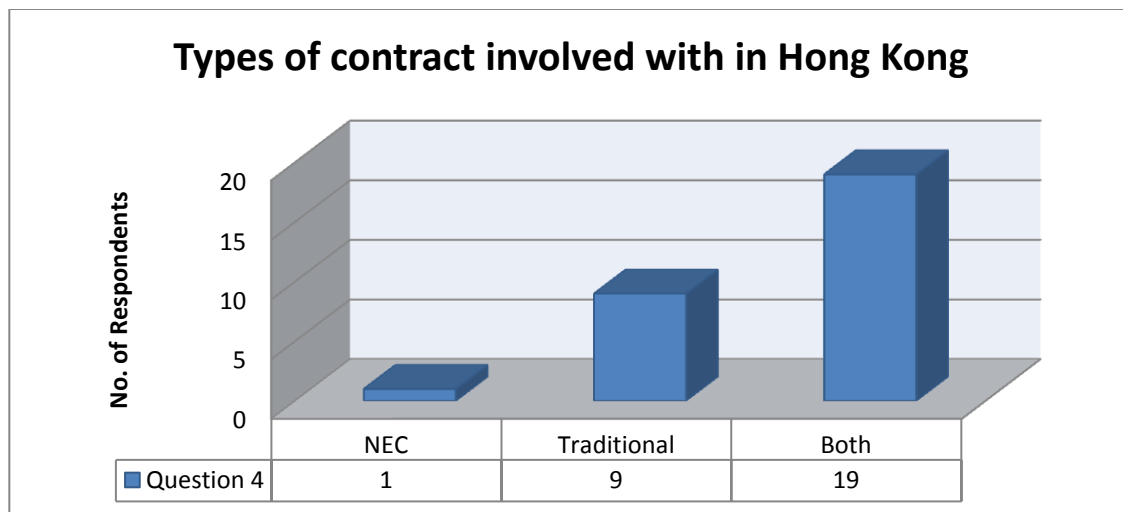
The range of experience with NEC contracts was mixed and the majority of respondents have less than 5 years experience (18). 10 people have over 6 years experience.

Question 3



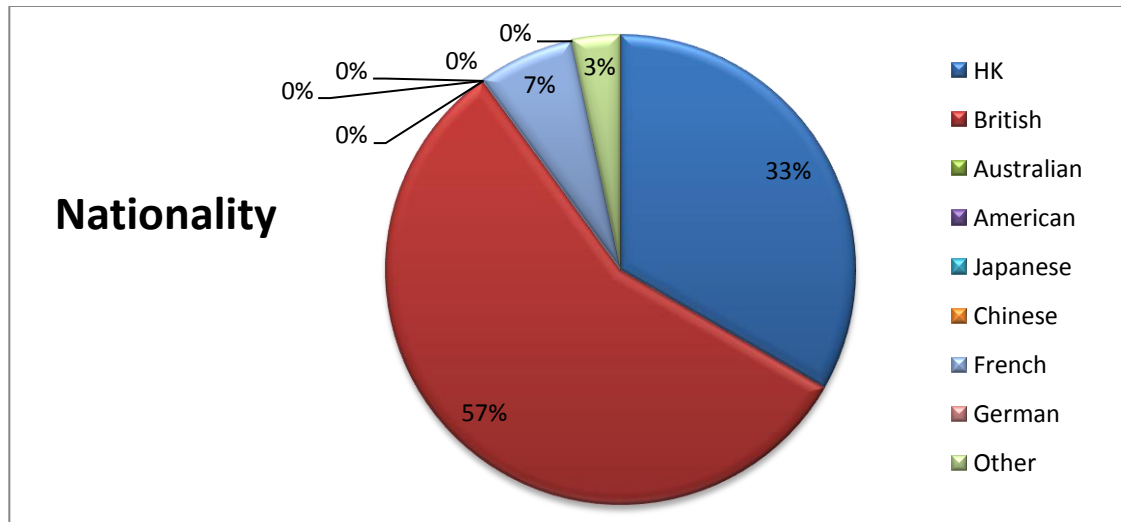
The experience with Traditional contracts was much higher than for NEC. 19 respondents have over 15 years experience and only 6 respondents have less than 5 years experience.

Question 4



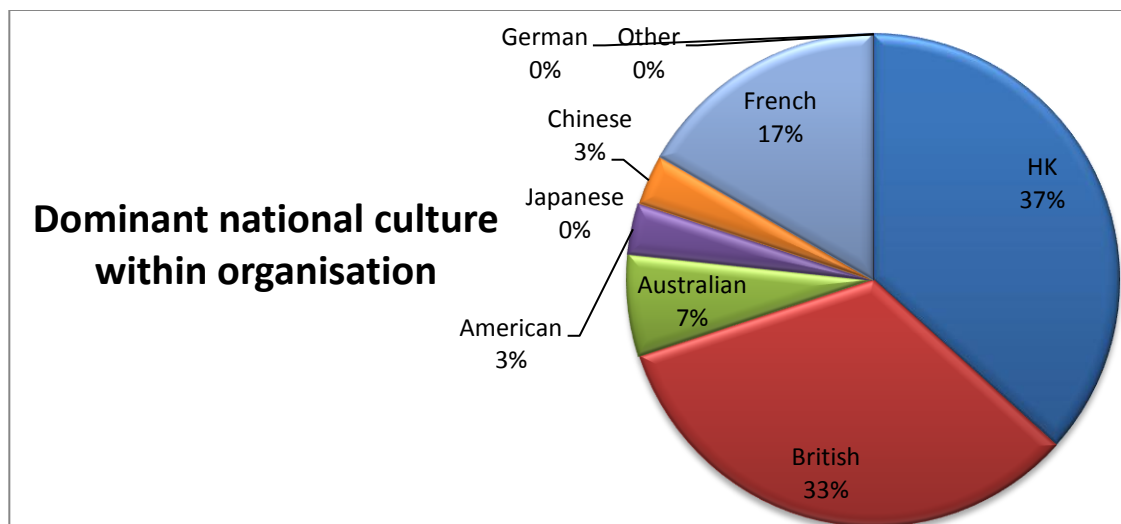
The majority of respondents have used both NEC and Traditional contracts in HK (19). Of the other respondents, 9 have used only traditional contracts and only one respondent has used only the NEC.

Question 5



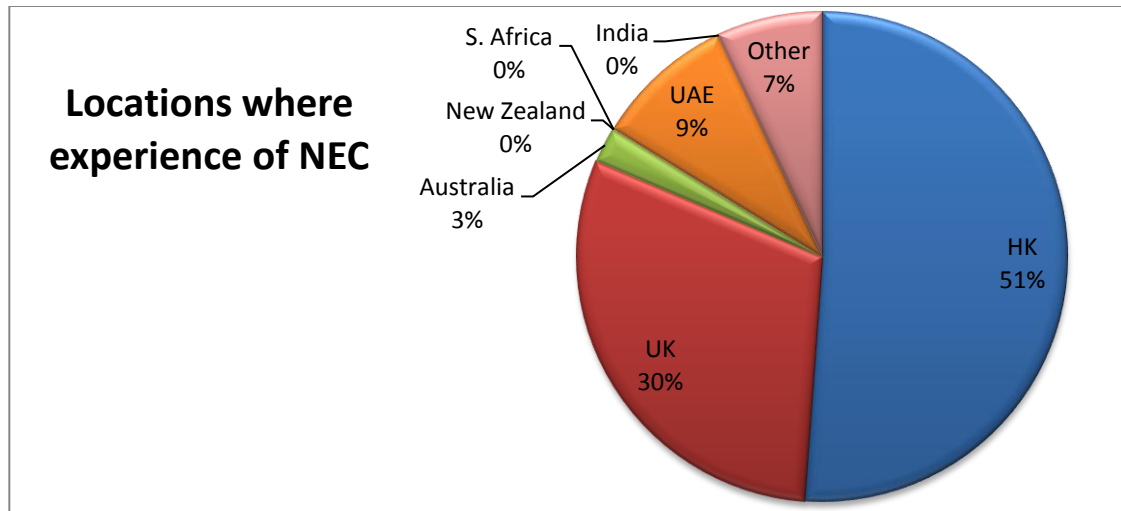
The predominant nationality of respondents is British (57%) and HK (33%), which in total accounted for 90% of respondents. 7% of the respondents are from France.

Question 6



The dominant cultures apparent for the respondents organizations are HK (37%) and British (33%). 17% and 7% of the respondents are from within French and Australian organisations respectively. 3% is attributed to American and Chinese organizations.

Question 7



Over half (51%) of the respondents have experience of NEC in HK. The next majority is the UK (30%) with UAE (9%), Australia (3%), and Other (7%).

7.2.3 Summary of Results

The results for Part A demonstrate that the purposive sampling worked well, since the respondents are all experienced professionals in HK and many have used the NEC or Traditional forms of procurement. In fact, 19 respondents (66%) have experience of both types of procurement in HK.

In terms of background, most respondents are from the UK (57%) followed by HK (33%). The high number of UK respondents may partly be because of the origins of NEC, with many UK professionals now applying their trade in HK having used NEC previously. Their interest in NEC may have prompted their response to the questionnaire.

The dominant culture of organisations was HK (37%), closely followed by the UK (33%) and French (17%). The literature suggests that it will be respondents from HK or from a HK organization, that may find it difficult to adopt NEC due to it being a major change in

cultural mindset. Therefore it is valuable to have a large proportion of respondents with this background.

Of the respondents that have used NEC, the most frequent location was HK (51%) followed by the UK (30%). Australia (3%), UAE (9% and other (7%) together made up a combined 19%, which could prove valuable since these respondents have experience of using NEC in a different country, where they will have witnessed the successes and failures of its implementation.

7.3 Part 2 – Perceptions of NEC vs Traditional Contracts (Questions 8 to 21)

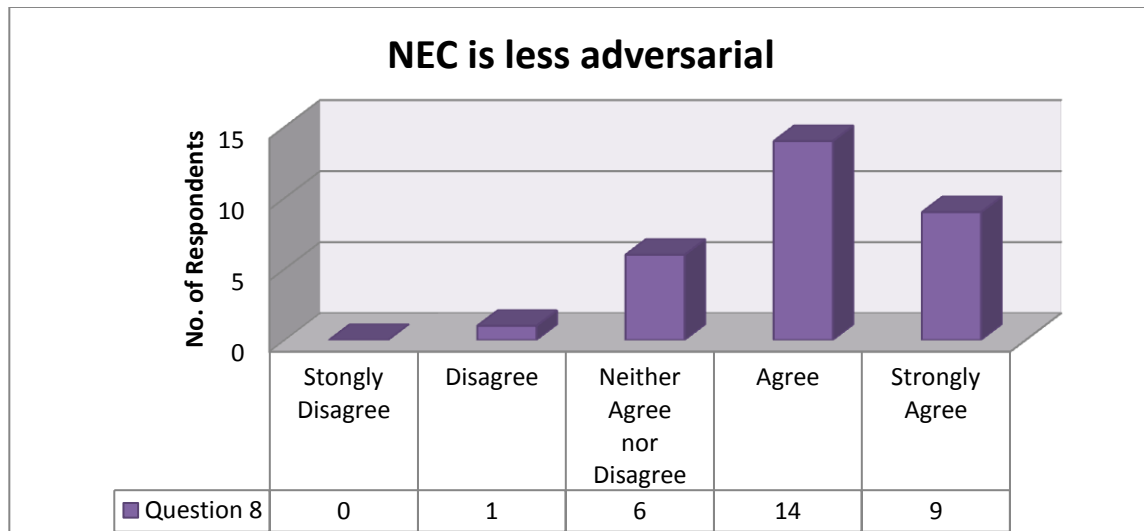
7.3.1 Questions and Rationale

Following a review of the literature, some common benefits of NEC in relation to Traditional contracts were identified, re-phrased and expanded into 14 statements, which formed the basis of the next set of questions.

Respondents were requested to give an opinion using the 5 point Likert Scale (Chapter 6), with regards to their perceptions of NEC contracts vs Traditional contracts (See Appendix C).

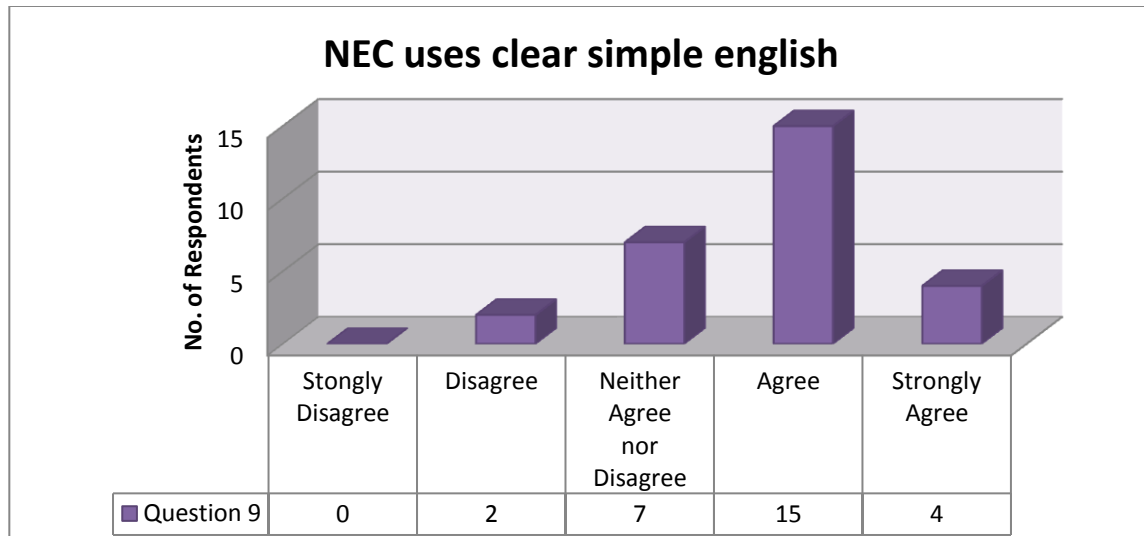
7.3.2 Results and Analysis

Question 8



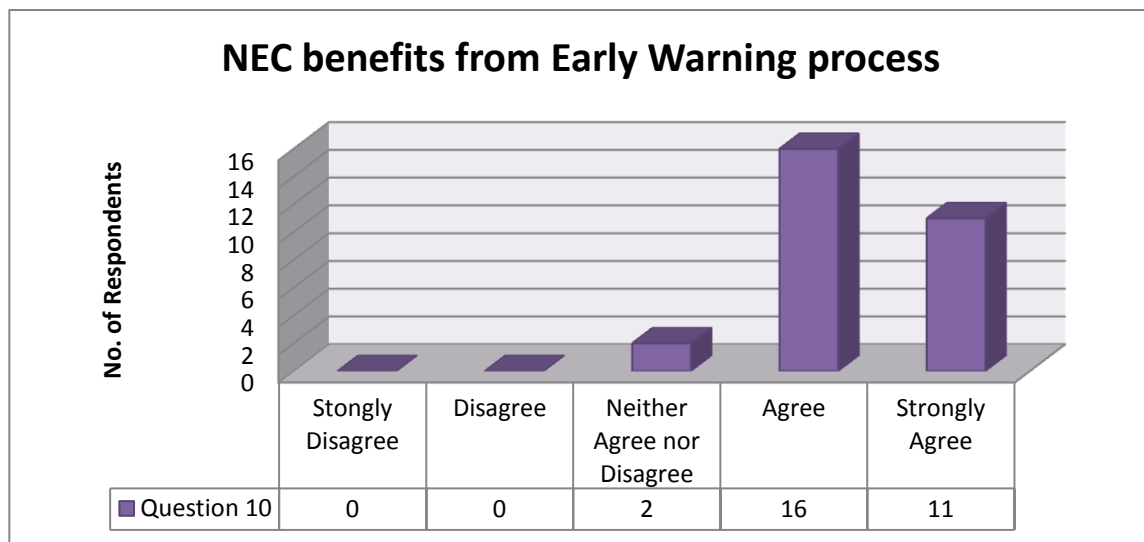
The results show that 23 of the respondents either agree or strongly agree that the NEC is less adversarial. 6 people remained neutral and only 1 person disagreed.

Question 9



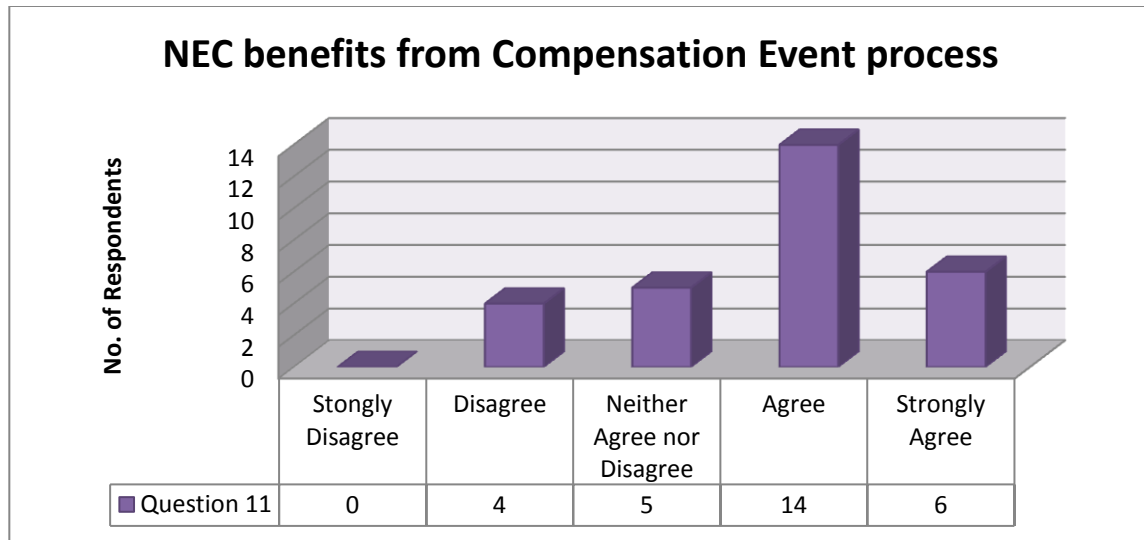
The majority of respondents agreed that the language of NEC is clearer. In total, 19 respondents agreed (4 strongly). Only 2 people disagreed and 7 remained neutral.

