Regional Public and Private Sector Green Purchasing/Procurement: Investigation, Analysis and Guidance

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Abstract

Across the world, complex social and market forces are driving green purchasing (GP) as an instrument to negate the steep environmental price paid for global development. The ultimate aim is to promote environmentally preferable products and services by greening the market supply and demand chain. Although Hong Kong is defined by its advance economic infrastructure, green purchasing is established only in the Government and large foreign-based multi-national overseas corporations. It has yet to be a mainstream practice in the general business sector.

This study aimed to evaluate evidence-based factors to assist the development of GP in the local private sector, notably from the perspective of a Non-Government Organization (NGO). The study developed a conceptual model to investigate the facilitators and barriers of private sector GP using the case of Hong Kong. The validity of this model was tested through the collection of data via a number of surveys.

In the first stage of the study, public opinion on GP was investigated through a street intercept questionnaire survey in 2006. It was found that the concept of GP was well understood by the general population, which signifies a potential green market is in place. In the next stage, the conceptual model was tested through a survey of attitudes and experiences of GP among practitioners in the business sector. The process involved an initial questionnaire survey, followed by statistical scrutiny. In order to obtain more practical information, a follow-up descriptive survey with open-ended questions was performed with 60 participants from the original survey. Lack of guidance was clearly identified as a major obstacle by the surveys. To look for practical ways to providing guidance, the synergistic relationship between Government Green Purchasing (GGP),

Private Green Purchasing and ecolabelling was investigated. It is concluded that ecolabelling is a time-proven instrument to provide such guidance and the government plays a crucial to expedite growth of green markets and the labelling system.

Keywords: Government green purchasing; government green procurement; sustainable consumption and production; Ecolabel; green labelling

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Abbreviations

APCC	Australian Procurement and Construction Council
APRSCP	Asia Pacific Round Table on Sustainable Consumption and Production
CEC	Commission for Environmental Cooperation
CSR	Corporate Social Responsibility
EAP	Environmental Action Programme
EC	European Commission
EMS	Environmental Management System
EPA	Environmental Protection Agency
EPD	Environmental Product Declaration
EU	European Union
GDP	Gross Domestic Product
GEN	Global Ecolabelling Network
GGP	Government Green Procurement
GHG	Greenhouse Gas
GIPPER	Governments Incorporating Procurement Policies to Eliminate Refuse
GLD	Government Logistic Department
GPN	Green Purchasing Network
GPP	Green Public Procurement
HKEELS	Hong Kong Energy Efficiency Labelling Scheme
HKGPC	Hong Kong Green Purchasing Charter
HKSAR	Hong Kong Special Administration Region
ICLEI	International Council for Local Environmental Initiatives
IGPN	International Green Purchasing Network
ISO	International Organization for Standardization
LCA	Life Cycle Assessment/Life Cycle Analysis
LEED	Leadership in Energy and Environmental Design
MoE	Ministry of Environment
NASPO	National Association of State Procurement Officials
NEA	National Environment Agency
NGO	Non-Government Organization
OECD	Organization for Economic Co-operation and Development
OFEE	Office of Federal Environmental Executive
SCORE	Sustainable Consumption Research Exchange
SCP	Sustainable Consumption and Production
UNCSD	United Nations Commission on Sustainable Development
UNDESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environmental Programme
USGBC	United States Green Building Council
WSSD	World Summit on Sustainable Development

Chapter 1 Background to Study

1.1 Introduction

This chapter provides an outline of the thesis that follows. The starting point is the acknowledgement that green purchasing has become established in Government and large size local and overseas corporations. The concept of buying green is also widely accepted by the general population. However, the situation in the general business sector is enigmatic. Following this introduction, the research objectives are stated and a summary of the entire thesis is outlined.

1.2 Government Green Purchasing in Hong Kong

The Government of Hong Kong Special Administration Region (HKSAR) introduced green purchasing as a major component of public procurement in 1999.[1] By 2000, the Stores and Procurement Regulations (SPR) were amended to require Government departments to give consideration, as far as possible and where economically rational, to purchasing products with improved recyclability, higher recycled content, greater energy efficiency, reduced use of toxic substances, etc. The Government Logistics Department (GLD) has developed green specifications for a range of commonly procured products including recycled papers, environmentally preferable cleaning materials, clean fuels, etc.

The regulations were solidified in 'A Policy Framework for the Management of Municipal Solid Waste (2005-2014)'[2] published in December 2005. In 2006, the Chief Executive, in his annual public policy address, formally encouraged the trade and

[1] *Source: HKSAR Sustainable Development Homepage -- http://www.susdev.gov.hk/html/en/sd/index.htm (Retrieved on November 25, 2009).*
[2] *EPD (2005) A Policy Framework for the Management of Municipal Solid Waste in Hong Kong (2005-2014). Retrieved on November 25, 2009 from http://www.epd.gov.hk/epd/msw/htm_en/content.htm.*

industry sectors to develop and implement green procurement[3]. At a Task Force meeting on Economic Challenges in June 2009, the HKSAR Chief Executive announced in his *Policy Address 2009-10* that the Government would expand the scope of Green Purchasing and take the lead in making Hong Kong a green city through legislation and specific green measures. In the follow-up, the Central Policy Unit representatives emphasized the importance of research and development (R&D) endeavours, and identified that the Government must be responsible for playing a leading role in promoting industrial environmental performance advancement and leadership along with green purchasing.

1.3 Green Purchasing in mega size local and overseas corporations

The Government, its affiliated large institutions and mega size corporations have integrated environmental initiatives into their procurement process. The author performed a face-to-face task force procurement survey with 12 high calibre corporations between 2006 and 2009 (Appendix A). The number of staff in these companies ranged from 3000 to 50000 and the average number of procurement staff is 47. They all have a centralized procurement department functioning as the Government Logistic Department. Standard proactive environmental programmes in place include producing "green" (environmentally-sound) products, developing reusable packages, conserving energy, reducing waste, recycling, creating an environmentally sensitive corporate culture, and integrating total quality environmental management into the firm's planning processes. Evidenced based evaluations of the supplier's engagement to develop sustainable products are an essential part of their programmes.

[3] *Chief Executive (2006) Policy Address 2006-07. Retrieved on November 25, 2009 from http://www.policyaddress.gov.hk/06-07/eng/p66.html.*

1.4 Green purchasing in the general population

While the above-mentioned study shows that green purchasing in government and large corporations is well implemented, there was no data on the scenario in the public domain and business sector. A study in 1998 (Yam-Tang and Chan, 1998) showed that Hong Kong consumers' environmental concern is suboptimal but the current status has not been studied.

In 2006[4], the author organized a cross-sectional street intercept questionnaire survey to study the opinion of the general population on green purchasing (Appendix A: Green Purchasing Population Survey). The interview took place in three major business districts and seven major housing estates in Hong Kong. Each region was allocated 100 questionnaires. A total of 735 interviews were conducted. The average response rate is 67% in the business districts and an average of 80% in the residential housing estates. The interview completion rate is 97%. Most of the interviews were completed in less than five minutes. The result showed that 75% of respondents were willing to pay more for green products. However, a significant number (59%) of respondents found it difficult to find their desired green products. Almost 90% of respondents expressed their need for information on environmentally preferable products and expected the government to take a stronger role in promoting green purchasing.

The scope of this population survey is narrow and it served the purpose more of a campaign than a scientific study. The sample was not stratified demographically; there was no open-coding process or figures that were well intentioned for statistical testing.

[4] *Green Council (2006) Results on the Green Purchasing Survey 2006*, p8. Retrieved on November 25, 2009 from http://www.hkgpc.org/html/eng/doc/2006survey_results.pdf.

Nevertheless, the result does imply that the general public has a strong desire to 'buy green'. It is the realization of this 'desire' that inspired the author to explore the green purchasing practices in the local business sector in greater depth.

1.5 Research question and objectives

The green purchasing programmes have been concentrated on the public and professional procurement market. The situation in the rest of the business sectors, in particular the small and business enterprises[5] that constitute most purchasing activities, is grossly under investigated. What facilitates or inhibits these companies to join the league? How could government and environmental NGOs provide support? In order to generate evidence-based data for design guidance there is a need for a quantitative, empirical study of factors that have an impact on the compliance of the business sector with green purchasing. This thesis is aimed at filling this gap: it draws out and empirically tests hypotheses on compliance behaviour, supplementing both the conceptual and empirical knowledge of the challenges encountered.