Question 10



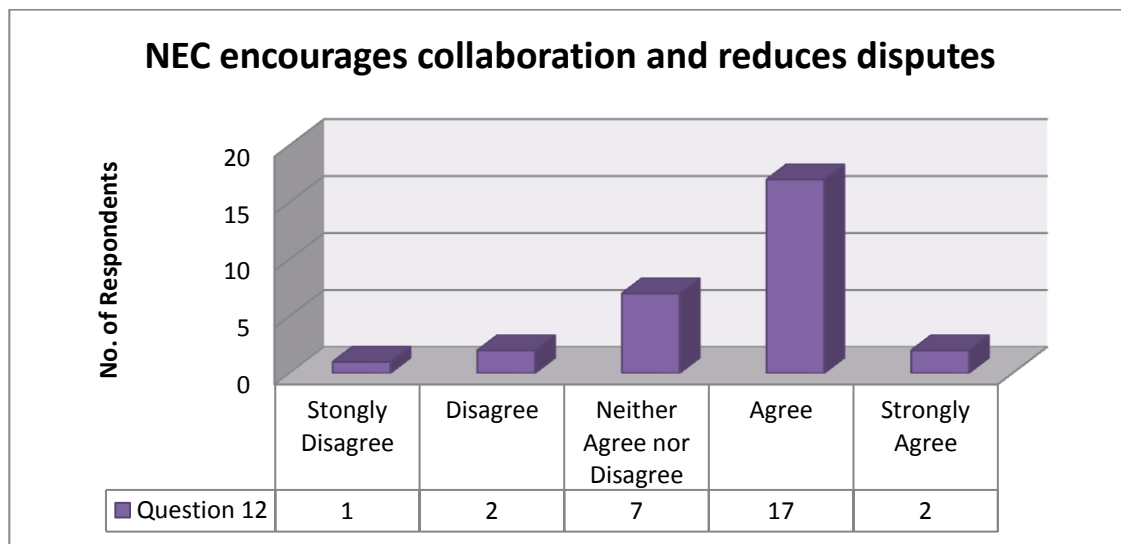
27 respondents believe that the early warning process is a benefit for the NEC. Only 2 people remained neutral but nobody disagreed with this statement.

Question 11



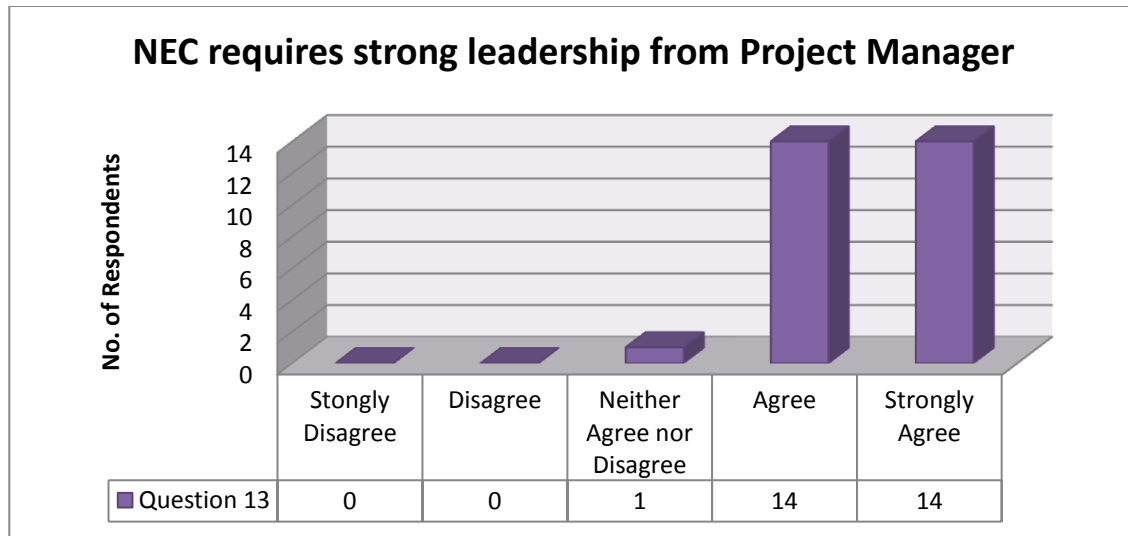
The results regarding compensation events are also conclusive, with 20 respondents believing they are beneficial. Only 4 people disagreed with this statement.

Question 12



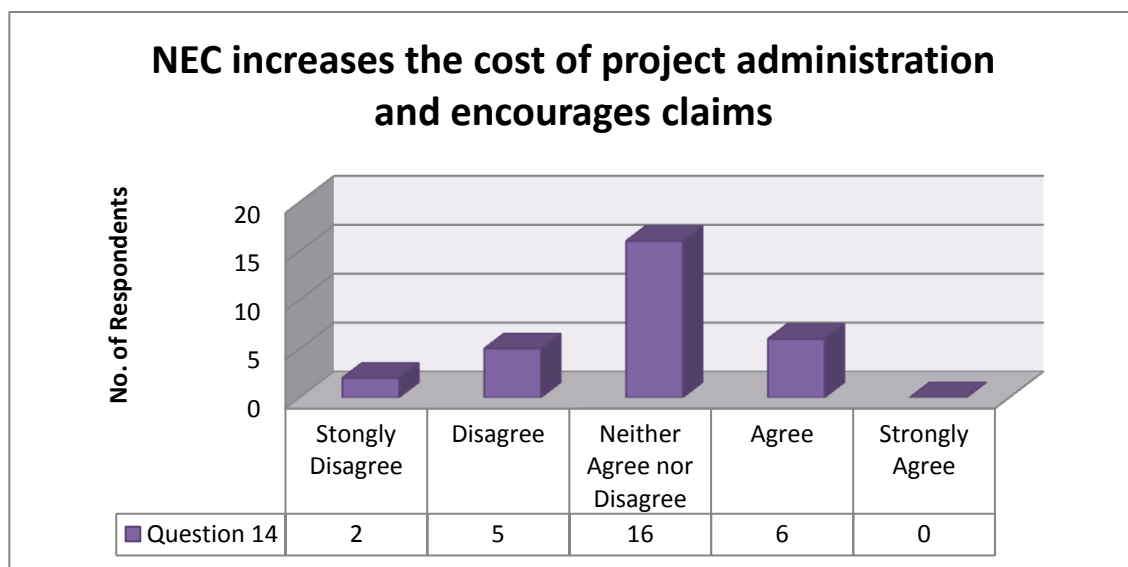
19 respondents believe that NEC encourages collaboration. 7 people remained neutral and 3 people disagreed with this statement.

Question 13



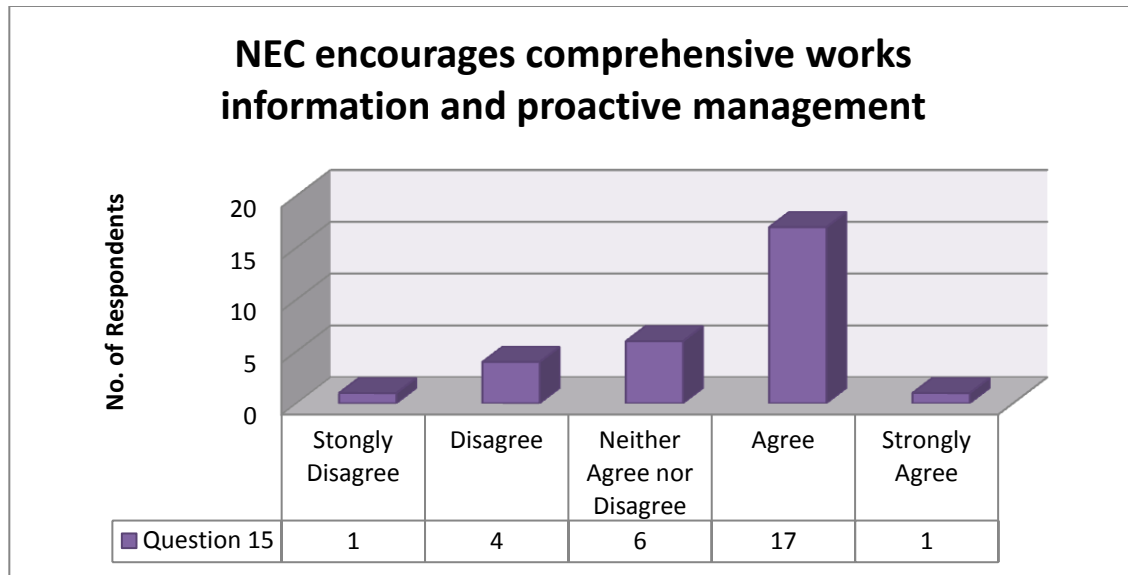
The results were unanimous, with 28 people agreeing (14 strongly) that leadership is an essential trait of the project manager. 1 person remained neutral and nobody disagreed.

Question 14



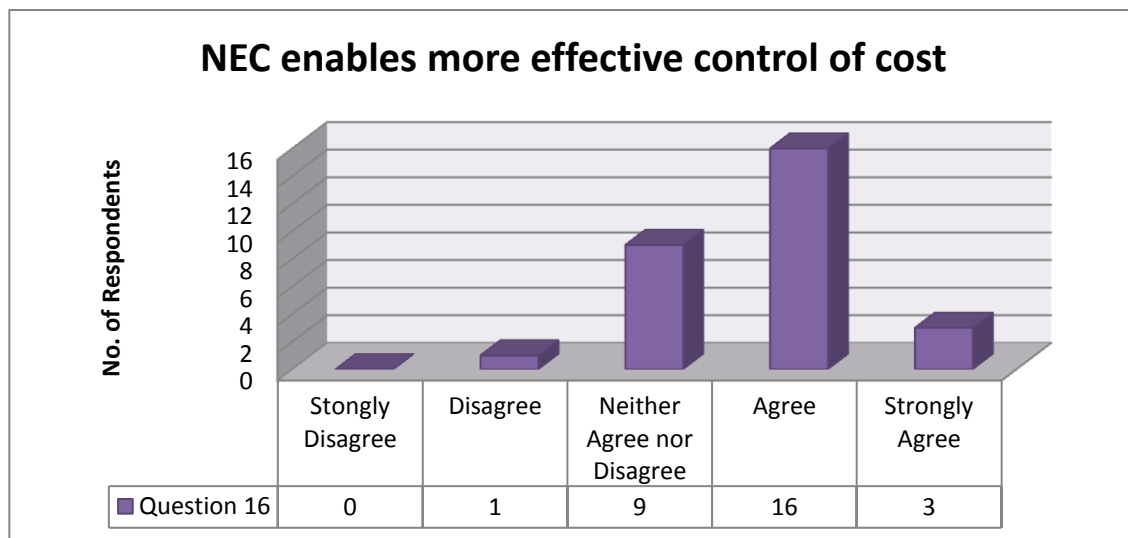
The results for increased cost leading to more claims gave mixed results. Most (16) remained neutral and the rest were divided, with 7 disagreeing and 6 agreeing.

Question 15



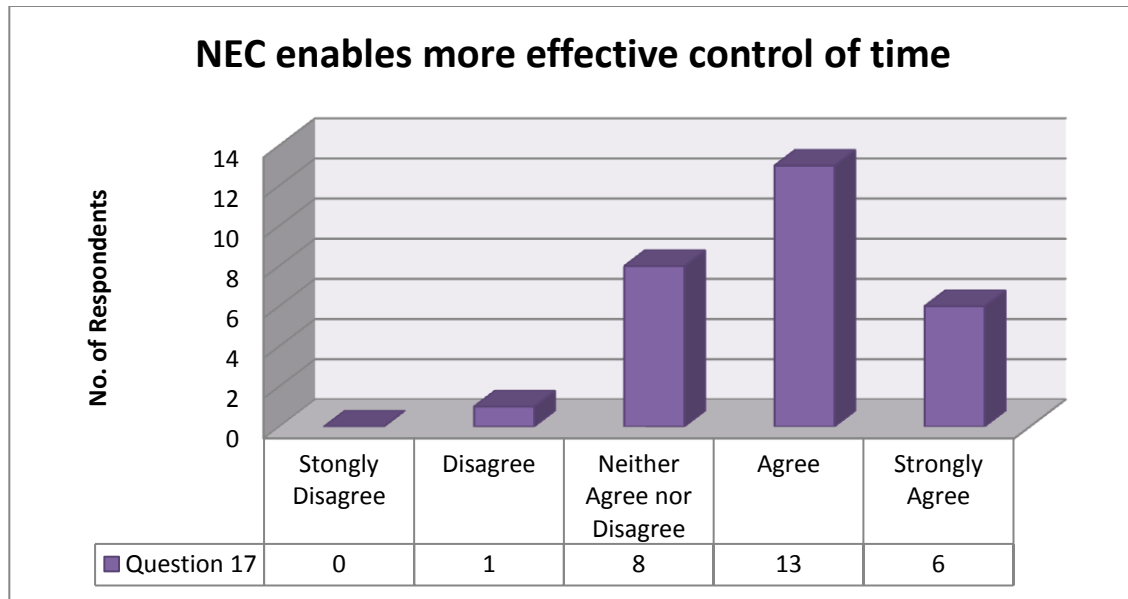
18 people agreed that NEC resulted in better works information and proactive management. 6 were neutral and 5 either disagreed or strongly disagreed.

Question 16



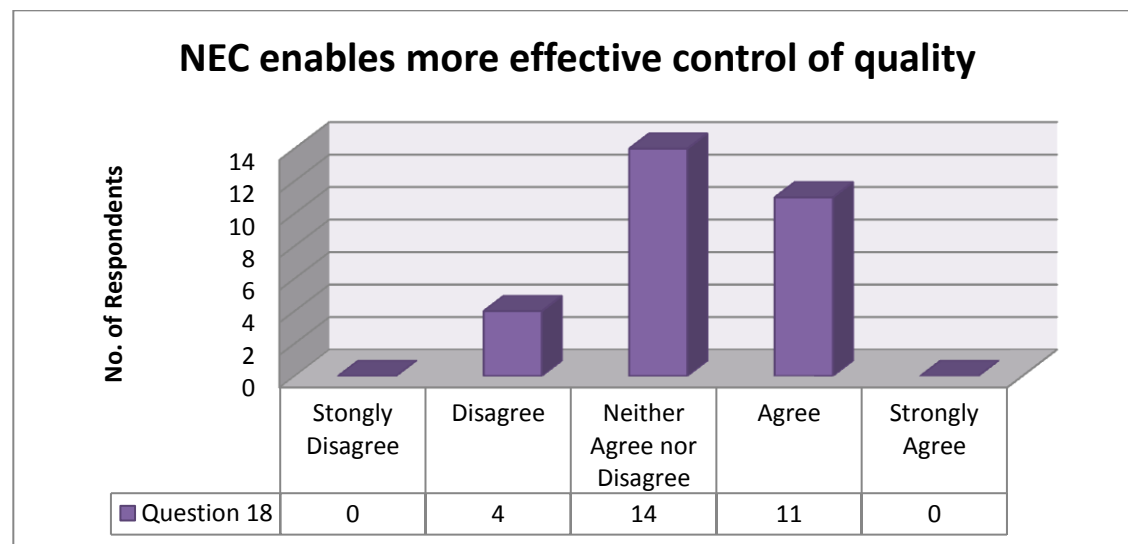
19 respondents said that NEC gives greater control of cost. 9 were neutral and only 1 disagreed.

Question 17



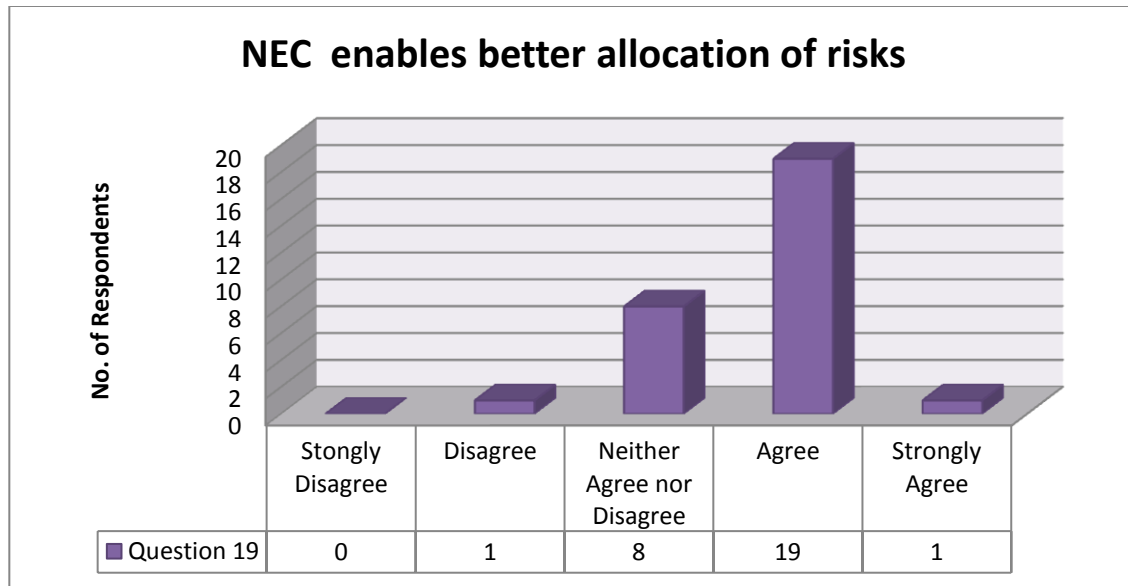
19 people believed NEC gives better control of time, including 6 who strongly agreed. 8 were neutral and only 1 disagreed.

Question 18



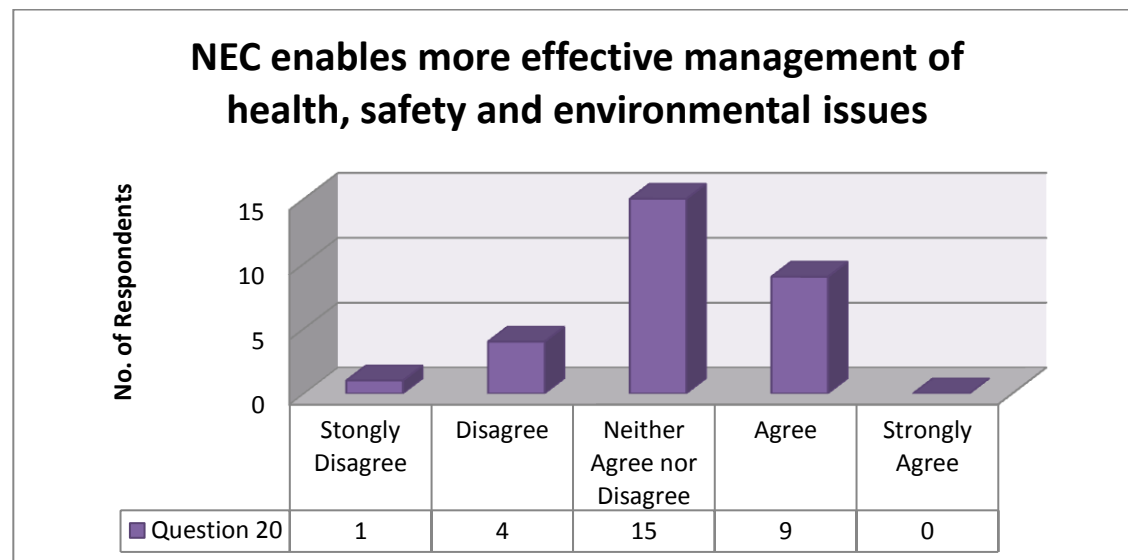
Most people didn't think the control of quality is altered by using NEC, with 14 selecting the neutral value. However, 11 people did agree vs 4 who disagreed.

Question 19



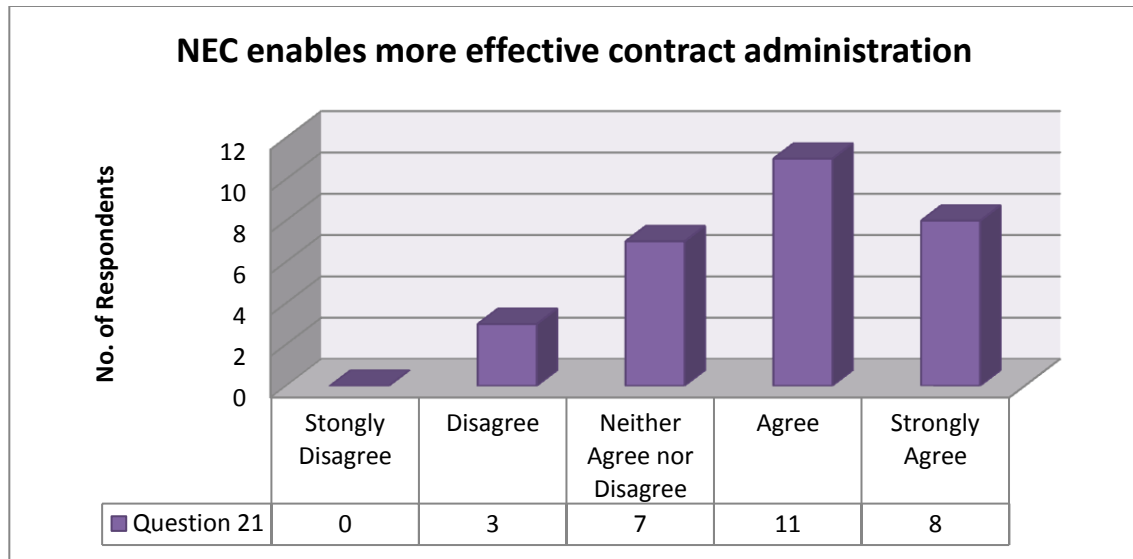
20 people believe that NEC provides a better allocation of risks. 8 were neutral and only 1 disagreed.

Question 20



The majority (15) remained neutral, 9 people agreed and only 4 disagreed, with 1 person strongly disagreeing.

Question 21



19 people agreed that NEC enables better contract administration, with 8 of those strongly agreeing. 7 people were neutral and only 3 disagreed.

7.3.3 Summary of Results

As the graphs indicate, the consensus from the respondents is that NEC offers many benefits in comparison to traditional contracts. The mean scores are shown below, with scores between 1 and 5 (3 is neutral).

	QUESTION													
	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Mean	4.03	3.75	4.31	3.76	3.59	4.45	2.90	3.45	3.72	3.86	3.24	3.69	3.10	3.83

As shown from the mean results, only 3 statements do not give conclusive answers since they are close to a mean score = 3. These are Questions 14, 18 and 20.

Question 14 have a high amount of neutral responses (over 50%) and the other responses were fairly split. This indicates that people perceive the cost of administration to either not be affected, or they are not aware of any issues.

Question 18 has 14 neutral responses, but the sway is towards NEC improving quality, with 11 agreeing vs 4 disagreeing.

Question 20 has 15 neutral responses (over 50%), implying that most believed that NEC made no difference to the health, safety and environment on a project. However, 9 did agree vs 5 who disagreed.

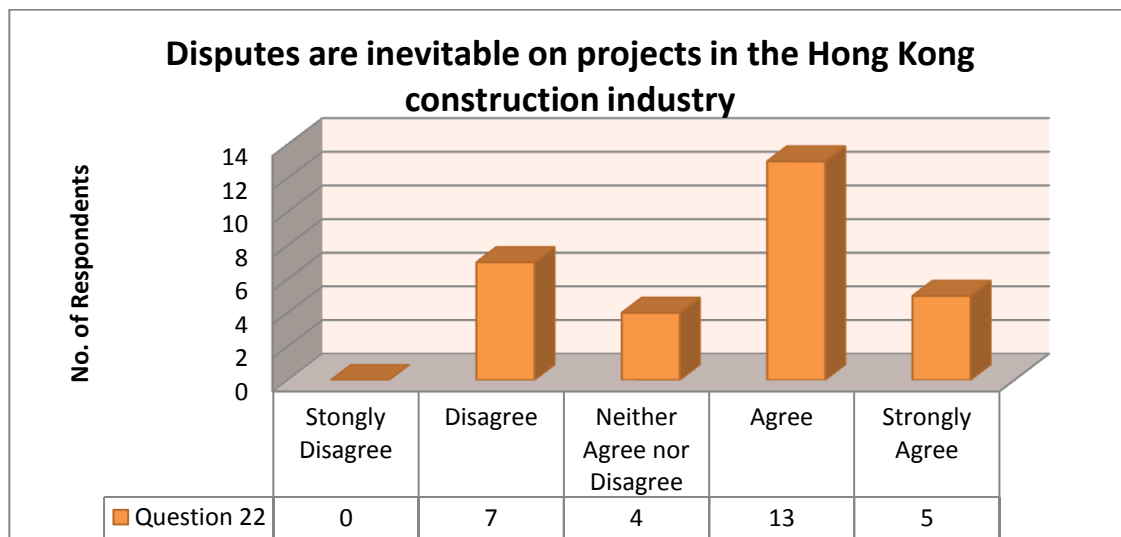
7.4 Part 3 – The Culture of the HK Construction Industry (Questions 22 to 26)

7.4.1 Questions and Rationale

This section aims to determine people's thoughts on the HK Construction Industry, with particular regards to disputes and the ways to resolve disputes. It looks at whether there is the need for a change from traditional forms of dispute resolution in favour of other methods available, to improve the state of conflict resolution in the industry.

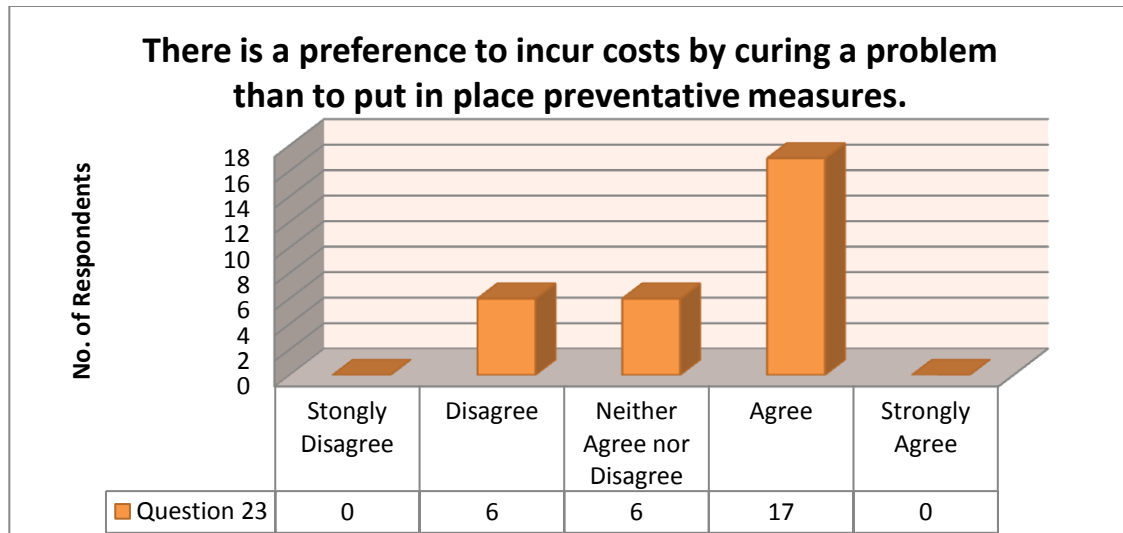
7.4.2 Results and Analysis

Question 22



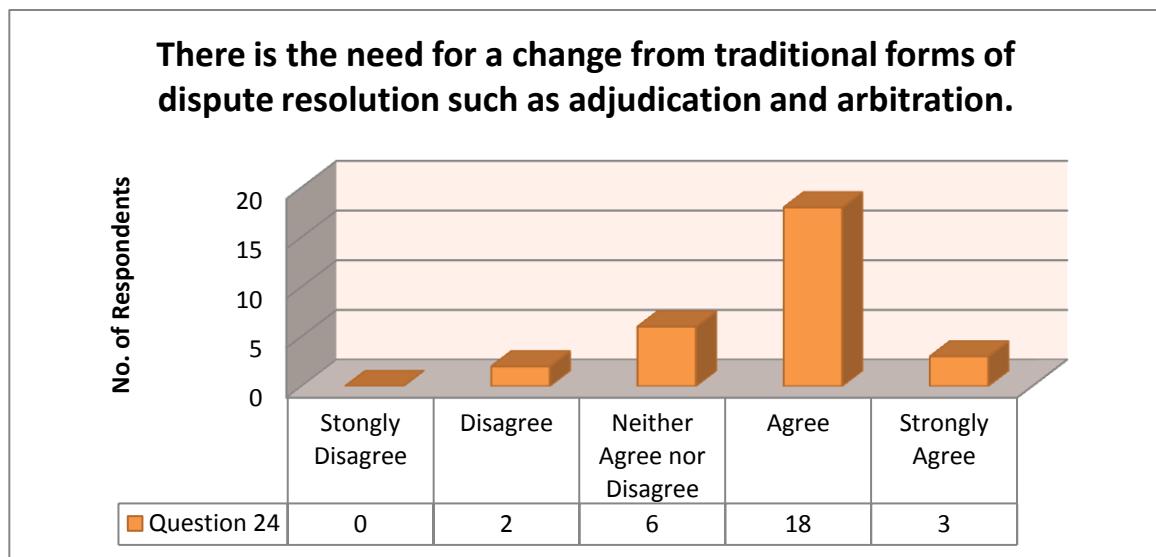
Overall, 18 people agree with this statement, including 5 who strongly agree. 4 people remained neutral and 7 disagreed.

Question 23



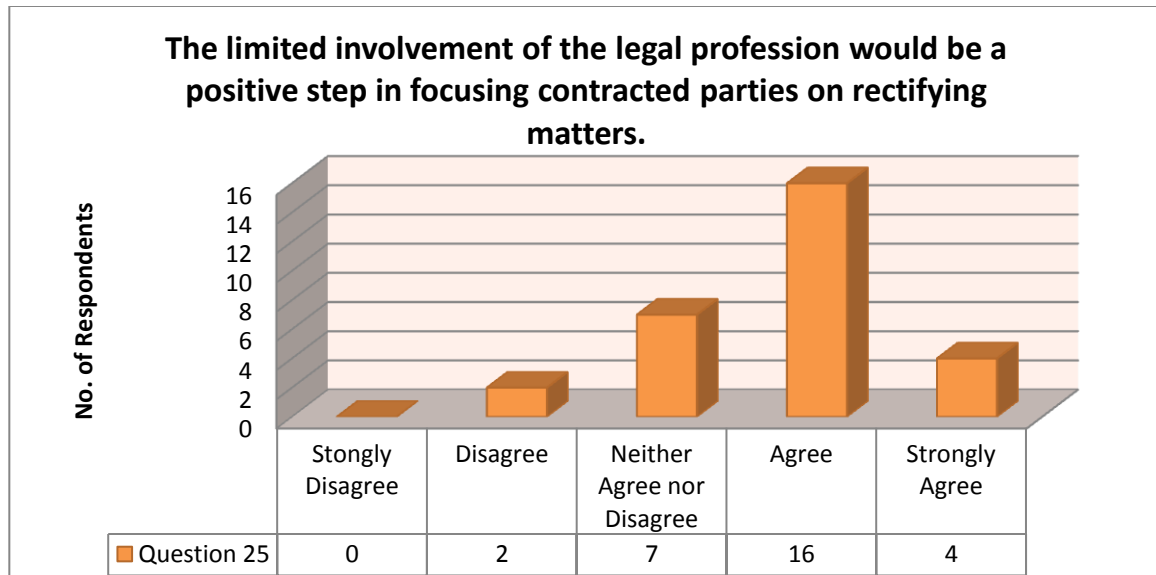
17 respondents agreed that the culture is more reactive than proactive when it comes to fixing problems. 6 people disagreed with this and 6 remained neutral.

Question 24



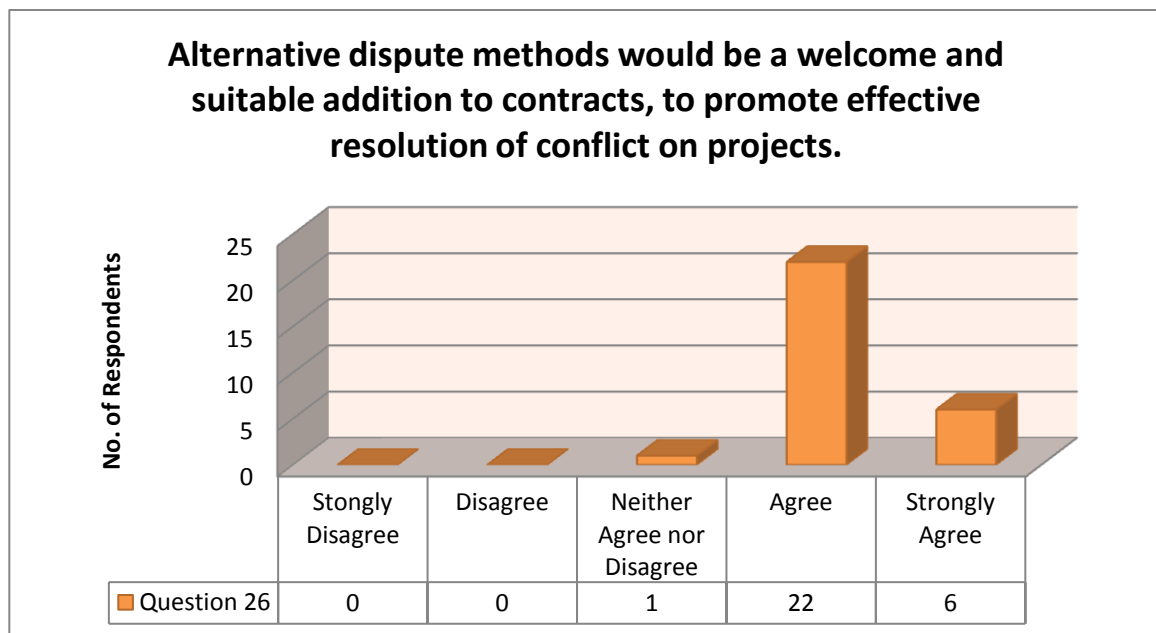
The majority of respondents (21) called for a need to change from traditional forms of dispute resolution. 6 remained neutral and only 2 disagreed.