This thesis seeks to answer the following research questions:

1. What are the drivers and barriers of green purchasing in the business sector of Hong Kong?

2. How to provide guidance to the business sector to engage green purchasing?

The steps taken to answer these questions include:

- To review the major literature on green purchasing with regard to its drivers and barriers. As part of this, the study will identify the range of green purchasing programmes that are used internationally; the relationship between green

[5] *In accordance with the Industrial Department's definition, an SME is: a) any manufacturing business which employs fewer than 100 persons in Hong Kong; or b) any non-manufacturing business which employs fewer than 50 persons in Hong Kong*

purchasing and ecolabelling; and the role of NGOs in green purchasing worldwide will be examined.

- To develop a generic model to determine green purchasing uptake.
- To determine and analyze the significance of these drivers and barriers in the domestic setting of Hong Kong.
- To identify possible ways that the government and a third-party NGO could contribute to facilitate the take-off of green purchasing in the business sector.

1.6 Thesis Outline

Following this introductory chapter, Chapter 2 will review literature on green purchasing with regard to its background, mechanism and development. The review will include the government and private sector, the relationship of green purchasing to ecolabelling and the international experiences.

Chapter 3 will discuss the research methodology and review the development of the questionnaire in both a quantitative and an open-ended format. The review is also intended to identify component parts of the various constructs and how they are measured. The final part of the chapter will conclude the construction from the literature of the conceptual model.

Chapter 4 will discuss the result of the study and the statistical methods utilized.

Chapter 5 will provide the result of a supplementary opinion survey in form of an open-ended questionnaire survey of the original participating respondents.

Chapter 6 will discuss the quantitative and qualitative results of this survey and how the results could be translated into practice. The researcher argues that ecolabelling carried out by NGOs would be a good place to start.

Chapter 7 will conclude the study and discuss the managerial implications from the perspective of an NGO.

Chapter 8 is intended to identify limitations to the thesis and suggest areas of future research.

1.7 Chapter Summary

This chapter has outlined the thesis that follows. It has emphasized that green purchasing in the business sector of Hong Kong has not received adequate attention from academia or from the sector itself. Following this, a brief summary of each chapter has been provided.

Chapter 2 Literature Review

2.1 Introduction

The literature survey encompasses the development of green purchasing and its implementation in the public and private sectors. It is followed by a review of the development of an ecolabelling system and its synergistic effect on green purchasing.

2.2 Background - A vulnerable planet

Environmental decay in the Old World ominously prefigured even swifter despoliation in the New. Marsh's classic, Man and Nature; Or, Physical Geography as Modified by Human Action (1864, p.44), sketched the history and depicted the perils of human impact.

> *[In] parts of Asia Minor, of Northern Africa, of Greece, and even of Alpine Europe, the operation of causes set in action by man has brought the face of the earth to a desolation almost as complete as that of the moon ... The earth is fast becoming an unfit home for its noblest inhabitant, and another era of equal human crime and human improvidence would reduce it to such a condition of impoverished productiveness, of shattered surface, of climatic excess, as to threaten the depravation, barbarism, and perhaps even extinction of the species.*

This apocalyptic warning is deeply felt by artists. Anton Chekhov, the great Russian dramatist and writer, used deforestation as the theme in his long play, Ivanov, performed in 1887(Act Three): "*the forests are groaning under the axe…*" In his next play, The Wood Demon(1889, Act One), he visualized that:

> *Deforestation destroys the habitat of birds and animals and dries up rivers, whereas planting trees softens the harsh climate and thus helps to civilize man. Nature did not heal itself; once exploited and then abandoned, land did not regain its previous plenitude but remained for ages, if not forever, depleted.*

In the following hundred years, there has been increasing scientific evidence that the earth, which is approximately 4.5 billion years old[6], is failing. Scientists have performed pathological analysis of the earth and attribute its dysfunctioning to the erosion of the ecosystem by human activities at a global scale (Steffen *et al*., 2007; Millennium Ecosystem Assessment, 2005). The complication of uninhibited growth of destructive resource consumption patterns (Geng and Cote, 2004; Geng and Dobersteian, 2008) was made resonant to various stakeholders and ignited political momentum. The need to rectify present errors and to allay future disaster led to the establishment of the United Nations Environment Programme (UNEP). It was against this background that the United Nations launched numerous investigations and commissions. The widely applauded Brundtland Commission in 1987 brought out the quintessential concept that, while human economic development has its perils, it might be able to resurrect the environment: "meeting the needs of the present without compromising the ability of future generations to meet their own need[7]" (World Commission on Environment and Development, 1987).

The Commission introduced the notion that the consuming habits of every global citizen could have a visible impact on the environment. This approach uses green purchasing as an instrument to address the environmental effects related to the production and consumption of goods. This concept was engaged at the 1992 Earth Summit. The Rio Declaration at that Summit included green purchasing/procurement as one of the principles of Sustainable Consumption and Production (SCP), which aims to eliminate unsustainable patterns and enact effective environmental legislation,

[6] Age of the Earth, U.S. Geological Survey. 1997. Archived from the original on 23 December 2005.
[7]Brundtland Commission 1987: http://www.un.org/documents/ga/res/42/ares42-187.htm

standards and objectives towards the goal of sustainable development. Subsequent to the Earth Summit, the United Nations Commission on Sustainable Development (UNCSD) and the Organization for Economic Co-operation and Development (OECD)[8] devised and launched Earth Summit Action Plans, which solidly directed strategies and actions pertinent to green purchasing.

2.3 Environmental Impact of Products (EIPRO)

The objective of the EIPRO project (2006) in Europe was to identify the products (or product groups) that had the greatest environmental impact across their life cycle and thus qualified for an assessment of their improvement potential and, depending on the outcome of such an assessment, for being addressed within the European Integrated Product Policy (IPP) process[9].

An analysis of the environmental impacts of the product groups demonstrated that for all impact categories there was a substantial difference between product groupings, taking into account their full life cycles, and the volumes purchased each year. The results also showed that there was generally a correlation between the different categories of environmental impact for a specific product grouping. For example, a product grouping with a high impact on global warming tended to have a similar impact on acidification or human toxicity.

[8] *The OECD member countries are: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.*

[9] *European Science and Technology Observatory (2005) Environmental Impact of Products (EIPRO): Analysis of the life cycle environmental impacts elated to the total final consumption of the EU25. Summary available at http://ec.europa.eu/environment/ipp/pdf/eipro_summary.pdf*

It was identified that between 70-80% of all life cycle environmental impacts can be attributed to food and drink, transport and buildings. **Food and drink –** 20-30% of the environmental impacts associated with private consumption were caused by the food production and distribution chain, 'from farm to fork'. This increased to more than 50% for eutrophication. Within this area, meat and meat products had the highest impact, followed by dairy products.

Depending on the category, the contribution of **passenger transport** to the total environmental impacts of private consumption ranged from 15-35%. Based on the data used for the study, the greatest impact was from cars, despite major environmental improvements (especially regarding air emissions) in the previous years.

Buildings included housing, equipment and utility. This category is a dominant area of consumption with respect to environmental impact, accounting for between 20-35% of the total impacts. The heating of households is one of the most important impacts in each category, with energy used for hot water and electrical appliances also accounting for significant impacts, as does the creation of the structure itself.

2.4 Green Purchasing

'Green Purchasing', which is used as a synonym for 'green procurement'[10] in this thesis, basically means purchasing products or services that minimize negative or even provide positive environmental impacts. It involves considering the full costs and environmental consequences of a product in all stages of its life cycle, from product

[10] Around the world, the terms 'green procurement' and 'green purchasing' are both used frequently and often interchangeably to categorize strategies, initiatives and actions involved in or related to identification, selection, investigation, acquisition, use and proper handling (i.e. pre- and post-consumption) of environmentally preferable (i.e. less environmentally harmful) products and services.

development and manufacturing, through distribution and use, to the recovery and/or ultimate disposal of whatever remains of the product at the end of its life span. The procuring organizations have to face three dimensions: Environment (Lacoix, 2008), Economic, (Lacroix, 2007) and Social (Lacroix, 2006).

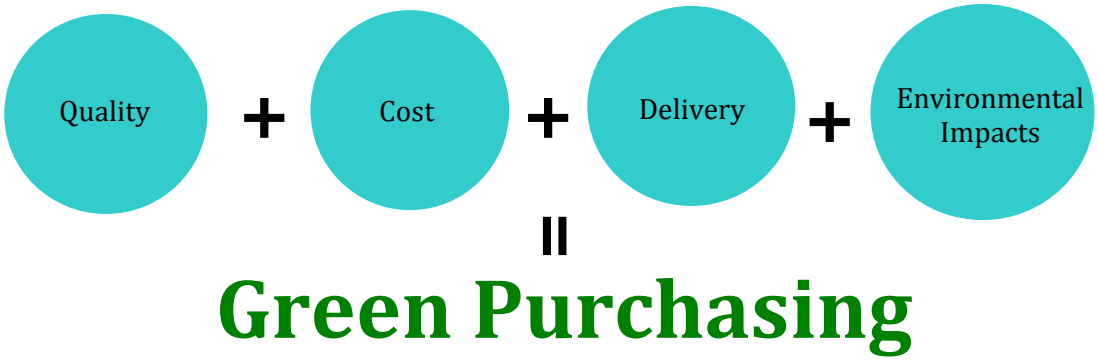

Figure 1: Green Purchasing Equation

(Source: Commission of the European Communities, 2008)

Environmental Dimension

Environmental concerns are the dominant macro-level justification for sustainable procurement; born out of the growing 21st century consensus that humanity is placing excessive demands on available resources through unsustainable but well-established consumption patterns. An example of green procurement efforts in the environment is vividly exemplified in a figure put forwarded by Min and Galle (1997).

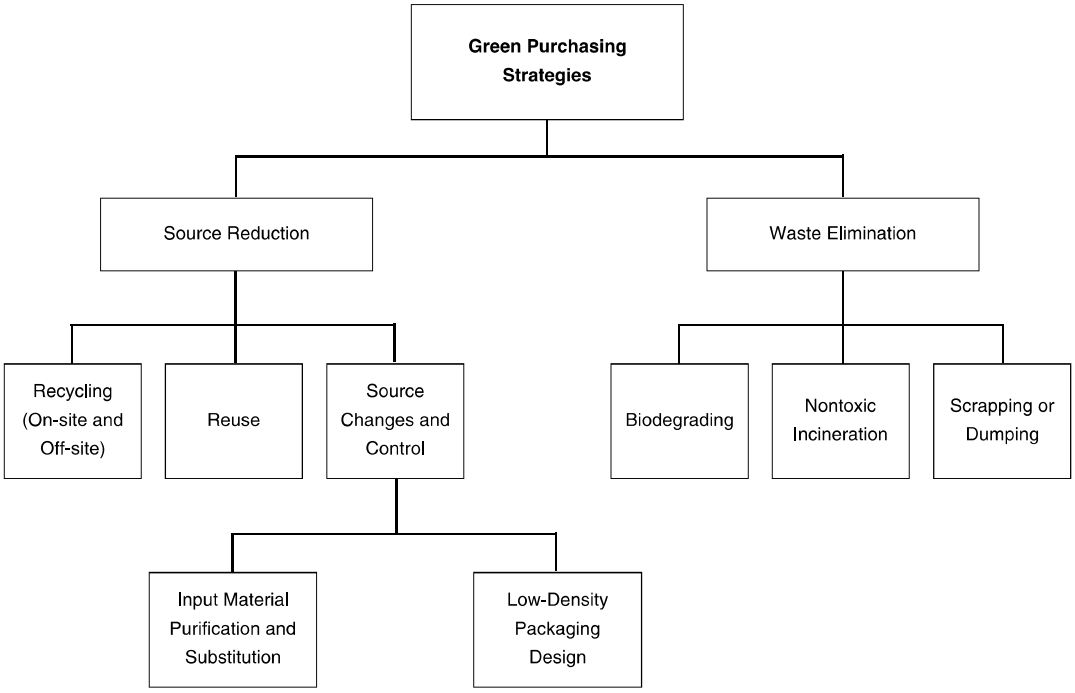

Figure 2: Classification of Green Purchasing Strategies
(Source: Min and Galle, 1997)

Social Dimension

Sustainable procurement is also used to address issues of social policy, such as inclusiveness, equality and diversity targets, regeneration and integration. Examples include addressing the needs – whether employment, care, welfare or other – of groups including ethnic minorities, children, the elderly, those with disabilities, adults lacking

basic skills, immigrant populations, and homosexual, bisexual and transsexual communities.

Economic Dimension

There are economic benefits in the form of efficiency gains from incorporating whole-life costing into decision-making. In addition, the creation of sustainable markets (Lacroix, 2006) is essential for long-term growth while sustainable development requirements foster innovation. There are also potential global applications: sustainable procurement can favour fair trade or ethical practice (Lacroix, 2005) and allow extra investment to be channelled towards developing countries. On a microeconomic level, sustainable procurement offers the chance for economic redistribution. Targets might include creation of jobs and wealth in regeneration areas, or assistance for small and/or ethnic minority-owned businesses.

2.5 Government Green Purchasing

2.5.1 Motivation

The key motivation driving GPP schemes is to provide guidance on how to reduce the environmental impact caused by public sector consumption and to use GPP to stimulate innovation in environmental technologies, products and services[11]. During the last few decades, the public sector has faced increased demands to integrate environmental and social aspects in its procurement processes. These demands come from stakeholders such as suppliers, taxpayers, NGOs, authorities and governments.

At the World Summit on Sustainable Development in 2002, public procurement was identified as an important instrument for stimulating the production of more

[11] *European Commission interpretative communication of 4 July 2001 on the Community law applicable to public procurement and the possibilities for integrating environmental considerations into public procurement (COM (2002) 274 final).*

environmentally sound goods and services. In the same year, the Organization for Economic Cooperation and Development published recommendations for green procurement, and in 2003 the European Commission adopted a Communication on Integrated Product Policy (IPP), which recommended that member states increase the level of green public procurement (GPP) and elaborate national action plans that set targets and outlined the concrete measures necessary to implement this policy. In 2006, the scope was widened when the Marrakesh Task Force on Sustainable Procurement was established with the aim to promote and support implementation of public procurement programmes that encourage the uptake of sustainable products and services (United Nations Department of Economic and Social Affairs, 2009).

Green procurement is defined in EU Commission communication [COM (2008) 400; p.4]as:

> *..." a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured."*

When the mission is entitled 'sustainable procurement', the general perception is that it is broadened to also embrace and consider social impacts. For simplicity, in this thesis the term green procurement is used for the assessed approaches, although some social aspects are also included.

2.6 The EU Model

The EU recognizes that a more sustainable use of natural resources and raw materials would benefit the environment as well as the overall economy, creating opportunities for emerging 'green' economies. Such a shift could also boost the competitiveness of European industry by stimulating innovation in eco-technologies and promoting eco-industries. Public procurement can shape production and consumption trends and a significant demand from public authorities for 'greener' goods will encourage markets for environmentally friendly products and services. With a collective annual budget of two trillion Euros or 17% of the EU's GDP, Europe's public procurers are a highly influential group of bodies, who can contribute significantly to drive the establishment of sustainable production and consumption. In 2003, the OECD noted that public purchasing was 8-25% of gross domestic product (GDP), with an average of 15% in OECD countries (Michelsen and de Boer, 2009).

In the Communication and Public Procurement for a better environment (2008)[12], the European Commission proposed that, by the year 2010, 50% of all tendering procedures should be green in all Member States, where 'green' means compliant with endorsed common core GPP criteria. To facilitate this, the GPP guidance toolkit was developed.

Green Public Procurement (GPP) focuses only on environmental areas of concern, while Sustainable Public Procurement (SPP) potentially encompasses a range of areas, but largely focuses on social and environmental aspects. The traditional focus has been on environmental issues; however social aspects are rising up the agenda fast. In 2006, the

[12] *http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0400:FIN:EN:PDF*

scope was widened when the Marrakesh Task Force on Sustainable Procurement was established with the aim to promote and support implementation of public procurement programmes that encourage the uptake of sustainable products and services (United Nations Department of Economic and Social Affairs, 2009).

2.6.1 Recommended Framework of National Schemes by the EU

Key Performance Characteristic - Scheme

1. The stated overall aim for the Scheme should be clear and directly linked to EU policy.
2. An EU GPP Advisory Group should be established, with final responsibility for the development of the EU GPP Scheme and establishment of criteria.
3. Prioritization and selection of products/services/works should be evidence-based and a transparent process.
4. Early dialogue with external stakeholders is essential.
5. Information concerning the overall development timetable and specifically the external consultation process must be made available at the outset.
6. A continuous training programme and supporting information should be a key element of the GPP Scheme.

Key Performance Characteristic - Criteria

1. The criteria must be developed from lifecycle-based thinking.
2. The evidence used for criteria development must be transparent.
3. The scope of the requirements should be sustainable public procurement, containing relevant environmental criteria and, where possible and relevant, appropriate social criteria.