Question 25



20 people agreed (4 strongly) agreed with this statement. 7 respondents remained neutral and only 2 disagreed.

Question 26



27 people agreed (6 strongly) with this statement. Only 1 person was neutral but nobody disagreed.

7.4.3 Summary of Results (Questions 22 to 26)

The results of this section suggest that the HK Construction Industry not only gives rise to many disputes, but the methods for solving these disputes are back dated and in need of change. The most conclusive response was for the welcome addition of alternative dispute resolution methods to help with the effective resolution of conflict on projects.

The mean scores are shown in the table below:

	QUESTION				
	22	23	24	25	26
Mean	3.55	3.38	3.76	3.76	4.17

7.5 Part 4 – The Implementation of NEC in HK (Questions 27 to 34)

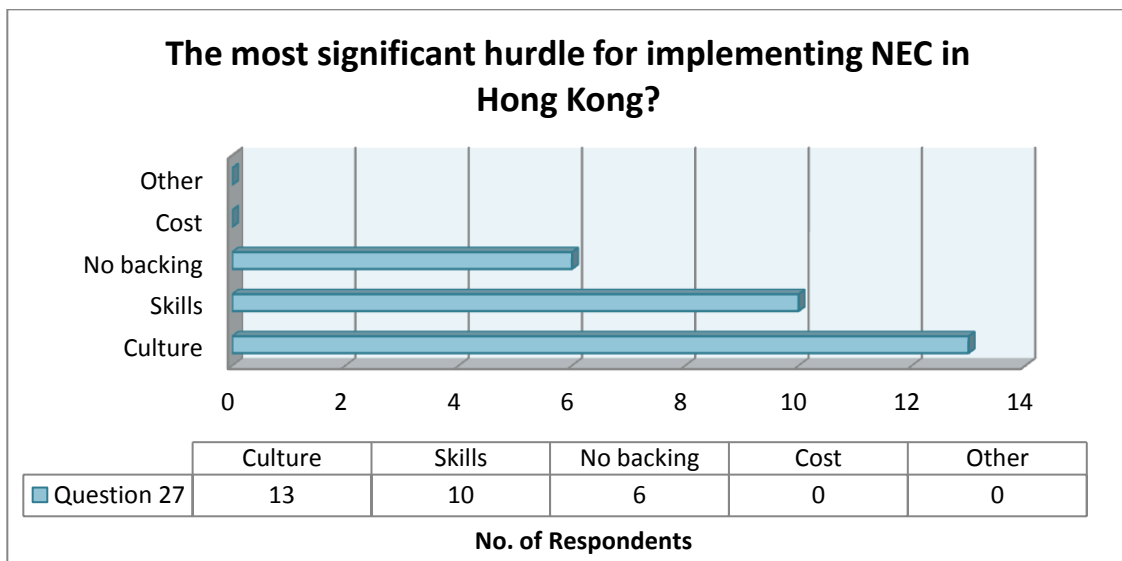
7.5.1 Questions and Rationale

The purpose of this section was to find out where the respondents thought the problems with implementation of NEC may lie. It also aimed to determine that despite the issues with implementation, whether or not they wanted to at least see the NEC be introduced and tried out in HK. The questions would also determine if change is already underway and what the extent of awareness of NEC.

The questions also looked to determine whether respondents think that the change will be difficult or potentially too much for some, based on the long term traditional cultures that have been established and the difficulty in changing people's mind set.

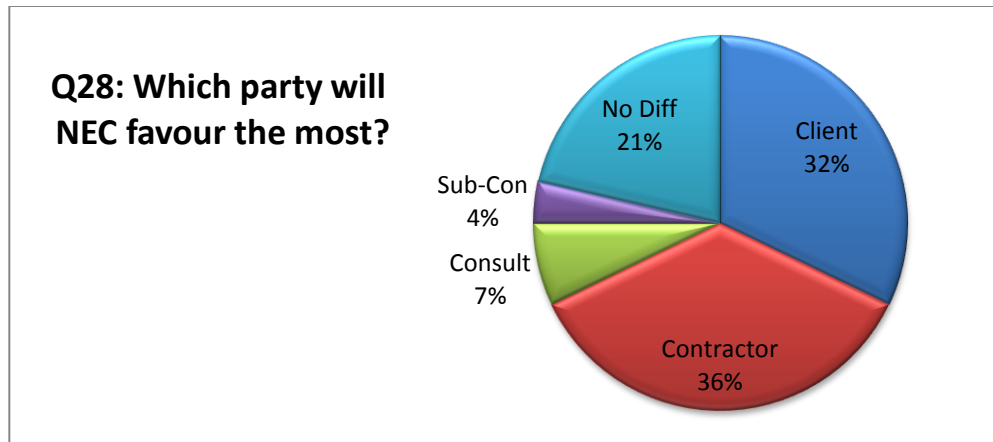
7.5.2 Analysis and Results

Question 27



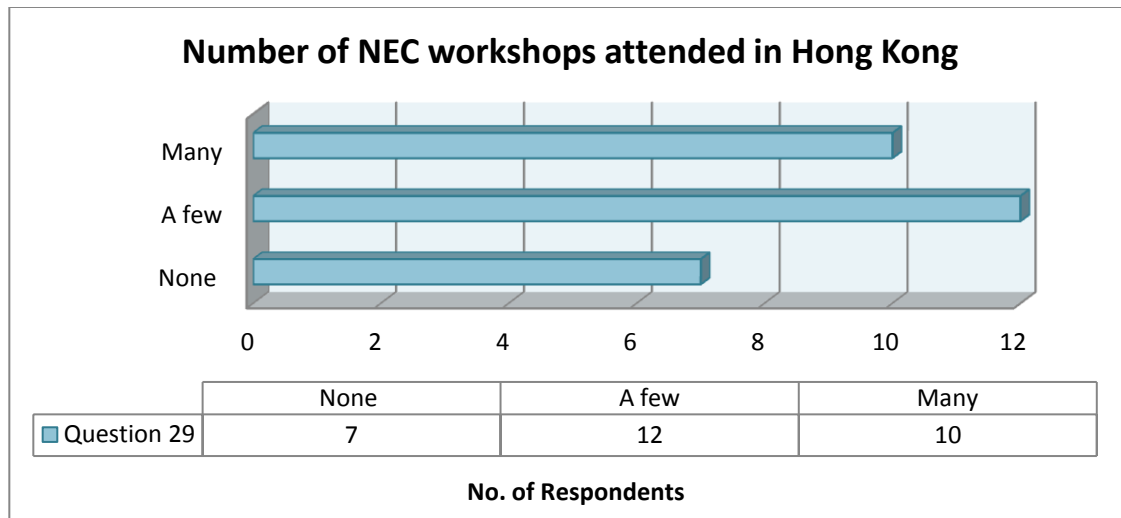
Respondents believe that the most significant barrier to change for NEC in HK is 'culture', with 13 responses. Next was the current lack of skills, with 10 responses. 6 responses were given for lack of backing from government. No issues were assigned to cost.

Question 28



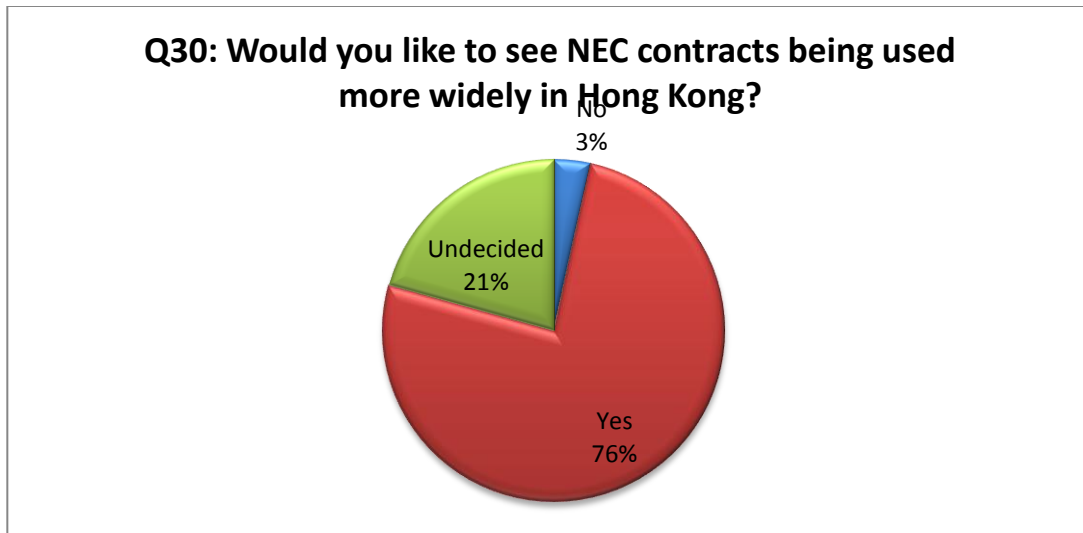
The most popular response was the contractor (36%), closely followed by the client (32%). 23% of respondents believe there will be no significant difference in terms of who benefits the most. 7% selected consultants as the main benefactors and 4% selected sub-contractors.

Question 29



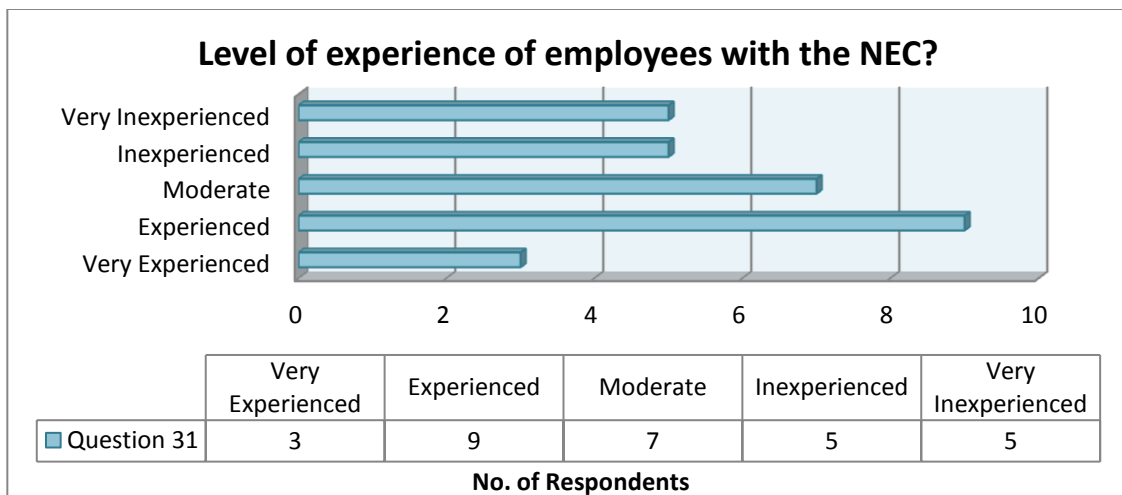
22 of the respondents have been involved in at least one or more NEC workshops in HK. Only 7 respondents haven't been involved in any workshop.

Question 30



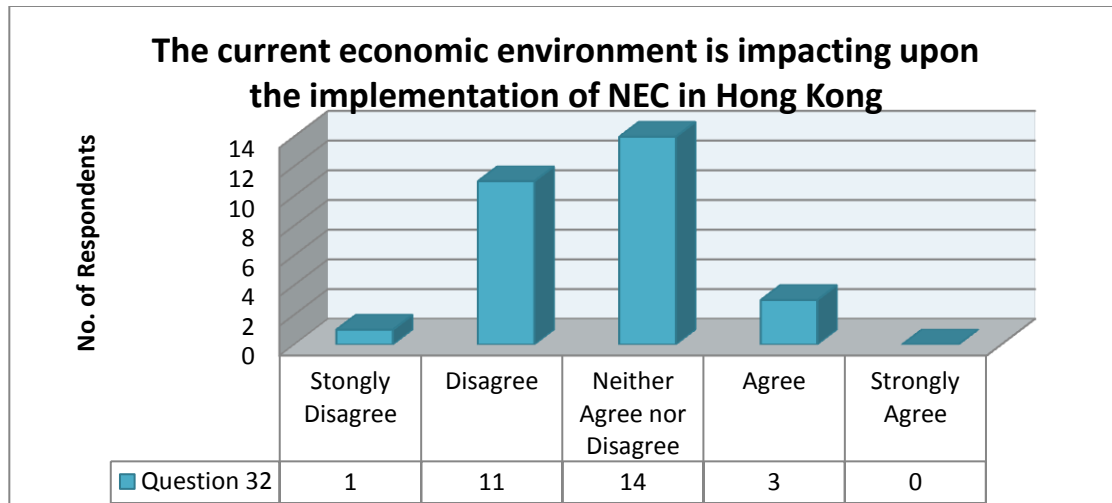
The response to this question was conclusive, with 76% of respondents claiming that they would like to see NEC be used more widely in HK. 21% were undecided and only 3% did not want to see the use of NEC increase.

Question 31



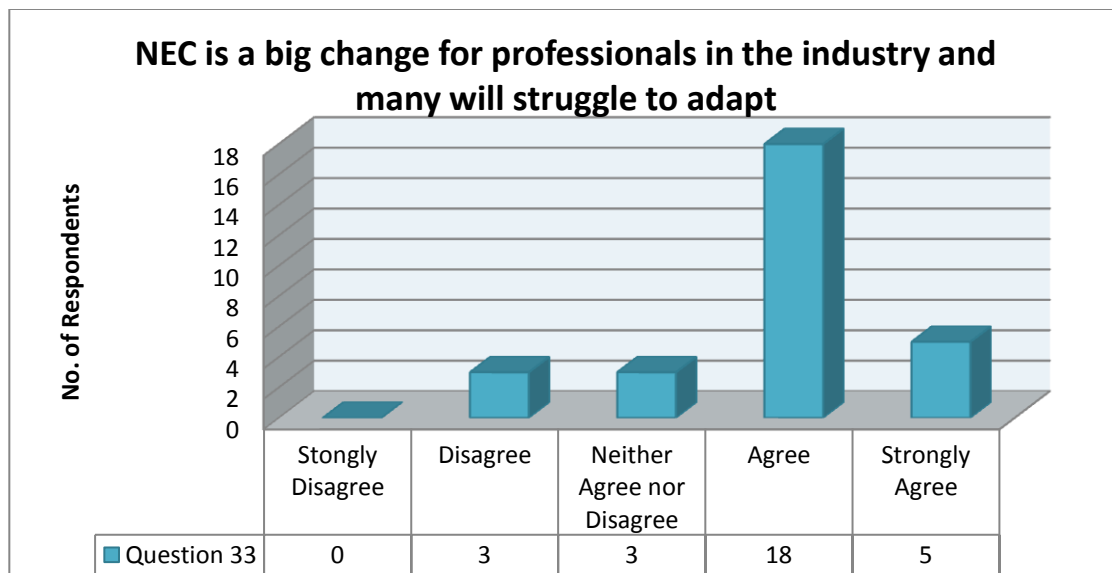
The response to this question was very mixed, with a range of NEC experience given. In general though, 17 respondents claimed their employees have at least moderate experience or above. Only 3 said their organizations are very inexperienced.

Question 32



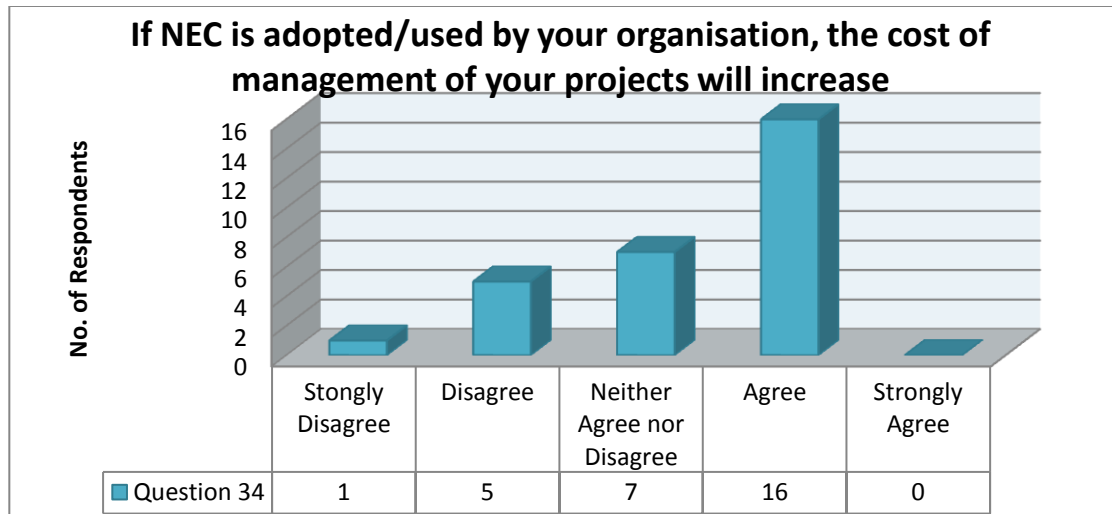
The respondents tended to agree that the economic situation has no influence, with 12 people disagreeing with this statement including 1 strongly. However, most respondents remained neutral (14). Only 3 agreed with this statement.

Question 33



There was agreement that this is a big change for construction professionals, with 23 agreeing (5 strongly). 3 remained neutral and 3 didn't believe this was a big change.

Question 34



Most respondents agreed (16) that the cost of project management will increase with NEC. However 6 disagreed, including 1 strongly. 7 remained neutral.

7.5.3 Summary of Results

The table below shows the mean scores for opinion based (Likert) questions 32 to 34. The only major sway and notable set of responses is that people think NEC will be a major change for HK professionals, with many struggling to adapt.

	QUESTION		
	32	33	34
Mean	2.66	3.86	3.31

The other responses (questions 27 – 31) also suggest that for implementing NEC into HK, there are causes for concern and barriers to change, namely the existing culture and change in mind set required, and the lack of current skills and experience with NEC in HK. Some

of these are already being addressed, with the workshop attendance a measure of how people are looking to learn about NEC and how the momentum is growing.

For the change in culture, it does seem that the mentality of individuals in influential positions is changing, with a focus on NEC, as suggested by the response to perhaps the most important question in the whole questionnaire, for whether respondents wanted to see more of NEC in HK. The result was an overwhelming 'yes', with a few others applying a degree of caution, and only one respondent not wanting to see this change. In that sense, it would seem the culture is already being influenced.

DISCUSSION OF INTERVIEWS RESULTS

8.1 Introduction

A list of 11 open-ended questions were used and interviewees were encouraged to answer in full (Fellows, 2003). The main aim of the interview was to gain a deeper understanding of the similar themes that were incorporated within the Questionnaire. Therefore, the discussions were based around the topics of NEC, Traditional contracts and the culture of HK's construction industry. The questions and a brief discussion for the reasons for their inclusion are as follows:

1. What is your experience with NEC and Traditional Government construction contacts?

This was primarily to provide background information of the interviewee, to demonstrate that during the sampling phase, the selected individuals were of a distinguished background and were considered able to provide valuable information and feedback about the subjects matter.

2. What made you first interested in NEC ?

To understand why NEC became important to them.

3. How would you summarise the key benefits and failures of the NEC contract ?.

This would enable comparisons with the questionnaire results and provide a more detailed insight into what the NEC has to offer.

4. What are your thoughts about the HK Construction Industry culture, in particular for its history of adopting traditional styles of procurement ?

To enable the interviewees to elaborate on the effect that traditional styles of procurement have had on the industry.

5. Are you in any way involved with the implementation of NEC in HK?

A background related question which could also give insights into the current methods for implementation of NEC.

6. What do you consider will be the main barriers for implementing NEC in HK?

To discuss the reasons why NEC may not succeed and why.

7. How do you foresee the progression of the use of NEC in HK and how is it being implemented?

To understand what the interview predicts in terms of the implementation of NEC and whether it will grow as a procurement option.

8. Ultimately, should Government style traditional contracts be abolished, or do they have a place in the industry ?

To see if despite the potential success of NEC, the interviewee feels that traditional style contracts will still form a part of HK procurement.

9. Could you recommend any ways to facilitate effective implementation of NEC in HK?

To discuss the interviewee's recommendations for promoting and implementing NEC.

10. What do you think your involvement will be with NEC in the future ?

To see the level of involvement in NEC that the interviewee expects to have in the future.

11. Any other items you'd like to discuss?

To maintain the openness of the interview and ensure the interviewee can raise any more issue or topics that they feel are necessary.

8.2 Results

As outlined in Chapter 6, the responses from the interviews were categorised as per Figure 3. To ascertain the results, each time a theme was raised by the interviewee, it was given a score of one. Therefore, the results measure the frequency that the themes were raised.

The frequency tends to suggest a themes level of significance and so the themes are considered as equal. All the themes displayed were raised by at least one interviewee and the maximum possible score for a theme was ten, in the case that all interviewees raised or commented on it.

In order to conceptualise the results and patterns, only themes which raised more than five comments are discussed. Furthermore, for each sub-category, the themes with five responses or more will be ranked, to ascertain what the interviewees perceive to be the most significant issues.

The results and their rankings within each sub category for the full set of results are shown in Appendix E. A summary of the results and rankings for each sub-category with five or more responses is shown in Figure 4.

Figure 4: Summary of Interview Results

	INTERVIEWEE										Total	Rank
	1	2	3	4	5	6	7	8	9	10		
	Comments on the Themes											
NEC												
+ve Response												
•Positive concept	1	1	1	1	1	1	1	1	1	1	10	1
•Encourages Collaboration	1	1	1		1	1	1	1	1		8	2
•Reduced disputes	1	1			1	1	1	1	1		7	3
•Project management		1			1	1	1	1	1		6	4
•Increased use	1	1	1	1		1				1	6	4
•Trust		1			1	1	1		1	1	6	4
•Increased awareness of partnering and team building			1		1	1	1	1			5	7
•Better mindset		1		1	1	1	1				5	7
•Allocation of Risks		1		1			1		1	1	5	7
Barriers to implementation												
•Culture - wrong mindset	1	1	1		1	1		1	1	1	8	1
•Reluctance to change	1	1			1	1		1		1	6	2
•Lack of trust	1	1			1	1	1			1	6	2
•Lack of awareness and experience	1	1		1		1	1			1	6	2
•Z clauses					1	1	1	1	1		5	5
•Decision making process and delegating power					1	1	1	1	1		5	5
Advisory												
•Raise awareness	1	1	1	1	1	1	1	1	1	1	10	1
•Draw upon expertise	1	1	1	1	1	1	1	1		1	9	2
•Training	1			1	1	1	1	1	1	1	8	3
•Selection of the right people	1	1	1	1	1	1	1			1	8	3
•Measure performance	1	1			1	1	1	1	1		7	5
•More use of NEC and Dispute Resolution Advisors	1	1			1		1	1	1	1	7	5
•Increase awareness of partnering and team building	1			1	1	1	1		1	1	7	5
•Pilot projects		1	1		1	1		1		1	6	8
•In house project		1	1		1	1		1		1	6	8
•Gain experience		1	1			1	1	1		1	6	8
•Government to accelerate decision making process					1	1	1	1	1		5	11
•More success stories and case studies	1	1				1	1			1	5	11
•Convince own people in organisation first		1		1	1	1				1	5	11
TRADITIONAL												
+ve Response												
•Still a place for them	1	1	1	1				1	1		6	1
•Familiarity		1	1	1	1	1	1				6	1
•Clients are comfortable with the process		1		1	1	1	1	1			6	1
•Suits a certain mindset	1	1			1	1	1				5	4
-ve Response												
•Disputes	1	1			1	1	1		1	1	7	1
•Lack of trust	1	1			1	1	1			1	6	2
•Claims orientated	1	1			1	1	1		1		6	2
•Poor relationships	1	1			1	1	1				5	4
•Long time to close out projects	1	1	1			1				1	5	4
CULTURE												
+ve Response												
•Beginning to see benefits and change mindset	1	1	1	1		1		1			6	1
-ve Response												
•Disputes	1	1	1		1	1	1			1	7	1
•Adversarial nature	1	1	1		1	1	1				6	2
•Trust and respect issues	1	1			1	1	1			1	6	2
•Master / servant relationship	1	1				1		1		1	5	4
•Resistance to change	1	1			1	1				1	5	4

8.3 Discussion

The discussion of the results will initially be based on each category and its sub-categories. From this, the inter-relationships between the categories will be discussed.

8.3.1 Category 1 – NEC

Since most questions in the interviews were related to NEC, a high number of responses and themes were raised. The discussion highlights the most significant responses.

Sub-category 1A: +ve Responses

As the results show, there are an overwhelming 10 responses which in some form express that overall the NEC is a 'positive concept'. It may be difficult to scientifically prove what exactly is meant by this, but it seems that the human side of this style of procurement appeals to people. In that the idea of working together towards a goal is perceived as some kind of advanced philosophy in comparison to competing against each other.

This is supported by the 'theme' ranked second, which emphasizes that the interviewees admired the collaborative style of the NEC. These two core elements of the NEC play a major role in the other aspects that were considered significant, including the reduced disputes, trust, partnering ethos and in general, a better mindset.

Other themes highlighted were the positive observation that the use of NEC is increasing in HK, project management would be improved, and the allocation of risks is done more effectively.

Sub-category 1B: -ve Responses

The key barrier to change for implementing NEC in HK is considered as the existing culture, which was raised by 8 of the interviewees. In connection with this, a 'reluctance to change', 'lack of trust' and 'lack of awareness and experience' were each suggested 6 times.

The other issues of significance are about clients over using the 'Z clauses' in the contract and hence losing the effectiveness of the NEC. Finally, the issue regarding the internal structure of Government, since it is considered that to use the NEC effectively, the Government will need to 'streamline' through empowerment of individuals, much of its traditional internal practices so that decisions can be made in a timely manner to suit the requirements of the contract.

Sub-category 1C: Advisory Comments

There are many advisory comments for the NEC and the most common is to 'raise awareness'. This tends to imply that although NEC is growing, there are still many in the industry that don't fully understand its concepts and processes.

Also with a high response rate are three linked themes including; 'drawing upon expertise', 'training', and the 'selection of the right people'. These all suggest the need to use key people that already have substantial NEC experience to guide the industry leaders and educate the future users of the contract.

Other high responses included 'measuring performance', with 7 responses, which is considered as a way to convince the skeptics. This was supported by 5 suggestions that more 'success stories and case studies' will provide further evidence that NEC is effective.

The 'use of NEC and Dispute Resolution Advisors' is considered a good way to guide project teams, whilst in the same tone, by 'increasing awareness of partnering and team building', the performance of project teams will be enhanced.

Several responses were similar in the sense that they covered themes such as doing trials with NEC on 'pilot projects' or 'in house projects, with the focus to 'gain experience' and convince people from within their own organizations.

The remaining significant theme for advice are for Government to ‘accelerate their decision making process’ so that NEC can be administered in the appropriate way.

8.3.2 Category 2 – TRADITIONAL

In the interview questions, there were generally less questions orientated towards traditional contracts and so as expected, there are less comments received about them, but still enough to signify some meaning.

Sub-category 2A: +ve Responses

6 people claimed that even if NEC becomes widely used in HK, there is ‘still a place’ for traditional contracts, at least in the short term.

The suggestions also highlighted that the reasons are because many clients are already ‘familiar’ with its use and ‘Clients are comfortable with the process’. In addition, the traditional contracts ‘suit a certain mindset’ and so in certain circumstances it may be more practical to use it.

Sub-category 2B: -ve Responses

The themes that occupied the negative responses are closely linked, with 7 people saying that ‘disputes’ are the main cause of grievance. Also cited with this is a ‘lack of trust’ and ‘claims orientated’ culture, which have lead to ‘poor relationships’ between the contracted parties.

The other significant issue raised are the ‘long time to close out projects’, which is primarily to do with the long duration of claims and the slow process in resolving them, or lengthy litigation, which has been known to continue for 10 years since project completion.

8.3.3 Category 2 – CULTURE

The subject of culture was raised briefly in the interview questions, primarily to provide further insights to support the literature and gain an in depth understanding of the perceptions of the industry culture.

Sub-category 3A: +ve Responses

Only one theme has 5 or more responses, which suggests that the culture in construction industry culture in HK is ‘beginning to see benefits and a change in mindset’. Further probing of this revealed that with the introductions of partnering and target cost project in the last 10 years, along with an awareness that traditional contracts have many problems, clients and industry professionals have had their awareness raised and are more open to considering changes. However, of the 6 interviewees that suggested this, they all admitted that there is still a long way to go to change the mind-set of the ‘masses’.

Sub-category 3B: -ve Responses

The most common themes for a negative perception of the culture are the ‘dispute’ orientated and ‘adversarial nature’ of the industry, which commonly leads to ‘trust and respect issues’.

Along with this, 5 people commented on the traditional master / servant relationship that typically exists between client and contractor, saying that this mentality is difficult to alter, in particular for clients.

Finally, 5 people also referred to a ‘resistance to change’, suggesting that the mentality of the industry was fairly stuck in its ways, despite the acceptance that other ways of doing thing are likely to be better.

8.4 Summary of Results and Inter-relations

In summary, it can be seen that there are strong links between the 3 main categories. Perhaps the most obvious relation is that the main barriers to change are commonly the negative aspects of the culture and traditional contracts in HK. For example, the nature of disputes and adversarial relationships in the industry has lead to many disputes over many years, which has damaged relationships, mainly between client and contractor, almost so much that some believe it is not possible to fully repair. Hence, issues such as the existing culture, trust and respect are major barriers for the implementation of NEC.

The other main link it that the negative impact of the culture and traditional contracts as a combination, help to emphasize the benefits of the NEC, since in many ways it works in the opposite way. NEC aims to bring parties closer as opposed to becoming more distant and closed off to one another.

The inter-relation between culture and traditional relationships is another strong link, since the two tend to work in combination with each other. The historical culture of HK has bred a conforming nature in its people, which has become almost so rigid that is accepts many practices which are not in a spirit of trust or respect. In addition, the long term use of traditional contracts has continued to essentially force parties further apart, which drives the state of the confrontational and competitive culture even more.

DISCUSSION OF CASE STUDY

9.1 Introduction

The purpose of the case study was to provide an account of the first completed NEC project and also support the evidence gained from research during the questionnaire and interview stages. The Fuk Man Road Nullah Case Study is in Appendix A. It describes the first NEC pilot project by a Government authority, in this case DSD.

The research for the case study was carried out using information provided by DSD. In addition, 3 interviews were held with DSD employees, including two members of the project team and Deputy Director, Mr Wai Tsui.

As recommended in an interview with Richard Patterson of Mott Macdonald, there are certain checks which can be done by utilising the project data, to gain an understanding of the effectiveness of NEC.

From the raw data available, courtesy of DSD, the following comparisons / checks were done:

1. Initial Project Budget, Final Target Cost and Final Actual Cost
2. Final Target Programme vs Actual Project Duration
3. Number of Early Warnings (EW) and No. that became a Compensation Event (CE)
4. Total number of Compensation Events
5. Time taken to agree Compensation Events
6. Project Partnering

The results are shown in the case study and are generally very positive, with the project finishing early and within budget, gaining high project partnering scores, and 100% close out of all compensation events, which considering it was the first NEC, have relatively successful average close out durations.

9.2 Limitations and Recommendations for future projects

The author was fortunate to receive first hand information from two members of the projects team. In addition, both Ivan Cheung and Bryan Clifford were also involved in management and NEC advisory roles and were also interviewed. However, it is accepted that in order to provide a full account of the effectiveness of NEC, the research would need to include members from the consultant, Black and Veatch, and the contractor, Chun Wo. With the limitations of time, this was not possible, but it would be recommended for other NEC projects in the future, so that a full spectrum of thoughts are received from the project parties.

The author also recognizes that information from a single case study does not provide a significant quantity of evidence. However, as the only completed NEC with access to data, the scope for case studies was limited. Therefore, the author is keen to stress that similar case studies or project reports should be provided for all NEC projects in HK, as it is in a critical stage of its implementation. The results of these should be compared between departments and most importantly, the results should be accessible to all in the industry in order to set the scene for the openness the contract aims to bring to the industry.

CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

The overall aim of this research was to determine if the use of NEC forms of Contract, over traditional forms, will benefit the HK Construction Industry. Chapter 1 discusses 5 main objectives, a main hypothesis and a sub-hypothesis. The conclusions of each are described in the following sections:

10.2 Achievement of Objectives and assessment of the hypotheses

Objective 1 - Make comparisons between NEC and Traditional forms of contract

The background of traditional contracts and NEC were outlined in Chapter 2 and 3 respectively. Then, throughout the research, there were many comparisons made between the two forms of procurement.

It can be concluded that from the literature review, the questionnaire, the interviews and case study, that the NEC offers many benefits in comparison to traditional forms of contract. In the countries where NEC has been adopted, this has generally been accepted, but the case in HK is somewhat different. The overall thoughts about NEC are that it will reduce disputes, improve relationships between parties, and also offers many good mechanisms to enable effective project management. However, the traditional form of contract has been widely used in HK for many years, and it is part of the culture. In that sense, despite its flaws, people know how to use it and to an extent are comfortable with it, or without the change.

Objective 2 - Assess the potential impact of ‘change’ due to the existing culture in the HK construction industry

Within the literature, it is evident that change is not a comforting phenomena for HK professionals. In many people's minds, the current methods have worked well, with the evidence being the fact that HK is an undisputedly well developed region with excellent infrastructure, buildings and public services.

Rowlinson's study into change in a government organization clearly portrays the difficulty that is facing NEC. The main source of the issue is with cultural attributes within organizations and individuals, which play a key role. For example, the power-distance relationship culture in HK is not typically consistent with how NEC intends to work, as it strives to empower the whole team to integrate, share ideas and work together.

In addition, the high uncertainty avoidance is an explanation for why the profession is comfortable to refer directly to a set of contact clauses for solutions to problems, as opposed working through issues logically and collaboratively.

Finally, Confucian Dynamism plays a role because it provides HK with its focus on long term thinking based on tradition, as opposed to short term thinking based on improving the way things are done. A radical change such as NEC is therefore not wholly desirable for some professionals.

Objective 3 - Outline and discuss any other barriers to change, e.g. training needs, skills gaps and cost.

Included in the literature, questionnaire results, interviews and case study are references to barriers to change for NEC. Culture has been the primary focus and remains the biggest issue and barrier to change. However, the other main issues will be discussed below:

Lack of experience and trained individuals / organizations:

This issue was raised in both the questionnaire and also the interviews, with the general concern being that not enough people in HK currently understand what NEC is and how to use it.