4. The criteria must be easy to use, both for procurement professionals and for suppliers.

5. The criteria development process should have clear, defined roles for stakeholders and participants.

6. A clear outline of the stages of the criteria development process should be given, with timetables established for each stage of the process. The whole process should take no longer than one year.

7. Criteria revision should be performed on a regular, pre-agreed, timeframe. Revisions should occur at least every three years and at most annually.

Most OECD countries have adopted green purchasing strategies and practices to varying extents and levels of application. The OECD Council's Recommendation on Improving the Environmental Performance of Public Procurement (OECD, 2007) states that green purchasing should aim to take into account the effects on the environment exerted by a product or service over its lifecycle, from 'cradle to grave'.

2.6.2 Evaluating Government Green Purchasing

The 2008 Commission Communication proposing GPP levels of 50% for each Member State by 2010 also required a verification method. The European Commission was asked to develop a practical evaluation methodology to measure progress made by 2010 and thereafter.

In January 2009, PricewaterhouseCoopers, Significant and Ecofys released their study.[13] The main objective was to develop a methodology to monitor the current level

[13] *Collection of statistical information on Green Public Procurement in the EU, Report on methodologies and Report on data collection results, 2009.*
http://ec.europa.eu/environment/gpp/pdf/statistical_data.pdf.
http://ec.europa.eu/environment/gpp/pdf/statistical_information.pdf.

of GPP in the seven best-performing Member States, and then apply this to establish the current situation. In addition, the methodology should enable measurement of CO_2 and the financial impact of GPP. The seven best-performing Member States were Austria, Denmark, Finland, Germany, the Netherlands, Sweden and the United Kingdom.

Ten products most suitable for greening under GPP, as identified by the Commission

These ten products are cleaning products & services; construction; electricity; catering & food; gardening; office IT equipment; copying & graphic paper; textiles; transport; and furniture.

The indicators used for measuring the quantitative level of GPP were:

1. The GPP percentage of total public procurement, in terms of monetary value.
2. The percentage of total public procurement of GGP in terms of number of contracts.
3. The environmental impact of GPP, in terms of CO_2 emissions.
4. The percentage of financial impact of GPP in terms of Life Cycle Costs.

The Green-7

The European Commission (EC) has identified seven countries in Europe[14] as 'deep green' in terms of public procurement; these are termed 'Green-7' (EC, 2007). Two of these countries, the Netherlands and Denmark, were the first in the world to introduce green production and consumption into their national policies in 1989 and 1991, respectively (Kataoka, 2006). A study by the EC in 2006 compared the purchase of

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[14] The seven countries are Austria, Denmark, Finland, Germany, the Netherlands, Sweden and the United Kingdom.

construction materials and found that, while 14% of all OECD countries made solid green purchases[15], 60% of the 'Green-7' countries did so. An analysis of tenders issued by the Green-7' showed 50% used ecological criteria for paper, printed matter and printing services, 45% did so for chemical products, rubber and plastic, and 23% for construction work (Bouwer *et al.*, 2006). The study also identified several key reasons why the 'Green-7' countries were successful in GGP:

- Strong political drivers;
- National guidelines and programmes for GGP;
- Public information resources available via websites and ecolabels;
- The use of innovative tools such as life cycle thinking and green contract variants in purchasing procedures; and,
- Formation and implementation of environmental management systems by purchasing authorities

(Source: Bouwer *et al.*, 2006).

To encourage greater uptake of green procurement, the European Commission adopted a Communication[16], setting a target whereby Member States were to achieve a level of 50% GPP by 2010. Providing appropriate information and guidance to procurers, to enable them to make informed sustainable and green procurement decisions, is a key challenge in this area. To facilitate this, the GPP guidance toolkit was developed[17].

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[15] *More than three clear environmental specifications of each product.*
[16] *Public procurement for a better environment, 16th July 2008*
[17] *Public procurement for a better environment, Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 16.7.2008, COM(2008) 400 final.*
http://ec.europa.eu/environment/eussd/pdf/com_2008_397.pdf

2.6.3 Barriers to GPP

The obstacles that limit the uptake of green and sustainable public procurement have been identified as follows[18]:

- Perception of financial burden: higher initial investments and tight budgets are often the first hurdle. There is also insufficient information on the life cycle costs of products and the relative costs of environmentally friendly products and services. Preparation of the Cost/Benefit Analysis of green products and services needs to be promoted.
- A lack of knowledge about the environment and how to use environmental criteria: there is a low awareness of the benefits of environmentally friendly products and services, and some uncertainty remains about the legal options to include environmental criteria within tender documents.
- Lack of management support: public officials often demonstrate low awareness of the importance of GPP. Without a dedicated strategic focus, estimates of future procurement needs and an organizational policy that strongly promotes GPP, in terms of time and money, the integration of environmental aspects will remain inadequate.
- Lack of practical tools and information: communicating, disseminating and coordinating the exchange of best practice are extremely important if a country is to increase its GPP quotient.
- Lack of training: public administrations in general and the relevant purchasing officers in particular often lack the technical and legal expertise to apply green/sustainable procurement standards. Cooperation across

[18] *http://gpp.itcilo.org/index.php?id=163*

departments and the consultation of external experts is therefore a crucial success factor.

2.7 A Brief Review of GPP International Trends

In developed countries and some developing ones, green purchasing practices have already been established and operate with support from the respective governments (Li and Geiser, 2005). A diverse range of international, national and regional consortia, directives and guidelines has been established. For instance, Asia Pacific Roundtable for Sustainable Consumption and Production (SCP) officials and members have focused attention upon urban development, corporate cleaner production programmes, supply chain management, eco-industrial development (Chertow, 2000) and industrial parks for recycling, along with increasing awareness and understanding of the role of human factors in bringing about environmental change (Chiu, Ward and Massard, 2009).

Due to the huge purchasing power of the public sector, GGP accounts for the largest single promoter and contributor to green purchasing. In this regard, there is a prevalent view that public authorities must act as 'leaders' in the process of changes in consumption towards greener product(Kunzlik, 2003).

In the developing countries, several studies (relatively scarce compared with those on developed countries) have reported that, although there are severe constraints on the availability of resources as well as complicated environmental challenges, the effective application of GGP is more urgently needed and has potentially greater impacts in these countries (Leung, 2003; Dong, 2004).

Internationally, green purchasing (GP) and sustainable consumption are commonly practised within the building development industry, energy industry, roadwork, electrical and electronic products, furniture products, timber products, the healthcare sector, golf course operations, organic food networks and renewable energy generation, distribution and supply. The main product categories targeted for GP have included: paper products (recycled, chlorine-free), heating appliances, information technology equipment, cleaning products, packaging, furniture, motor vehicles, and energy and waste services. For example, GP has resulted in greater calls for and selection of fuel-efficient vehicles and energy efficient appliances and lighting in the Australian public sector; refilled toner cartridges and recycled paper in Austria; and solvent-free paints and renewable energy options in Switzerland. United Kingdom government officials recently had to address recommendations that central government buildings and transport be carbon neutral by 2012.

Generally, national and multinational public sectors have played leading roles in the introduction, development, promotion and implementation of green procurement. In this regard, a recent International Green Purchasing Network (IGPN) study identified that in 2007:

- European Commission green public purchasing was calculated at 1 trillion Euros (about USD1.5 trillion) which represented over 14% of the total European Union GDP;
- The US federal government spent about USD500 billion while the American state and local governments collectively spent an additional USD400 billion on green purchasing; and

- The Japanese national government and local governments spent Yen14 trillion (about USD162 billion) and Yen44 trillion (about USD510 billion) respectively, which cumulatively represented 17.6% of the GDP (Kataoka, 2006).

This thesis will now outline 'green' measures taken by countries that have been pioneering GPP.

United Kingdom

In the United Kingdom (UK), green purchasing (GP) is targeted at different levels – e.g. from small businesses to large corporations (Walker and Preuss, 2008) and from food to sustainable agriculture (Winter, 2003). The office of the Mayor of London, with support from the London Development Agency, launched a Green Procurement Code in 2001 and re-launched it in 2007[19]. This Code provides free support services for London-based organizations and is intended to encourage and guide such organizations to reduce their environmental impacts through responsible purchasing. In 2008, the renewed Code had a total of 181 signatories who identified that, through their cumulative efforts, 72,490 tonnes of waste had been diverted from landfills and greener products had been purchased from over 500 suppliers. Going forward, the renewed Code encourages signatories to incorporate GP criteria and environmental specifications into present and future contracts[20]. Public purchasing is a powerful

[19] *Details of the Mayor of London's Green Procurement Code can be found at* http://www.greenprocurementcode.co.uk/.