The respondents to the questionnaire and the interviewees were selected on the basis that they knew about NEC or because they were 'likely' to know about NEC, but this is not necessarily a true reflection of most HK professionals. This could be a major problem, certainly with the speed at which NEC can be implemented, because the initial efforts will be required to train and help people understand the ethos and functions of the contract. In addition, any training will bare a cost (both monetary and time), so who is to pay for it all?

As pointed out by the literature, one of the biggest failures when implementing NEC for the first time, is that the understanding of the contract, its values and principles, were underestimated by the parties involved.

Lack of backing from Government organizations:

It is fair to say that the drive for NEC is largely coming from government and in particular, DB. They have set the scene for the government departments to trial various forms of NEC on a number of projects. However, what remains to be seen is the depth of this backing, with particularly regards to the internal dynamics of the Government departments.

For example, using the NEC with the focus of it being a contract is likely to see it fail. What is necessary is the complete buy-in to its philosophy and values. To do this, requires Government organizations to adopt NEC in its pure form, without the addition of numerous 'Z clauses' or by altering clauses, which are both more likely to contradict the whole approach that is trying to be achieved.

The concern is that whilst the contracts being used on projects may well come under the heading of NEC, the reality will be very different and clients may find comfort in resorting back to traditional methods of contract management.

The additional cost of managing projects:

It is generally accepted that NEC warrants greater project management costs. However, there is extensive literature to suggest that these costs are more than recovered in the 'bottom line' project figures.

What may be more of an issue with regards to cost, is the initial costs for organizations relating to training needs and resources for NEC tenders, in particular Option C – Target Cost, which often requires substantial input from a contractor prior to the actual commencement of construction works.

Objective 4 - Determine whether overall, NEC Contracts will benefit the HK construction industry and should be adopted on a wider scale.

NEC has a substantial amount of literature to suggest that it adds real value to projects. It also has various endorsements from organizations and individuals. With regards to HK, it is still new, but the evidence to date suggests that it can make a significant improvement to the HK construction industry.

There will undoubtedly be barriers to change, but most of which are acknowledged, which is often the first step in solving anything. There are also many individuals who do not think that it will benefit HK, but the evidence suggests that if you have ever used NEC, you would be unlikely to be so dismissive of it.

Finally, this research was conclusive in terms of the number of respondents that were in favour of NEC being used on a wider scale in HK.

To summarise, this research has established the following advantages and disadvantages for the use of NEC, with HK in mind:

Figure 5: Advantages and Disadvantages of NEC in Hong Kong:

Advantages	Disadvantages
Clear plain language and is easily understandable.	Concerns with the language from the legal profession.
More clarity with the contract roles and allocation of responsibilities	Possible confusion at first due to historical definition of roles
More suitable allocation of risk, to the contract party which is most able to manage it.	For a client to adopt particular risks such as unforeseen ground conditions, a major change in mind set is required.
Flexibility with the options for secondary clauses, payment options and allocation of financial risks.	Clients may feel the need to alter the contract too much and losing the benefits of the contract.
A structured project management framework, which enables efforts to focus on the project.	Requires individuals with strong leadership capabilities, which is often hard to find.
Lower project costs due to settling issues and disputes in a collaborative manner.	Increased project management costs in comparison to traditional contracts due to the resources required to manage the project.
Contract procedures that are highly effective in terms of the contract itself and project management	Requires more training and experience for the people using the contract.
Early Warning procedure as it facilitates the proactive management of the contract	Concern over the ability of clients to respond efficiently due to internal requirements
The creation of an environment which is proactive, forward thinking, and acts in the best interests of the project.	

A collaboration contract, which encourages the client and contractor to work together with an open and honest relationship	A major change in cultural mind-set is required for clients and contractors to work together and trust each other
Increased job satisfaction due to the collaborative nature of the work.	Some people thrive on the adversarial and competitive nature of the industry and business in general.

Objective 5 - Make recommendations, if appropriate, for the continued use of NEC contracts based on lessons learned from the use of NEC in the UK and HK to date.

The recommendations will be discussed at the end of this Chapter.

***Hypothesis* - There will be no significant improvement to the HK construction Industry by introducing NEC alternative form of procurement.**

The objectives have helped shape this argument and have provided a means to understand the potential benefits vs the potential problems for NEC in HK. Whilst there are many suggestions that NEC will improve the industry, the difficulty at the moment is the lack of evidence.

The Fuk Man Nullah case study highlights some of the benefits attributed to NEC, but due to its relatively small value and lack of comparative data, it is difficult to base the future success of NEC on this. It is also inherently difficult to assess the outcome of an NEC project with a comparable traditional style project. Whilst this has been done before in other countries, it requires projects of very similar nature and the results will not be useful until after the project completion. In addition, issues on a project are often bespoke, which will provide difficulties when comparing data.

However, the more recent and larger projects such as Happy Valley Underground Stormwater Storage Scheme and Tin Shui Wai Hospital should provide a much deeper insight to the successes and failures of NEC.

Overall, due to lack of scientific evidence, it is difficult to prove or disprove this hypothesis. However, included later are some recommendations for further testing this hypotheses. This is based on the NEC health check that was done for the Fuk Man Nullah Case Study.

***Sub-Hypothesis* - The culture of the HK society and its construction industry does not enable the large scale implementation of a procurement system that relies distinctly on the adoption of collaboration and trust between parties.**

As discussed throughout this research, culture is likely to be the most significant barrier and potential reason for NEC to fail in HK. The change in mind set required is significant and this has been expressed by respondents to the questionnaire and in particular in the interviews.

However, as Rahmen and Kumaraswamy (2002) suggest, if the Government took the necessary steps to make NEC principles mandatory in contracting and selection procedures, then it could be a catalyst for culture change, as it will force all potential project parties to fit into 'the system' in order to win work and survive. In doing so, the culture will in essence be evolving and here the value and mutual benefits of NEC are likely to shine through. This statement does of course rely on the government to enforce or at least encourage NEC, which it is already doing. So whilst the principles and plan are in motion, the long term effectiveness of Government intervention remains to be seen. Much of their success will be attributed to how well they can manage internal friction, and adapt their own systems and organization in order to meet the demands of the NEC.

In summary, any culture can be changed and it is no different for the implementation of NEC. The trust will form from the increased use of collaboration, whereby each party will begin to understand the needs of each other.

10.3 Final Conclusion and Recommendations

From this, it is evident that the implementation of NEC in HK is not a simple task, nor should it be underestimated. It will take time to change the well established existing cultures and raise awareness of the potential benefits of NEC. It must demonstrate that it will provide a mutual benefit to the organizations and individuals involved in the industry. In addition, due to the power distance nature of HK, it is likely that for change to be successful, it is imperative that it is driven from the top or at Government level. Only then will it generate sufficient commitment and enthusiasm for implementing a new way of procuring construction projects.

To emphasize the scale of the change, Inglis (2009) uses a figure to show that traditional contracts and NEC are practically on the opposite ends of the ‘collaborative working’ scale.

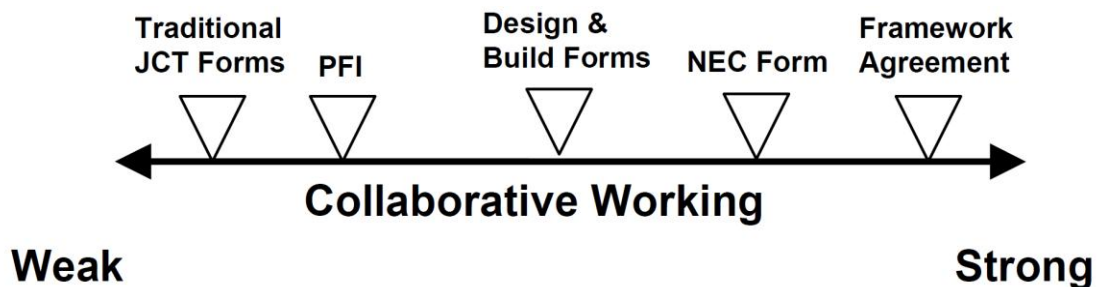


Figure 6: The effectiveness of collaborative working in relation to the type of contract employed (Inglis 2009)

10.3.1 Recommendations for Implementing NEC in the HK Construction Industry

The HK government evidently needs to take the initiative if they are serious about NEC. Along with this several recommendations are made, including:

High Level

- Formulating appropriate policies, implementing a plan of action, and monitoring the results.
- Translating the industry enthusiasm into performance improvements and savings to the 'bottom line',
- Government must change internal processes and empower individuals to meet the demand of the NEC contractual obligations.
- Creating a culture based on collaboration and trust so that it becomes the 'norm'. There needs to be a strong focus on the next generation of leaders and graduates, who have not been tainted by the adversarial nature of traditional contracts.
- Providing increased training for project teams and project management contractors.
- Increasing the awareness of the benefits of the NEC via integrated workshops and events including all parties involved in a project team.
- Promoting the wider future use of the NEC in the engineering and construction industry.

Project Level

- To enhance the collaboration effort, project teams should be co-located wherever possible, including design, client and construction teams. This is a simple measure that will encourage communication, trust and a close working relationship between the parties.
- Define and agree a set of 'mutual' project goals and values.
- Ensure commitment by the Project Leadership team in maintaining and driving the collaborative working relationship.

- Monitor the progress using KPI's for collaboration / partnering and perform NEC 'health check' as described in Chapter 9 and the Case Study.
- The clients must select an appropriate project manager and enable them to make the timely decisions that the NEC requires of them.

Finally, HK will need to be patient:

“Change processes can be achieved only relatively slowly on a step by step basis in some circumstances, particularly when collectivism, power distance and ‘face’ are important factors.” (Rowlinson and Root, 1999)

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Appendix A

Fuk Man Road Nullah

Hong Kong's First NEC Project

CASE STUDY
MSc International Construction Management
University of Bath

By Robert Dickson

Project Summary

Project Name:	Improvement of Fuk Man Nullah
Location:	Sai Kung, Hong Kong
Project Value:	\$76.7 million HKD
Client:	Drainage Services Department (DSD)
Consultant:	Black and Veatch
Contractor:	Chun Wo Construction
Project manager:	Chief Engineer/Drainage Projects, Drainage Services Department
Contract Start:	31 st August 2009
Contract Completion:	19 th May 2012
Contract Used:	NEC3 Engineering and Construction Contract (ECC) Option C (Target Cost)

CONTENTS

- 1** Project Summary
- 2** NEC – A First for Hong Kong
- 2** Measuring Project Performance
- 3-6** Analysis of the Project
- 7** Thoughts from DSD
- 7** Conclusions

Key Requirements:

- *Decking of 180m long, 12m wide nullah*
- *Local Road Improvements*
- *Landscaping works including 4000m2 park*

Fuk Man Nullah before work began



Fuk Man Nullah after project completion



NEC - A First for Hong Kong

Fuk Man Road Nullah is Hong Kong’s first Government NEC3 pilot project and was completed in May 2012, 6 months early and under budget.

The project was selected as a pilot by the government’s Development Bureau as a result of the increasing interest in adopting partnering based and collaborative procurement methods.

It is expected that the success of the project will pave the way for more use of the NEC3 form of contract, which will include the use of the Professional Services Contract (PSC) and Term Service Contract (TSC). In fact, there are 30+ projects in various stages currently ongoing using some kind of NEC3 contract.

This case study aims assess the success of the project and give an indication of its overall performance.

“NEC encourages each party to work together and solve problems collaboratively, which benefits the overall delivery of the project.”

Anthony Tsang - Senior Engineer, DSD

Measuring Project Performance

There are various ways in which the NEC can be evaluated, include both quantitative and qualitative approaches.

From the data available for this project and with the help of members from client DSD, this Case Study has been able to achieve both.

It has been possible to measure quantitative data by displaying some of the statistical data from the project. In addition, since the style of procurement has a large social element, it was valuable to get the insights from client DSD and project team members including:

- Wai Tsui, Deputy Director, DSD
- Anthony Tsang, Senior Engineer, DSD (member of project team)
- CL Leung, Engineer, DSD (member of project team)

The following pages will display a series of graphics to show how well the Fuk Man Road nullah project was carried out using the NEC3.

A summary of the interviews will be discussed in the final section, where we will hear first-hand about the use of NEC, its benefits, and potential pit falls for its further implementation in Hong Kong.

“NEC helps bring issues to the table, resulting in easier resolution and reduced conflict. It promotes trust among team members.”

CL Leung – Engineer, DSD

Problems with Measuring Performance

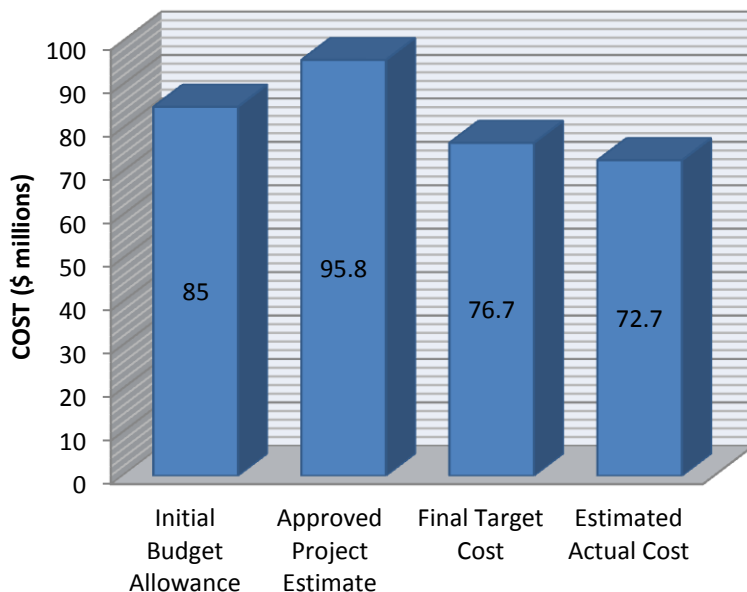
The main difficulty in analyzing the use of NEC and indeed any method of procurement, is that making comparisons is inherently difficult, since it is impossible to carry out exactly the same project, with the same parties and teams, using an alternative form of contract.

It may be possible to compare ‘similar’ projects in terms of the type of work, resources available, project budget and programme. However, ultimately there will be errors when attempting to make a direct link as one cannot account for all potential project issues that the team have to manage and resolve.

Analysis of the NEC on the Project

For this project, comparisons will be left aside and instead the data will focus entirely on the project. The data analysed can be considered as an NEC 'health check' and will be as follows.

1. Initial Project Budget, Final Target Cost and Final Actual Cost
2. Final Target Programme vs Actual Project Duration
3. Number of Early Warnings (EW) and No. that became a Compensation Event (CE)
4. Total number of Compensation Events
5. Time taken to agree Compensation Events
6. Project Partnering



1. Initial Project Budget, Final Target Cost and Final Actual Cost

According to the original Legco report, the initial budget allowance = \$85 million.

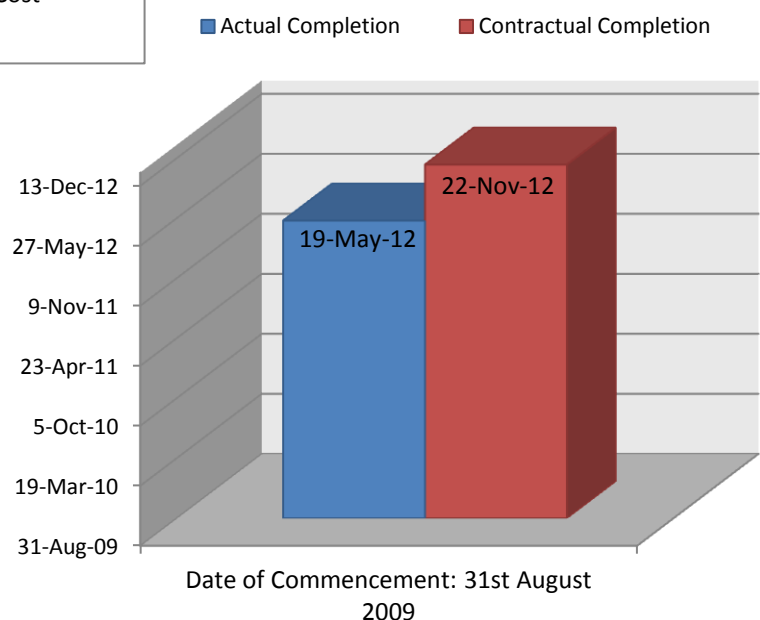
The approved project estimate = \$95.8 million

From the project data, the Final Target Cost = \$76.7million. However, the Estimated Actual Cost = \$72.7 million, giving a saving = 5.2 %

2. Final Target Programme vs Actual Project Duration

The date of commencement of the project was 31 Aug 2009 and the date of actual completion was 19th May 2012. However, the date of contractual completion was the 22nd Nov 2012 which gave a programme saving = 6 months.

The graph opposite compares the actual and contractual completion dates.



3. Number of Early Warnings (EW) and No. that became a Compensation Event (CE)

The total number of Early Warnings issued on the project was 15. Of this, 8 became compensation events.