[20] *London Development Agency, 2008. London's Green Procurement – The first annual progress review of the Mayor of London's Green Procurement Code. Retrieved on October 16, 2009 from* http://www.greenprocurementcode.co.uk/files/Annual%20Progress%20Review%202008.pdf.

function in the UK which involves a total annual budget of approximately £150 billion (Morgan, 2008).

United States of America

The United States of America (USA) contains one of the largest consumer market networks in the world. The American states have developed different product classes with various environmental priorities reflecting their specific and contrasting needs and market demands. Of particular note, Californian government officials launched an initiative several years ago to devise and transform into a distinctive, progressive and leading greener state government (Swanson et.al., 2005). Similar to other consumer networks, there has been rapid development and progress in designing competitive purchasing schemes and mechanisms of all types. However, actual experience with implementing green purchasing has been uneven, particularly for initiatives undertaken within the regulatory frameworks currently overseen by state commissions (Tierney and Schatzki, 2009).

China

China has experienced rapid economic growth during the last two decades and moved quickly to urbanization and industrialization. However, in the absence of a comprehensive sustainable development programme, this has also given rise to severe environmental challenges (Geng & Doberstein, 2008; Tian, 2010). The notion 'pollute now, clean up later' results in environmental disasters that hamper and complicate further development (Geng and Côte, 2004). A monumental 3-12% of China's GDP is offset by the cost of environmental damage (SEPA & NBS, 2006).Chinese Government officials have recognized that GP can and should contribute significantly to national

environmental and sustainable development policy strategies and goals. A government procurement law – Order No. 68 of the President of the People's Republic of China - was approved in June 2002 and enacted in January 2003 (Geng and Doberstein, 2008).

China uses open tender purchasing to invite and decide on bids. General government purchasing in 2003 reached USD20 billion or 6.7% of the national GDP, representing a 64.4% increase over 2002 when total spending was just USD12.21 billion. By 2008, public purchasing conducted by public tenders reached USD60.66 billion, accounting for 71.6% of total government procurement (Tian, 2010).

With the promulgation of the *Government Procurement List on Energy Saving Products* in 2004, the implementation of government green purchasing (GGP) was firmly established in China. More recently, the scope of this legislated requirement has been expanded to involve all levels and types of government agencies. As of June 2009, over 10,000 products grouped under 33 product categories established under the initiative's Energy Saving Label Scheme, were recognized and targeted for preferential procurement status.

Japan

In Japan, the Government enacted its *Green Purchasing Law* in May 2000, and enforced it in May 2001. All pertinent institutions are obligated to purchase designated 'green purchase items' in accordance with a list of 200 eligible products listed under 18 product categories including: copy/printing paper products, stationery and office supplies, office furniture, office automation equipment, lighting equipment, automobiles, uniforms and work clothes, construction materials and services (hotels

and inns, etc.), and others. As of 2007, all central government ministries, forty-seven (47) provisional governments, twelve (12) designated cities and 68% of 700 cities have been obliged to comply with this law. As a result, and cumulatively, 95% of all purchased products within the designated categories were identified 'green products'. 'Green product criteria' have been mainly adopted from the Japanese Ecomark ecolabelling programme and the Energy Star [energy-efficient products] Programme (37%), or specially developed and promulgated for this initiative in order to guide the government purchasers in deciding and selecting preferable and identifiable green products.

Additionally, the Japanese Government promulgated a *Law Concerning the Promotion of Contracts Considering Reduction of GHG Emissions by the State and Other Entities* 'Green Contract Law' in 2007. This Law stipulates environmental contracting conditions and requirements for inclusion by government agencies and public institutions in the establishment and awarding of contracts for electric power, automobiles, energy services companies projects, and building designs.

Even though the Green Contract Law focuses more on the reduction of greenhouse gases (GHG) aspects of specific products and services, it complements the Law on Promoting Green Purchasing in terms of establishing a Japanese legal framework for government green purchasing. Further, when combined with Japan's national ecolabelling programme and national and multinational green purchasing networks, the two laws offer strong incentives and stimuli for considerable and quick expansion of GP activities in Japan.

Korea

In Korea, legislation on the promotion of the purchase of environmentally preferable products was enacted in December 2004, and enforced in July 2005. The Law authorizes the Ministry of the Environment (MoE) to set up 'Purchasing Guidelines for Environmentally-friendly Products', and directs public agencies to prepare and announce purchasing strategy plans and initiatives and report on these annually. Government agencies are obliged to purchase designated green products from the list of products qualifying for and labelled with the Korean Ecolabel, Energy Saving Mark or Good Recycled Mark.

Since 2005, the implementation of the Green Purchasing Law has resulted in a tremendous increase in the amount of green purchasing in the Korean public sector, from USD 255 million in 2004 to USD 770 million in 2005 and USD 850 million in 2006. Korea Eco-Product Institute officials have predicted that the level of green purchasing will reach USD 1400 million in 2010, representing 80% of all government purchasing (Moon, 2006).

Taiwan

A Taiwanese 'Government Procurement Law' for public enterprises and administrative offices was enacted in 1998 and came into full effect in May 1999. This Law guides and allows government purchasers to consider and purchase green products at 10% higher prices than competing regular products. Taiwan's government is increasingly using green purchasing as an effective instrument to control municipal solid waste and to mitigate the adverse environmental impacts of consumption.

To accommodate the green consumption trend in the 21st century, the Taiwan Government promulgated a Green Procurement Policy in July 2001. This Policy established the levels and categories of environmentally preferable products that the government would purchase going forward. The green purchasing component was initially set at 30% for all government agencies, meaning that each was required to purchase and report purchasing of at least this amount of products in the prescribed product categories (e.g. 30% of all office stationery and paper products purchased were required to be 'green'). To further encourage green consumption and energy saving, along with promoting a healthy and safe environment, the government required all departments to purchase products identified and certified as 'low pollution', 'energy saving', and/or 'recyclable'. In 2006, the prescribed 'green products' share of overall purchasing for the selected product categories were set at 80%, and was raised in 2007 to 83%. More recently, Executive Yuan representatives have expressed a desire to expand the scope of products involved.

Additionally, Article 22 of the *Resource Recycling Act* states that government agencies, public schools, public enterprises and organizations, and military authorities must preferentially purchase government-recognized environmentally preferable products, renewable resources produced within the national territory, and/or recycled products in which at least a certain proportion of renewable resources are used as raw materials. The 'First Batch of Environmentally Preferable Product Items Requiring Preferential Procurement by Government Agencies, Public Schools, Public Enterprises and Organizations, and Military Authorities' contains the environmentally preferable product categories and annual purchasing targets.

Currently, there are forty-four (44) designated green product categories which qualify for the preferential purchasing treatment. They include: office paper, stationery, computers, refrigerators, air conditioners, water-saving toilets, compost, recycled wood products, water-based paints, cleaning products, and others.

In determining which products merit green purchasing preference status, the Taiwanese Government has bestowed top priority status on products certified and labelled under the national Green Mark (Type-I Ecolabelling) Scheme. This action has significantly raised the profile and recognition of the Scheme and its ecolabel among both public and private sector organizations as well as general consumers. Since the government green purchasing programme's implementation in 2002, annual green purchasing spending has increased from 2.6 billion NT dollars [about USD80.9 million] (for the second half of 2002) to 5.6 billion NTD [about USD174.2 million] (2003) and reached 6.77 billion NTD in 2008. Concurrently, the numbers of Green Mark licensed products have also increased from 576 in 2002 and 717 in 2003, to 876 in 2008 (Yu, 2009). These statistics demonstrate the close relationship between successful ecolabelling and government green purchasing programmes.

Thailand

Sustainable production strategies and initiatives in Thailand have targeted the producers and manufacturers. With the Thai Government being the largest national consumer (contributing 11%-17% of the GDP), the public sector is playing a lead role in promoting, introducing and advancing green purchasing. The Ministry of Natural Resources and Environment is the lead agency while the Pollution Control Department has been tasked to research, develop and establish criteria for green products

(Pinthong, 2006). A Governmental Management Plan promulgated by the Thai Government in March 2005 required all government agencies to initiate green purchasing activities within four years. All governmental agencies (at departmental level) must have adopted and implemented a 'purchase green products program' by 2011 (starting from 25% of agencies in 2008 to 100% compliance by 2011).