Early Warning Success

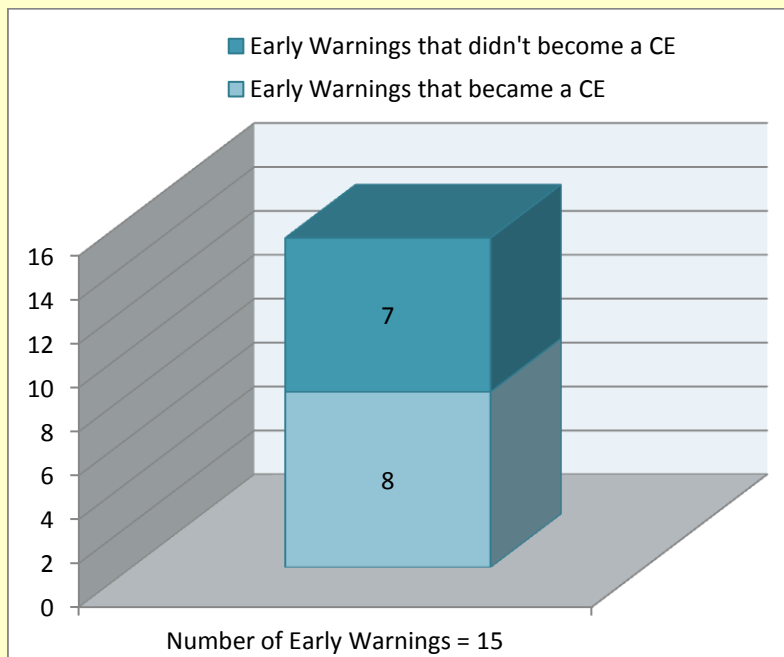
One early warning was for the work that was required to re-construct Sai Kung Roundabout.

As one of the main links into Sai Kung Town Centre it is often very busy and disruption due to project works was a significant risk.

The aim of the project team was to construct the roundabout without disruption to traffic flows.



Works by Sai Kung Roundabout.



The early warning process enabled the project team to work together and solve the issues collaboratively.

They established 3 mitigation measures:

- Consult local representatives about the upcoming works
- Issue information to the local community
- Establish traffic ambassadors

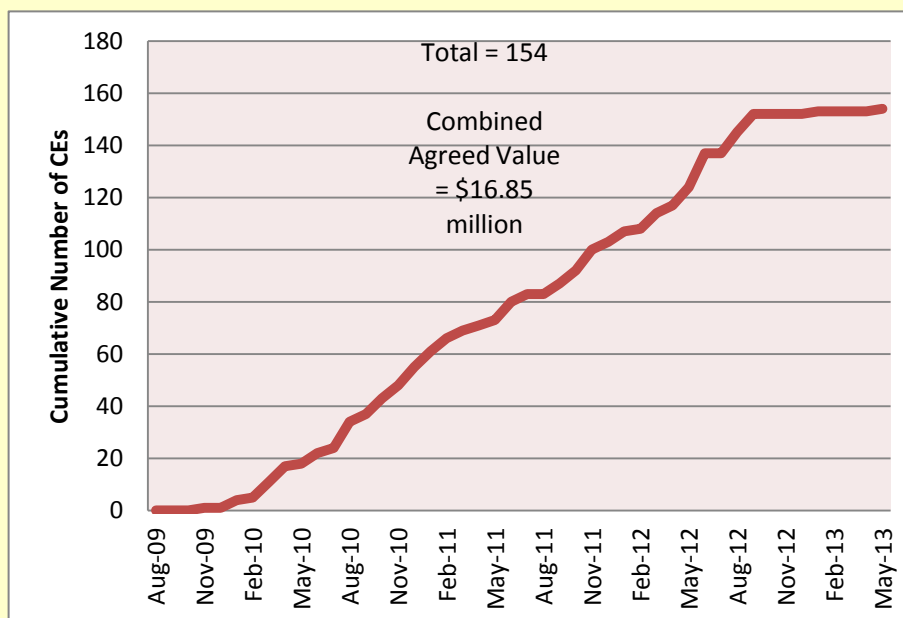
The joint and proactive management by the project team enabled the roundabout works to be completed in 4 days whilst traffic flows were maintained.

4. Total number of CEs

The total number of Compensation Events agreed on the project was 154.

This represented a total value of \$16.85 million.

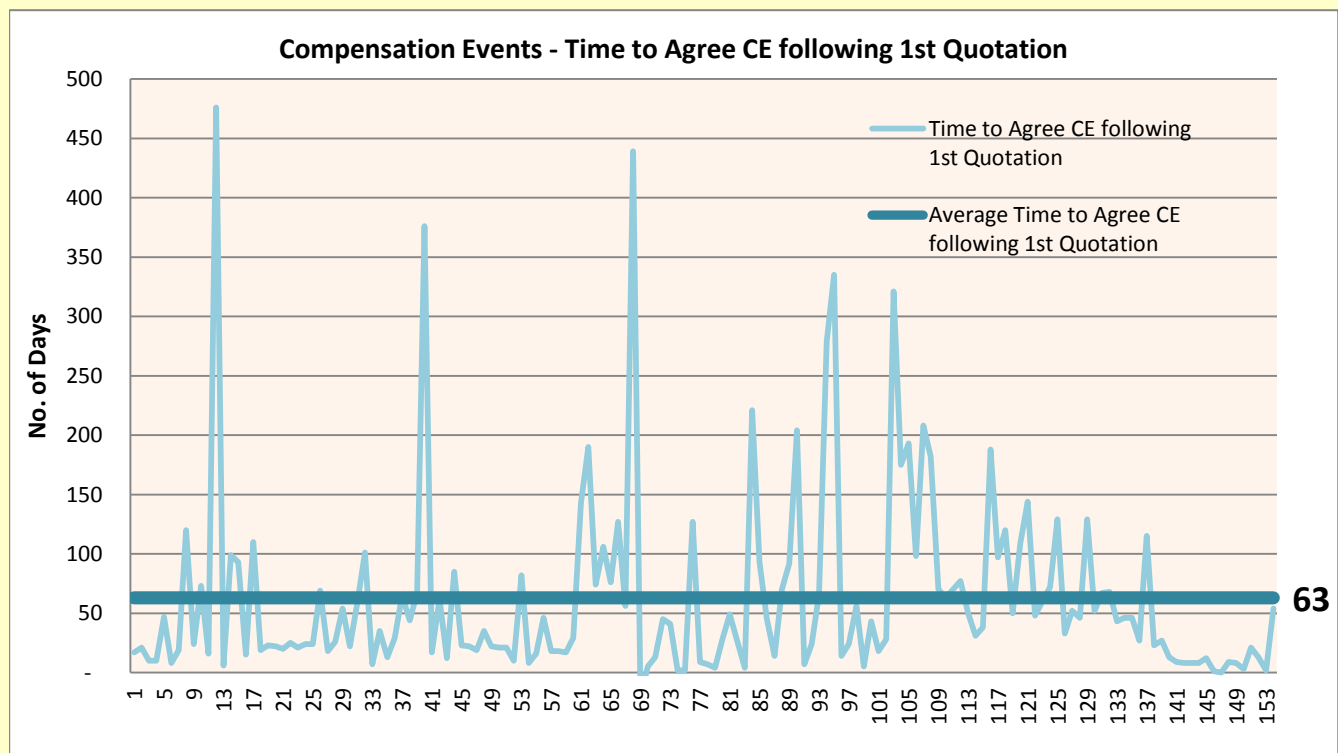
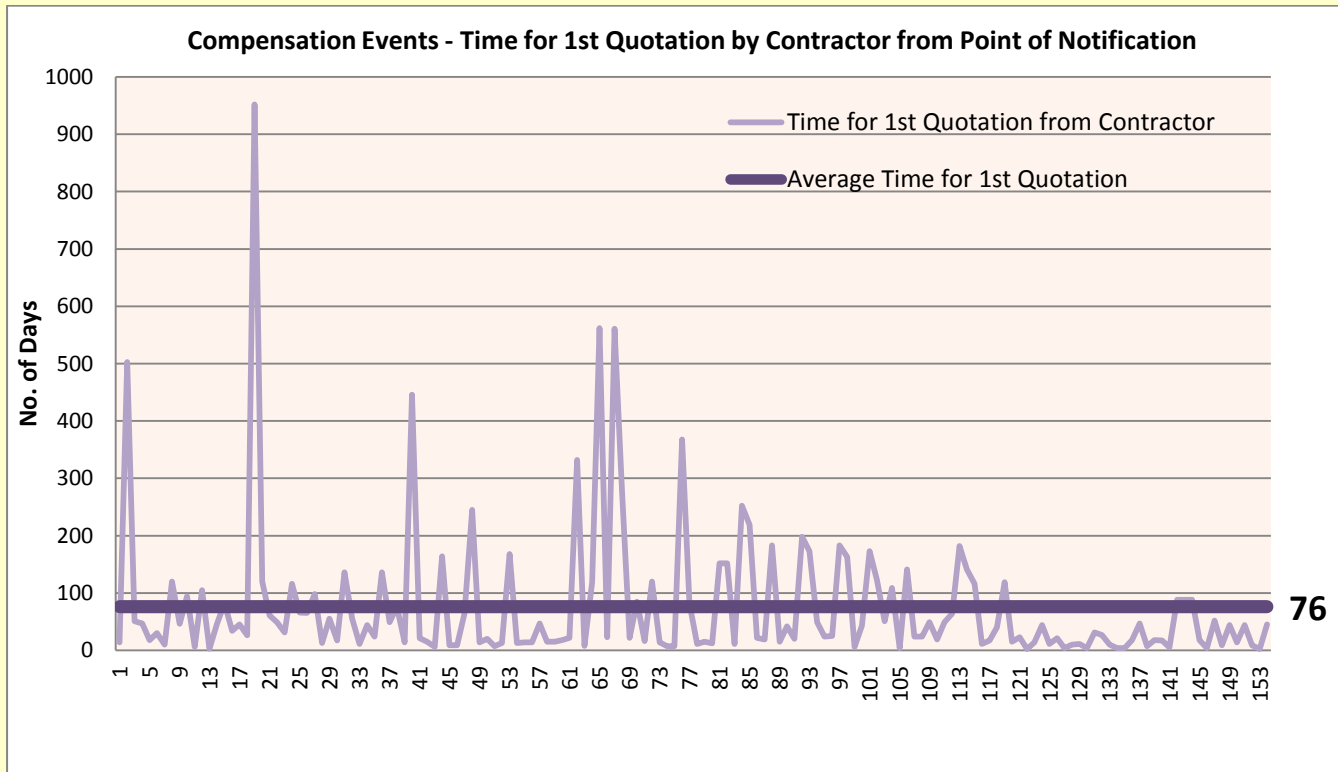
The cumulative total of CE's over the duration of the project is shown in the graph opposite.



5. Time taken to agree Compensation Events

The project team used KPI's to measure the progress of compensation events. They measured the time taken for the contractor to issue their 1st quotation since the notification of the event, and also the time taken for the CE to be resolved following the 1st quotation.

The two graphs below display the results:



6. Project Partnering

According to senior engineer Anthony Tsang, the project team adopted a number of measures to make NEC work.

Initially, a partnering workshop and NEC practical training sessions were arranged for the Drainage Services Department, the consultants.

He said, “the workshops were designed to bring about a change in mindset, from a traditional adversarial to a partnering approach, and to ensure a common understanding of the NEC contract conditions.”

In addition, to ensure the smooth running of the project under this new procurement type, the Drainage Services Department engaged an NEC adviser to guide the project team. Emphasis was put on the project team to work with a partnering spirit and to comply with the contract requirements.

“the workshops were designed to bring about a change in mindset, from a traditional adversarial to a partnering approach.”

**Anthony Tsang -
Senior Engineer, DSD**



A Partnering Workshop

The partnering success was measured by using KPI's. This was done for two separate groups within the project team:

- The Champion Group, which included the Project Manager, Supervisor and Contractor
- Pioneer Group, which was the front line project team

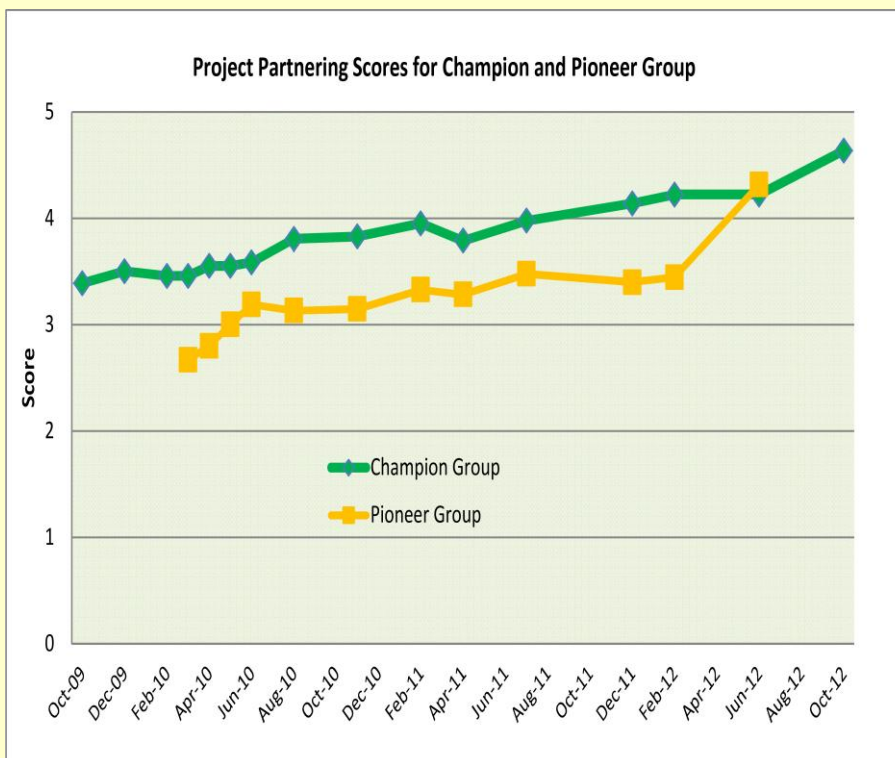
A score (shown opposite) from 1 to 5 were given according to the following guideline:

- 0 = Poor
- 1 = Fair
- 2 = Adequate
- 3 = Good
- 4 = Very Good
- 5 = Excellent

Co-location of project team

A common office was adopted for the project team so that the project manager, supervisor/consultants and the contractor were located adjacent to each other.

This practice is very unusual in Hong Kong Government projects, but it helped foster a good team spirit and facilitated effective communication.



Thoughts from DSD

Since the Development Bureau introduced NEC to Hong Kong, DSD have been one of the main users of the contract.

In an interview with Mr Wai Tsui, the Deputy Director of DSD, he said that, “DSD have completed one NEC project, with another five currently in the construction stage and five more due to be issued for tender.”

Mr Tsui went on to say that working collaboratively is a big step for Hong Kong, and whilst the NEC doesn’t necessarily enforce this, it is conducive to it.

However, despite the success of NEC to date, Mr Tsui emphasized that NEC still has its critics, largely due to the long established culture in the Hong Kong construction industry, particularly in Government organisations. He said, ‘the main challenge for NEC will be overcoming the cultural mind-sets of professionals in positions of power, that do not welcome such a major change.’

“DSD have completed one NEC project, with another five currently in the construction stage and five more due to be issued for tender.”

Wai Tsui – Deputy Director, DSD

Conclusion

It is evident from the statistical data, that the Fuk Man Nullah project was a success. In addition, the interviews have reinforced this data and overall the project has achieved its goals whereby it:

“The main challenge for NEC will be overcoming the cultural mind-sets of professionals in positions of power, that do not welcome such a major change.”

Wai Tsui – Deputy Director, DSD

- Fostered the creation of a project team with a partnering spirit and collaborative working culture.
- Resulted in high job satisfaction of staff working on the project, which according to members of the project was significantly different to other government contracts in terms of working culture.
- Early warnings and pain / gain share promoted joint and prompt problem solving.
- Significant cost and time savings were achieved (six months ahead of its 39 month programme and 5% below final target cost)

The skeptics of this project and NEC have said that the small value does not warrant too much praise for NEC. To an extent, they are correct, and the true value of NEC will better be understood on larger contracts, such as the \$678 million Happy Valley Underground Stormwater Storage Scheme, also a DSD project.

The important aspect for NEC and Hong Kong is that they are together moving in the right direction, towards the better management and success of projects for a sustainable Hong Kong.