2.8 Green Purchasing in the Private Sector

2.8.1 Principal Drivers

The recognition that their purchasing practice could take them to environmental destruction is a tipping point in the mindset of consumers (Boeck and Ward, 1997; Carter and Narasimhan 2000). The emergence of empowerment – "*how we as a global civilization can undo these deteriorations and reclaim control of our destiny and shape our future"* (Al Gore, The Future, p xiii) – sets the stage for a green market.

These vibrant, watchful civil societies coupled with regulatory compliance act as the principal driver for corporate greening. Besides satisfying a consumer's needs, it has to benefit the environment in the long term. Marketing managers must realize that the criteria used by consumers to evaluate products have changed. Consumers now consider the environmental consequences of products before making their purchase decisions. A product that has negative environmental consequences can be severely disadvantaged as consumers consider the impact of that product upon the environment (Follows & Jobber, 2000). Treading this path requires more comprehensive means to reduce pollution through attacking its sources at every stage of the product life cycle, which includes raw material extraction, transportation, manufacturing, product use, recycling, and disposal (Matos & Hall, 2007) Specific corporate environmental

strategies range from simple environmental impact assessment (EIA) and waste minimization to more sophisticated eco-efficiency and green supply chain, as follows, to prevent pollution and, ultimately, total product stewardship or green supply chain.

2.8.2 The Strategy Frameworks of business organizations

These strategies include the following:

1. Compliance as a defence: firms can be reactive in environmental management and simply comply with existing regulations. Environmental issues are generally seen as a regulatory nuisance to be met only because noncompliance would result in severe financial penalties (Handfield *et al*., 1997).
2. Cleaner production and waste reduction (Sinding, 2000).
3. Ecoefficiency: The World Business Council for Sustainable Development (WBCSD, 2006) defines eco-efficiency in terms of delivery of competitively priced goods and services designed to satisfy human need and enhance quality of life, while progressively reducing environmental impacts and resource intensity throughout the life cycle to a level at least in line with the earth's estimated carrying capacity.
4. Design for environment (DFE): this incorporates considerations of materials' recyclability and reusability; the materials' long-term impact on the environment; the amount of energy required for the product's manufacture and use; the capability for easy disassembly for remanufacturing; and considerations of the product's durability and disposal characteristics (Sarkis, 1998).
5. Green supply chain: this involves evaluating the total environmental effects of products through the entire life cycle of products and services (Handfield *et al*., 2005). Extending green activities throughout the supply chain represents an evolution over environmental assessment focused on firm-specific impacts and end-of-pipe analysis,

and is now part of many organizations' broader sustainable efforts (Matos & Hall, 2007).

2.8.3 Supply Chain Environmental Management

Translation of the passionate "green purchasing movement" into practice offers a platform for heated debates between academia, business consultants and green entrepreneurs.

The concept of supply chain environmental management has dominated the managerial principle in the past few decades. This concept is a multidisciplinary issue that emerges mainly from performing environmental management practices in the context of supply chains (Sarkis, 2006).

According to Sarkis (1999), the supply chain system should include purchasing and in-bound logistics, production, distribution and reverse logistics. A recent definition (Handfield and Nichols, 1999) goes as follows: the supply chain encompasses all activities associated with the flow and transformation of goods from raw materials (extraction) through to the end user, as well as associated information flows. Unlike the traditional environmental management, the concept of green supply chain assumes full responsibility of a firm towards its products from the extraction or acquisition of raw materials up to final use and disposal of products (Hart, 1997). It represents application of environmental management principles to the whole set of activities spanning the entire customer order cycle, including design, procurement, manufacturing and assembly, packaging, logistics, and distribution (Handfield *et al.,* 1997; Zsidisin & Siferd, 2001).

Examples of green supply chain practices could include reducing packaging and waste, assessing vendors on their environmental performance, developing more eco-friendly products and reducing carbon emissions associated with transport of goods. Green supply chain management can reduce costs and improve organizational performance (Carter *et al*., 2000) or act as a marketing tool (Wycherley, 1999).

However, it is not just about being environmentally friendly; green supply chain is also about good business sense and higher profits (Srivastava, 2007). Porter and van de Linde (1995) considered greening a competitive initiative because investment in greening can bring resource protection, waste elimination and improvements in productivity. Furthermore, according to Srivastava (2007), with good management of the green supply chain, there is no need to sacrifice quality, cost, reliability, and performance in order to reduce the ecological impact of industrial activities.

Green supply chain initiatives could be categorized into:

(1) Ecodesign or design for the environment (Zhu, Sarkis and Lai, 2007)

- Design for reduction or elimination of environmentally hazardous materials such as lead, mercury, chromium and cadmium (Zsidisin and Siferd, 2001).
- Design for reuse, which is a design that facilitates reuse of a product or part of it with no or minimal treatment of the used product (Sarkis, 1998).
- Design for recycling, which is a design that facilitates disassembly of the waste product, separation of parts according to material, and reprocessing of the material.

- Design for remanufacturing, which is a design that facilitates repair, rework, and refurbishment activities, aiming at returning the product to the new or better than new condition.
- Design for resource efficiency, including reduction of materials and energy consumption of a product during use, in addition to promoting the use of renewable resources and energy (APO, 2004).

(2) Green purchasing (Hamner, 2006)

- Product content requirements: buyers specify that purchased products must have desirable green attributes such as being recycled or reusable items.
- Product content restrictions: buyers specify that purchased products must not contain environmentally undesirable attributes such as lead, CFCs, or plastic foam in packaging materials.
- Product content labelling or disclosure: buyers require disclosure of the environmental or safety attributes of purchased product content. Such disclosure can be done using green seals and indicators of relative environmental impact such as the scientific certification system offered by various commercial organizations.
- Supplier questionnaires: buyers send questionnaires to suppliers asking them to provide information about their environmental aspects, activities and/or management systems.
- Supplier environmental management systems: buyers require suppliers to develop and maintain an environmental management system (EMS). However, the buyer does not require the supplier to certify the system.

- Supplier certification: buyers require suppliers to have an EMS that is certified as fully compliant with one of the recognized international standards such as the British Standard 7750 (BS 7750), ISO 14001 from the International Organization for Standardization (ISO), and the European Union Eco- Management and Audit Scheme (EMAS).
- Supplier compliance auditing: buyers audit suppliers to determine their level of compliance with environmental requirements.

(3) Reverse logistics (Sarkis, 1998; Carter and Ellram 1998)

Reverse logistics focuses primarily on the return or take-back products and materials from their point of consumption to the forward supply chain for the purpose of recycling, reuse, remanufacture, repair, refurbishing, or safe disposal. Reverse logistics encompasses the traditional logistics activities of transportation and inventory management, but its focus is to get product back from customers rather than moving product to customers.

Used or end-of-life products are returned into the forward supply chain for three main purposes:

- Reuse is the process of collecting used products from the field, and distributing or selling them used. Thus, although the ultimate value of the product is reduced from its original value, no additional processing is required.
- Remanufacturing is the process of collecting a used product or component from the field, assessing its condition, and replacing worn, broken, or obsolete parts with new or refurbished parts. In this case, the identity and functionality of the original product is retained.

- Recycling is the process of collecting used products, disassembling them (when necessary), separating them into categories of like materials (e.g. specific plastic types, glass, etc.), and processing them into recycled products, components, and/or materials. In this case, the identity and functionality of the original materials is lost.

Practice of Green Purchasing in the business sector

Among all the stages of a supply chain, purchasing plays an important part as a strategic initiator of the chain in an organization; also, it is integrally involved with the formation of trading partnerships. In this sense, the purchasing function is in a critical position to influence an organization's response to concerns about the natural environment (Zsidisin & Siferd, 2001).

Under pressure from a wide range of stakeholders, large, high profile firms have answered the call of green purchasing in developed countries (Srivastava, 2007). For instance, Ford Motor Company demanded that all of its suppliers with manufacturing facilities (including about 5,000 companies worldwide) obtained a third-party certification of environmental management system (EMS) for at least one of their plants by the end of 2001, and for all plants by 2003. It is not easy to do this; therefore, the truth is the firm needs to have enough financial support. Hence, in order to help the suppliers establish their own environmental management system, Ford offers awareness seminars and training for its suppliers, for them to be like any world-class organization and attain their goal of environmental excellence, which requires a specific amount of financial resource (Rao, 2002).

Japanese and European leading companies that have decided to go along with green

procurement activities are experiencing tangible benefits. Strategic sourcing can create value through increased overall cost efficiency, enhanced reputation and market share, and reduced environmental risks and liabilities.

Economic benefits are achieved when reducing supplier-generated wastes and surpluses, when decreasing handling expenses and risks associated with waste disposal, and from suppliers' savings from improved efficiencies - which may be passed along to buyers in the form of reduced prices.

Competitive advantage is achieved through innovation. This occurs when efficient production is enhanced through suppliers' use of cleaner technologies, process innovation, and waste reduction. This is especially true when suppliers and customers work together to find new ideas.

Improved public image is achieved when the greening of a company's suppliers can contribute to that company's overall reputation among customers, investors, employees, and other stakeholders.

Tangible benefits that are typically achieved by companies comprise:

- Cost reductions due to lower waste management fees, lower hazardous material management fees. Savings from conserving energy, water, fuel and other resources and easier compliance with environmental regulations (Lacroix, 2008B), (Lacroix, 2006B).
- Demonstration of due diligence;
- Reduced risk of accidents, reduced liability and lower health and safety costs; (Hill, 1993).

- Support of environmental/sustainability strategy and vision (Lacroix, 2007), (Lacroix, 2006A);
- Improved image, brand and goodwill; improved employee and community health through cleaner air and water; less demand for landfill and less demand for resources (Lacroix, 2008B), (Lacroix, 2006A); and
- Increased shareholder value.

While there are a number of other quantifiable measurable benefits that can be achieved from implementing green procurement, cost savings and risk reduction are perhaps the most universal across all types of industries and organizations. Qualitative benefits such as improved image, brand or ability to meet policy commitments is another key benefit and is of note in a business and public sector climate that is increasingly influenced by the public, nongovernmental organizations and employees who are well informed and educated around the environmental and social issues related to products and services. How both public and private sector organizations measure these benefits varies. They often quantify direct costs' savings, environmental benefits, or money spent, or they estimate hidden or indirect savings.

As one of the earliest countries that implemented GP, Taiwan's greening of the suppliers took off in a novel way (Rao, 2002). As is widely known, the companies in this sector often serve as suppliers to large firms; however, the sector has highly dispersed characteristics, is typically unregulated in nature and has limited financial resources. Therefore, a corporate synergy system (CSS) model was initiated to link the suppliers and the buyers (Rao, 2002). Rao also pointed out that many Taiwanese companies have taken advantage of this new system to improve their competitiveness, enhance

products' quality and environmental performance, and reduce the cost of production. The Ministry of Economic Affairs and many commercial banks have helped firms to implement industrial waste minimization, thus supporting this move in Taiwan. Moreover, Antonio (2000) did admit that industrial waste minimization was successfully implemented among small and medium enterprises.

Actually, greening the supply chain in South East Asia has started taking root already, for example in South East Asia. According to Rao (2002), ISO 14001-certified companies are the sign of environmental awareness, at least among the leading companies. The data of Rao's research showed 79% of the companies were holding awareness seminars for their suppliers, 76% were informing the suppliers about the benefits of cleaner production and technologies and 71% were guiding suppliers to set up their own environmental programmes. Rao (2002) also commented that a major part of the world's manufacturing will be taking place in South East Asia in the following decade. This would create many opportunities for this region, but would also bring about a substantial environmental burden. As a result, green supply chain and green purchasing would become more and more important.

Despite differences in emphasis, green procurement activities in both the public and private sectors take four main approaches:

- Procuring ecolabelled products or services
- In-house product/service evaluations
- Third-party product/service evaluations
- Supply chain initiatives

(Lacroix, 2008A)

These approaches are often initiated within the administrative, procurement, environmental or operational departments of private firms. Green procurement activities often rely on established product standards, labels and certifications that declare the environmental attributes or performance of the product. Private companies often use in-house and third-party evaluations to make informed green procurement decisions. Private businesses, however, are reluctant to establish green procurement activities unless there are clearly demonstrated business benefits for themselves and/or their customers.

In developing countries with pressing economic or political issues where green purchasing is not at the top of government priorities, multinational corporations that practice GP at headquarters could trickle this down to local small and medium-sized enterprises (SMEs), offering a transparent supply chain route through which GP can be promoted in these countries (Loo, 2004).

In essence, the triple bottom line impacting business is: increase profits, respect the planet and do good for their people (Schrader, 2010).

2.8.4 Impacts of GGP on Private GP

Governments have an active dual role to play in the green purchasing market, as both purchasers and regulators. Stevens (2010) suggested that governments could directly control SCP through regulation and taxation and indirectly influence SCP by motivating and encouraging consumers to purchase green goods and services through the creation of a new green market. Moreover, through the use of their purchasing power, they may influence the market to advance social and environmental objectives (McCrudden, 2004;

Faith-Ell *et al*., 2006). Kunzlik (2003, p.175) has argued that, "public authorities must act as 'leaders' in the process of changes in consumption towards greener products".

Government spending power can help to strengthen market demand for environmental goods, services and technologies by influencing industry to develop the means to meet these needs, particularly where public purchasers command a large market share, such as for computers, energy-efficient building, and public transport. Governments can even provide incentives for moving to cleaner technologies by lowering the costs of these technologies through economies of scale. This in turn can help private consumers to gain easier access to more affordable and environmentally preferable products.

Stevens (2010) suggested that governments can directly control purchasing behaviour through regulation and taxation and indirectly influence GP by motivating and encouraging consumers to purchase green goods and services through the creation of a new green market. Some governments and many progressive non-governmental groups have actively promoted green purchasing/procurement activities since the early 1990s, with the result that product categories have gradually expanded to include paper, office supplies, motor cars, office automation equipment (computers, printers etc.), furniture, clothing, food, lighting equipment and household appliances, as well as such services as banking, construction, cleaning, printing, hotels, transportation and electricity supply.

GGP has a decisive impact on the private sector by setting a powerful example to business, industries and individuals, thus promoting sustainability across society. A trickle-down effect in which green purchasing extends to all sectors in society could

result in a reduction in the environmental burden, improvement in environmental consciousness, demonstration of environmental achievements and the promotion of environmentally preferable living (IGPN, 2010). A study by Caldwell in 2005 found that "key suppliers" can be created through inadvertent public procurement (Caldwell *et al.,* 2005). This chain of reactions would help to create a sustainable market for green products.

While public and private sector purchasing are similar in many ways, an important distinction between them is the role each plays in the supply and demand dynamic of the market. The government typically buys finished products - products that were designed and manufactured by private sector companies and services.

Private sector companies, however, are both buyers and suppliers of products and services. As buyers, both the government and private industry are concerned with product price, performance, and availability. However, the decisions of the suppliers are determined by their ability to sell the manufactured products and the services they provide. Consequently, companies must concern themselves with each purchase's impact on their production costs and schedules, product performance, customer reactions, sales, and profits - concerns that are rarely part of the government's purchasing equation.

2.9 Ecolabelling

Structure of this section:

1. Literature survey on the background of ecolabelling.
2. Implication of ecolabels to various stakeholders in green purchasing.

3. Synergistic relationship between Government Green Purchasing (GGP) and ecolabelling.
4. A survey on the current status of government green purchasing (GGP) and ecolabelling in Europe, North America and Asian countries.
5. Discussion of the key elements of the success of ecolabelling in GGP; and how it could be translated to help green purchasing in private sectors.

2.9.1 Background of Ecolabelling

To steer society towards green purchasing, relevant and accessible information about both products[19] and organizational performance is a prerequisite. An ecolabel can provide venues for consumers and professional procurers to make and communicate informed decisions. This allows the producers and the retailers to interact and adapt accordingly.

The core purpose of ecolabelling is to: "*Reduce stress on the environment by encouraging the demand for and supply of products and services that are more environmentally responsible"* (from ISO 14024). Ecolabelling started in the late 1970s with the German Blue Angel. This was a reaction to the shift in focus from production to products and from regulative to push-pull approaches. Today there are over 300 ecolabels on the global market (Case, 2009). In view of this proliferation, several organizations have tried to establish international convergence and have started to structure and classify environmental labels (Ahrne and Brunsson, 2008). Examples include the International Organization for Standardization (ISO), the Global Ecolabelling Network (GEN) and the International Social and the Environmental Accreditation and Labelling Alliance

[19] *Products here include physical artifacts, software, processes, services and combinations of these.*

(ISEAL). In the late 1990s, ISO published standards for three types: type I (ISO 14024), what we normally refer to as an 'ecolabel' (see below), type II (ISO 14021), classified as self-declared environmental claims without third-party certification, and type III (ISO 14025), which is quantified environmental data based on life cycle assessments. Overall principles for all three types were also described in a separate standard, ISO 14020 (ISO, 2000).