Robert Dickson

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+852 5114 1767

E-mail:

robneildickson@gmail.com



Appendix B - Contact List

	Title	FirstName	LastName	JobTitle	Organisation	SubscriptionType
1	Mr	Alvin	Ko	Service Engineer - Commercial	CLP Power Hong Kong Ltd	Engineering Client
2	Mr	Ivan	Cheung	Partner	EC Harris (Hong Kong) Ltd	Management Consultants
3	Mr	Roger	Everson	Technical Director	Meinhardt Infrastructure and Env. Ltd.	Engineering Consultant
4	Mr	Bryan	Clifford	Director	JCP	Management Consultants
5	Dr	Patrick	Chan	ICE Regional Director, Hong Kong	ICE Hong Kong	Academia/Institution
6	Mr	Choi	Hayman	Associate	Mott MacDonald Hong Kong Limited	Engineering Consultant
7	Mr	Yui Chit Damon	So	Partner	Hogan Lovells	Legal
8	Mr	Nigel	White	Executive Director	Gammon Construction Limited	Engineering Contractor
9	Mr	Vincent	Connor	Partner, Head of Asia Pacific	Pinsent Masons	Legal
10	Mr	David Kam Ho	Leong	Assistant Secretary General	Hong Kong Construction Association Ltd	Academia/Institution
11	Mr	Kam Fai	Tang	Engineer	Civil Engg. and Deve. Dept, HKSAR Gov.	Engineering Client
12	Mr	Alan	Capps	Director	Navigant	Management Consultants
13	Mr	TC	Chew	Chairman - NEC Asia Pacific Users' Group	MTR Corporation Ltd	Engineering Client
14	Mr	Kevin	Poole	Deputy Director, Projects	Airport Authority Hong Kong	Engineering Client
15	Mr	Rex Siu Han	Wong	Director	Kum Shing (K.F.) Construction Co Ltd	Engineering Contractor
16	Mr	Simon	Mak	Hon Secretary	ACEHK	Engineering Consultant
17	Mr	Malcolm	Johnston	Director	Langdon & Seah Hong Kong Limited	Quantity Surveyors
18	Ms	Brenda	Yip	Manager	BK SURCO Ltd	Quantity Surveyors
19	Mr	James	Ford	Senior Commercial Manager	Mace Limited	Engineering Contractor
20	Mr	Colin	Lee	Executive Director	The Contracts Group Ltd	Management Consultants
21	Mr	Alan	Evans	Senior Commercial Manager	Hsin Chong Construction Group Ltd	Engineering Contractor
22	Mr	Alan	Donnet	Executive Director-Commercial/Contracts	Dragages Hong Kong Limited	Engineering Contractor
23	Mr	chun tat	TSE	Technical Secretary	Highways Department, HKSARG	Engineering Client
24	Mr	Lo	Yuen Cheong	Director	Concentric Construction Limited	Engineering Consultant
25	Mr	Chan	Chi Ho	Technical Secretary 1	Drainage Services Department	Engineering Client
26	Mr	Christopher	TO	Executive Director	Construction Industry Council	Academia/Institution
27	Mr	NORTON	MATTHEW ANDREW	Commercial Manager	VSL Intrafor	Engineering Contractor
28	Miss	Nada	Elsheikh	President & CEO	PERT Management Consultants	Engineering Consultant
29	Ms	Kim	Barton	Civil Engineering	King & Wood Mallesons	Legal
30	Ms	Dannie	Yung	Senior Consultant	PMMS Asia Pacific Int'l Ltd.	Engineering Consultant
31	Mr	Menachem	Hasofer	Partner	Mayer Brown JSM	Management Consultants
32	Mr	Andrew	Chau	Director	Shun Yuen Construction Ltd	Engineering Contractor
33	Mr	Aaron	Mak	Three Pacific Place	Maka Consulting Company Ltd	Engineering Consultant
34	Miss	Amelia	Fok	Secretary	Beria Consultants Ltd	Engineering Consultant
35	Mr	Lam Kwan	Yuen	Director	Sum Kee Construction Ltd	Engineering Contractor
36	Mr	Amanda	Wong	Programme Management	SWEETT	Management Consultants
37	Mr	Rod	Buckell	Director	Geotek Ltd	Engineering Contractor
38	Mr	Mr CC	Chan	Director	DSD	Engineering Client
39	Mr	Mr Tsui	Wai	Dep Director	DSD	Engineering Client
40	Mr	Wai Chi	Sing	Perm Work Secretary	Dev Bur	Engineering Client
41	Mr	Peter	Clayton	Director	Pinsent Masons	Legal
42	Mr	Mark	Lomas	Project Manager	MTR	Engineering Client
43	Mr	Chris	Cheung	Executive Director	Aecom	Engineering Consultant
44	Mr	Mike	Allen	Head of Contract Solutions	EC Harris	Legal
45	Mr	Anthony	Tsang	Senior Engineer	DSD	Engineering Client

46	Mr	Robert	Pegg	MD	Navigant	Legal
47	Mr	Andrew	Keir	Project Director	Kier	Engineering Contractor
48	Mr	Tony	Selormey	Planning Manager	Kier	Engineering Contractor
49	Mr	Declan	Mcgeeny	Operations Manager	LOR	Engineering Contractor
50	Mr	Francis	Thurley	Project Director	LOR	Engineering Contractor
51	Mr	Bill	Franklin	Chief Engineer	MTR	Engineering Client
52	Mr	Peter	Shek	Associate Director	Halcrow	Engineering Consultant
53	Mr	Gerry	Daughton	Director	Halcrow	Engineering Consultant
54	Mr	Malcolm	Chappell	Director	Halcrow	Engineering Consultant
55	Mr	Darcy	Buryniek	Director	Halcrow	Engineering Consultant
56	Mr	Ronnie	Thomson	Director	URS	Engineering Consultant
57	Mr	Tymon	Mellow	Director	AES	Engineering Consultant
58	Mr	Tom	Barrett	Project Manager	MTR	Engineering Client
59	Mr	David	Salisbury	Project Manager	MTR	Engineering Client
60	Mr	Francois	Dudouit	Project Director	Vinci	Engineering Contractor
61	Mr	Martin	Lane	Commercial Director	Vinci	Engineering Contractor
62	Mr	Ian	Nelson	Contracts Manager	Vinci	Engineering Contractor
63	Mr	Patrick	Chung	Senior QS	Vinci	Engineering Contractor
64	Mr	Ngai	Fai Lau	Vice President (also on Fuk Man Nul)	Black and Veatch	Engineering Consultant
65	Mr	Ko	Wing Nin	General Manager (also on Fuk Man Nul)	Chun Wo	Engineering Contractor
66	Dr	Arthur	McCinnis	Author: NEC - A Legal Commentary	HK Chinese Univ	Academia/Institution
67	Mr	Richard	Patterson	Procurement and NEC specialist	Mott Macdonald	Engineering Consultant
68	Mr	John	Battersby		BK Asia	Engineering Consultant
69	Mr	Cheuk Iun	Leung	Engineer (Site RE)	DSD	Engineering Client
70	Mr	Raymond	Chan		Evans and Peck	Legal
71	Mr	Pierre	Borgeois	Director	Vinci	Engineering Contractor
72	Mr	Kevin	M. L. Ng	Director	Chun Wo	Engineering Contractor
73	Mr	Jacky	Lam	Deputy Construction Manager	MTR	Engineering Client
74	Mr	Cameron	Chin	Deputy Construction Manager	MTR	Engineering Client
75	Mr	Lee	Askey		LOR	Engineering Contractor
76	Mr	Keith	Keown		Turner and Townsend	Engineering Consultant

Contractor	21
Consultant	19
Client	17
Legal	7
Academia	4
Management Consultants	6
Quantity Surveyors	2
Total	76

Appendix C

Questionnaire – NEC vs Traditional Contracts in the Hong Kong Construction Industry

Please provide your name and contact details if you are happy to be contacted in relation to this questionnaire and topic. I would be interested in arranging a brief one to one session (20 - 30 minutes) so that this topic can be breached in more detail.

Contact Details
Name:
Email:
Tel No:

Please respond to the following questions by double clicking on a box and 'checking' it.

NB: All information provided will be used for the purpose of this study only and will remain anonymous. If you feel uncomfortable answering any on the questions then please accept my apologies and leave the answer blank.

Section 1 – Background and Experience of NEC and Traditional Forms of Contract

The first section will ascertain your profile and determine your experience and knowledge of NEC and traditional forms of contract:

EXPERIENCE AND BACKGROUND		< 1 Year	1 – 5 Years	6 – 10 Years	11 – 15 Years	>15 Years			
1)	How many years' experience do you have in the construction industry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
2)	How many years' experience do you have of using NEC Contracts (in all locations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
3)	How many years' experience do you have of using Traditional Contracts (in all locations)? E.g. Hong Kong Government contracts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
		NEC	Traditional	Both	Other (specify)				
4)	Which types of contract have you been involved with in Hong Kong?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> _____				
5)	What is your Nationality?								
	Hong Kong	British	Australian	American	Japanese	Chinese	French	German	Other (please specify)
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> _____
6)	What would you consider to be the dominant national culture within your organisation?								
	Hong Kong	British	Australian	American	Japanese	Chinese	French	German	Other (please specify)
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> _____
7)	Which locations do you have experience of NEC contracts? Select as many as appropriate								
	Hong Kong	UK	Australia	New Zealand	South Africa	UAE	India	Other (please specify)	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> _____	

Please check only one box for each question

Section 1 – Additional Comments

Section 2 – Perceptions about NEC Contracts vs Traditional Contracts

The next section aims to understand your 'general perceptions' about the use of NEC contracts in comparison to traditional forms of contract:

	For the following statements, please answer by asking yourself: 'In comparison to traditional contracts, NEC _____'	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
8)	has a less adversarial nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9)	uses 'plain simple English', benefitting the users of the contract.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10)	'Early Warning' process helps to identify and close out issues that could affect the project more efficiently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11)	'Compensation Events' are an improved method of managing changes to the project and help reduce the potential sources of conflict between parties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12)	emphasis on Clause 10.1, 'Mutual Trust and Co-operation', encourages collaboration and helps to reduce disputes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13)	places a heavy duty on the Project Manager and requires stronger leadership.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14)	increases the costs of Project Administration and encourages the contractor to recuperate costs by other means. i.e. Claims.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15)	has greater emphasis on the Employer providing comprehensive Works Information, resulting in the contract parties being more proactive in their management of the project.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16)	enables more effective control of time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17)	enables more effective control of cost.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18)	enables more effective control of quality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19)	places risk on the party more appropriate for managing that risk.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20)	enables more effective management of health, safety and environmental issues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21)	enables more effective Contract administration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please check only one box for each question

Section 2 – Additional Comments

Section 3 – The Hong Kong Construction Industry

This section aims to understand your 'general perceptions' surrounding the culture of the Hong Kong Construction Industry:

	Please respond to the following statements:	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
22)	Disputes are inevitable on projects in the Hong Kong construction industry due to its adversarial nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23)	There is a preference to incur costs by curing a problem than to put in place preventative measures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24)	There is the need for a change from traditional forms of dispute resolution such as adjudication and arbitration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25)	The limited involvement of the legal profession would be a positive step in focusing contracted parties on rectifying matters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26)	Alternative dispute methods would be a welcome and suitable addition to contracts, to promote effective resolution of conflict on projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please check only one box for each question

Section 3 – Additional Comments

Section 4 – The Implementation of NEC in Hong Kong

Having considered your general perceptions of NEC contracts and the Hong Kong Construction Industry, this section intends to gather information about your thoughts on the future use of, and potential barriers for implementing NEC specifically in Hong Kong.

27)	What do you consider as being the most significant hurdle for implementing NEC in Hong Kong?					
	<input type="checkbox"/> The Industry Culture					
	<input type="checkbox"/> Lack of understanding or trained personnel / skills gaps					
	<input type="checkbox"/> Lack of backing from Government and major clients					
	<input type="checkbox"/> Cost of implementation for Consultants / Contractors					
	<input type="checkbox"/> Other, please specify					
28)	Assuming a full suite of NEC contracts are adopted in Hong Kong, which party will it favour the most?					
	<input type="checkbox"/> Client (Private or Government)					
	<input type="checkbox"/> Contractor					
	<input type="checkbox"/> Consultants					
	<input type="checkbox"/> Sub-Contractors					
	<input type="checkbox"/> No significant difference					
29)	How many NEC workshops have you been involved in within Hong Kong?	<input type="checkbox"/> None	<input type="checkbox"/> A few	<input type="checkbox"/> Many		
30)	Would you like to see NEC contracts being used more widely in Hong Kong?	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> Undecided		
31)	Which statement below best describes the level of experience your employees have with the NEC?					
	<input type="checkbox"/> Very Experienced - we are all well trained and comfortable using the contract.					
	<input type="checkbox"/> Experienced - some of our employees are experienced and the rest are learning from our in house experts.					
	<input type="checkbox"/> Moderate - we have some employees who are familiar with the contract and we have started training others.					
	<input type="checkbox"/> Inexperienced - we have had limited exposure to this form of contract some degree of training is required for most.					
	<input type="checkbox"/> No experience - we are not familiar with the NEC form of contract. Substantial training of our employees is required.					
	Please respond to the following statements:	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
32)	The current economic environment is impacting upon the implementation of NEC in Hong Kong.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33)	NEC is a big change for professionals in the industry and many will struggle to adapt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34)	If NEC is adopted/used by your organization, the cost of management of your projects will increase.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please check only one box for each question						

Section 4 – Additional Comments

My sincere thanks go to all who participate in the survey. Your time and effort is very much appreciated. Please contact me if you would like to discuss this topic further or to request a final version of the report.

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Appendix D (Questionnaire) - NEC vs Traditional Contracts in the Hong Kong Construction Industry

Results database

Question Section	Part 1 - Background and Experience														Part 2 - Perceptions of NEC vs Traditional												Part 3 - Culture of Hong Kong Construction Industry						Part 4 - Implementation of NEC in Hong Kong																
Question Type	Checklist														Likert																										Checklist					Likert			
Question Number	1	2	3	4	5	6	7							8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34									
Respondant																																																	
1	3	2	1	4	2	7		1							4	4	5	5	4	4	3	4	4	4	3	4	3	5	4	5	5	5	2	5	2	2	5	3	5	3									
2	4	3	4	3	2	2	1	1							4	4	5	4	4	4	2	2	4	4	2	4	2	4	4	4	4	4	1	2	2	2	3	2	4	4									
3	5	1	5	2	2	1		1							2	2	4	3	3	4	2	4	2		3	4	1	3	2	2	4	4	4	3	2	1	3	4	3	4	4								
4	5	5	2	1	2	2	1	1							5	5	5	5	3	5	3	4	5	5	4	4	3	5	4	4	4	3	4	1	5	3	2	2	4	5	3								
5	5	4	5	3	2	1	1	1							5	3	5	5	4	5	3	4	4	4	3	4	3	5	4	3	4	4	4	1	2	3	2	2	2	2	2								
6	5	1	5	2	2	7								1	4	4	4	4	3	5	3	3	4	4	4	4	3	4	5	4	4	4	4	3	3	1	2	5	3	4	4								
7	5	2	5	3	1	1	1								3	4	3	3	4	5	4	4	3	3	4	3	4	4	5	3	4	4	4	1	1	2	3	4	3	4	4								
8	3	2	1	3	1	3	1								3	3	4	3	2	5	3	2	3	3	3	4	3	3	4	4	4	3	4	1	2	3	3	2	2	4	4								
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11	5	1	5	2	2	7									3														5	4	4	2	4	2		1	3	5	2	4	3								
12	5	1	5	3	2	2	1								4	4	4	4	3	4	3	4	4	4	4	4	4	4	4	4	3	4	5	1	3	2	2	5	2	2	4								
13	5	2	5	3	7	7	1		1						5		4	4	4	5	4	4	4	5	3	4	3	3	4	3	4	3	4	3	5	2	2	3	4	4	4								
14	5	1	5	2	7	7								1	4	4	4	4	4	4	2	4	4	4	4	4	3	3	3	4	4	4	4	1	1	1	2	4	3	3	4								
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16			5	3	1	1	1					1		1	5	4	5	4	4	5	4	4	5	5	4	3	4	4	4	4	4	5	4	4	1	5	3	2	1	2	4	4							
17	5	1	5	3	1	6	1								4	3	4	4	3	4	3	2	3	4	3	3	3	3	3	4	4	4	4	1	1	2	2	3	3	5	3								
18	5	2	2	3	2	2	1					1			4	3	4	2	4	4	3	4	4	5	4	4	4	5																					
19	5	2	2	3	2	2	1					1			4	3	4	2	4	4	3	4	4	5	4	4	4	5	2	2	4	4	5	2	1	1	2	3	3	4	4								
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29	5	2	3	2	2	1		1							3	4	4	4	4	4	1	2	3	3	2	4	2	2	2	3	3	3	4	1	1	1	2	3	3	2	2								
30	4	3	4	3	9	2	1	1							4	4	4	4	3	4	3	4	4	3	4	3	3	4	4	4	4	4	4	2	2	2	2	2	3	4	2								
MEAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.03	3.75	4.31	3.76	3.59	4.45	2.90	3.45	3.72	3.86	3.24	3.69	3.10	3.83	3.55	3.38	3.76	3.76	4.17	N/A	N/A	N/A	N/A	3.00	2.66	3.86	3.31								

•Still a place for them	1	1	1	1				1	1	6	1
•Favoured by private developers	1							1	1	3	
•Familiarity		1	1	1	1	1	1			6	1
•Limited time and resources	1						1		1	3	
•Better for inexperienced clients	1									1	
•Transfer of risk from client		1	1							2	
•Clients are comfortable with the process		1		1	1	1	1	1		6	1
•Suits a certain mindset	1	1			1	1	1			5	4
•Well defined scope								1		1	
•Client control					1	1		1		3	
-ve Response											
•Poor relationships	1	1			1	1	1			5	4
•Leads to litigation	1	1				1			1	4	
•Disputes	1	1			1	1	1		1	1	7
•Lack of trust	1	1			1	1	1			1	6
•Positional basis	1	1			1			1			4
•Long time to close out projects	1	1	1			1				1	5
•In built history					1						1
•Time consuming / cost	1	1				1					3
•Additional unpaid cost for consultant and contractor		1							1	1	3
•Claims orientated	1	1			1	1	1		1		6
•Allocation of Risks		1		1			1		1		4
•Low job satisfaction						1	1				2
CULTURE											
+ve Response											
•Sophisticated workforce									1		1
•High degree of quality and safety										1	1
•Beginning to see benefits and change mindset	1	1	1	1		1		1			6
-ve Response											
•Master / servant relationship	1	1				1		1		1	5
•Trust and respect issues	1	1			1	1	1			1	6
•Resistance to change	1	1			1	1				1	5
•Disputes	1	1	1		1	1	1			1	7
•Adversarial nature	1	1	1		1	1	1				6
•In built hierarchys										1	1
•Confrontational		1	1			1			1		4
•Competitive									1		1
•Little innovation										1	1
•Technology not advancing										1	1
•Old fashioned						1				1	2
•Not glamorous										1	1
•Some will be impossible to change		1	1								2