The standard of interest for this thesis, ISO 14024, defines a type I programme as a:

> *Voluntary, multi-criteria-based third party programme that awards a license which authorizes the user of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life-cycle considerations. (ISO, 1999)*

International Organization for Standardisation (ISO)

The standardisation of green products (e.g. common categories and definitions, harmonized labels/certification criteria, standardized performance testing, etc.) can facilitate purchasing and promoting worldwide. One route for achieving this is through the International Organization for Standardisation (known as the ISO), which has affiliations with many international organizations, such as the Asian Productivity Organization (APO), European Commission (EC), Global Ecolabelling Network (GEN), International Institute for Sustainable Development (IISD), Organization for Economic Co-operation and Development (OECD), and the United Nations Environment Programme (UNEP). The ISO provides guidelines in such areas as safety and environmental impacts, and requires third-party compliance certification.

ISO 14000, the ISO's environmental standard regarding environmental management systems (EMSs) was originally developed in 1996 and updated in 2004[22] to promote the adoption of an environmental management system that addresses the environmental aspects of individual organizations' processes, products and services (ISO, 2009). An EMS entails monitoring, evaluation, reporting and implementation. The certification of a company's EMS demonstrates the transparency of its environmental values, particularly at the international level where increased global development, outsourcing and competition have resulted in greater industry connectivity (Seuring & Miller, 2008). A certified company also benefits because of increased efficiency in their administration, which leads to reduced costs and helps expand a business' environmental and financial performance (Chen, 2005). Of particular relevance to this thesis is the incorporation of green purchasing into the framework of ISO 14000[23]; EMS allows an organization to evaluate its environmental performance, and green purchasing is one of the key aspects. This course of action encourages and enables pollution prevention implementation prior to the disposal stage as well as green consumption education and engagement, with associated environmental and financial benefits (Chen, 2005). While this ISO 14000 aspect links well with the earlier stated need for an international definition of green purchasing, the Standard does not offer practical solutions or guidelines for governmental bodies to implement and conduct GGP.

In 1993, the ISO established a technical committee (TC207/SC3) to develop international environmental label standards. In 1998, the ISO published ISO 14020 – Environmental labels and declarations – General Principles. Subsequent ISO efforts

[22] *Available at http://www.iso.org/iso/catalogue_detail?csnumber=31807*
[23] *ISO 14000 – Environmental Management Introduction handbook can be downloaded from: http://www.iso.org/iso/theiso14000family_2009.pdf*

have focused on three main types of voluntary performance labels (note that there are many other types plus variations of these three prominent types):

1. ISO 14024:1999 Environmental labelling Type I (Guiding Principles and Procedures) - Type I labels are based on multiple criteria and have independent third-party certification based on life cycle considerations. Establishment of the principles and procedures of the product are included - selection of product categories, product environmental criteria and product characteristics - for assessment and must demonstrate compliance. Products that meet the requirements are certified for ISO 14024, most commonly used by ecolabel programmes worldwide.
2. ISO 14021:1999 Environmental labels and declarations Type II (Self-declared environmental claims) - Type II labels are informative, self-declarative environmental claims made by manufacturers, importers, distributors, retailers and others, without third-party certification. These claims can be made in the form of statements, symbols or graphics, product literature, or digital or electronic media. The standard describes selected terms commonly used in environmental claims and gives qualification for their use, general evaluation and verification methodology for self-declared environmental claims.
3. ISO 14025:2006 Environmental labels and declarations - Environmental labelling Type III labels first published in March 2000 are for programmes that present environmental product declarations (EPDs) according to LCA parameters. They are verified by a qualified third party, based on ISO 14025 standards, and provide quantitative information based on the LCA outcomes for the product or service in question. Type III EPDs are geared towards business-to-business transactions

providing information in quantified environmental “report cards” using predetermined conditions, such as chemicals or emissions used in manufacturing.

Table 1: Comparison of Types I, II and III Ecolabels

Type	Requirements	Selective	Science-based	Third party Verification	Trade Mark	Operators
I	Multiple	Yes	Life Cycle Analysis	Required	Yes	Mostly government supported by NGO
II	Mostly single	No	No	Preferred	No	Manufacturers
III	Multiple	No	Life Cycle Assessment	Required	Yes	Mostly government supported by NGO/trade association

(Source: Global Ecolabelling Network (GEN) Information Paper: Introduction to Ecolabelling. July 2004)

2.9.2 Ecolabelling and Green Purchasing: implications for various stakeholders

Implication for private consumers

Type I ecolabels are typically endorsed by third parties and undergo rigorous testing before they are awarded. The recognition and trust in the label is important for consumer purchasing satisfaction (Thøgersen, 2002). Consumers can trust the logo because it is based on comprehensive international standards and qualifications, while producers can demonstrate their environmental consciousness and reassure consumers that they are reducing their environmental impacts (Lozano *et al.,* 2010). Ecolabelling provides consumers with information on the characteristics of a product, while also promoting the practice of more environmentally sound production methods (Schumacher, 2010).

In summary, ecolabelling is seen as a consumer tool that:

- Informs consumers about product content and production processes to better understand environmentally relevant purchasing choices
- Encourages demand for environmentally friendly products
- Gives consumers choice and orientation in a broad array of products
- Empowers consumers in influencing producer behaviour
- Encourages responsibility in consumer behaviour (aims at sustainable consumption)

Implication for public purchasers

Firstly, having a national ecolabel programme symbolizes the government's reach beyond the bureaucratic doors into both the business community and society at large. Secondly, ecolabelling is a standard tool that better enables green purchasing policies in government procurement. Ecolabelling is helpful in setting the tendering criteria for the procurement process. Thereafter, the label is helpful as verification, since procurers often lack the capacity to follow up on the criteria (Leire and Thidell, 2009).

Public and professional procurement has become a frequent and recurring theme in the ecolabelling world. It allows ecolabelling organizations to focus on a smaller organized consumer group, that is, professional buyers at the institutional level. Ecolabelling organizations, such as the Canadian Environmental Choice, focus their limited promotional budget on a few big buyers. Public procurement therefore represents the success of ecolabelling in credibility and acceptance at the political institutional level.

The private purchasers' perspectives and green purchasing

Private companies are exposed to the harsh reality of competition. At the same time, they experience increased attention for their actions from a number of stakeholders, such as customers, governments, media and investors (Mont and Leire, 2009). The important roles of the procurer as a gate-keeper for what enters the company and as a supply chain manager point to the potential of green procurement to manage risks, promote and spur innovation for sustainability among suppliers, and thus also to promote competitiveness of the company (Schumacher, 2010).

Implication for retailers

For retailers, ecolabels have been described as helpful in building a more general understanding of the environmental issues that are in focus among different actors along the product chain (Thidell, 2009). Studies show that retailers appreciate the simplified information provided by a label, since this decreases their workload (Heiskanen *et al*., 1998). The label is also an information carrier that helps the retailer to make consumer preferences visible.

Implication for suppliers

The ecolabel is a marketing mechanism that suppliers can use to inform consumers and professional purchasers of their product in a way that is perceived as environmentally friendly (Schiesser, 2004). Secondly, for producers who are proactive in pursuing change, ecolabelling reduces their risk by demonstrating a workable change in processes. It may also have a multiplier effect as producers compete to surpass existing criteria. Thirdly, ecolabelling provides a high standard of guidance for producers who could not afford an internal environmental management programme, or producers who otherwise shy away from ecodesign. Ecolabelling again provides producers with workable guidelines by which to operate. The ecolabel licence gives such producers third-party verification and recognition in environmental stewardship.

Implications for policy makers

Ecolabelling is a means for policy makers to use market forces to push towards a better sustainability performance of products. Ecolabelling can also be seen as a means to reveal market acceptance of sustainability requirements and thus successively pave the way for regulative initiatives, as shown in Figure 3. By the public sector's promotion of products with reduced negative impacts on environmental and social systems, society at large is gaining from green procurement. By setting the example, the public sector sends a clear message to society at large and may also pave the way for the private sector, since corporate procurement processes take place all along the supply chain, thus triggering the integration of green procurement upstream (Leire, 2009). Thirdly, ecolabelling is a good public relations tool for politicians who claim commitment to environmental protection. Considered the soft alternative to eco-taxes, ecolabelling provides a publicly acceptable forum for politicians to test the environmental viewpoints of the voting public.

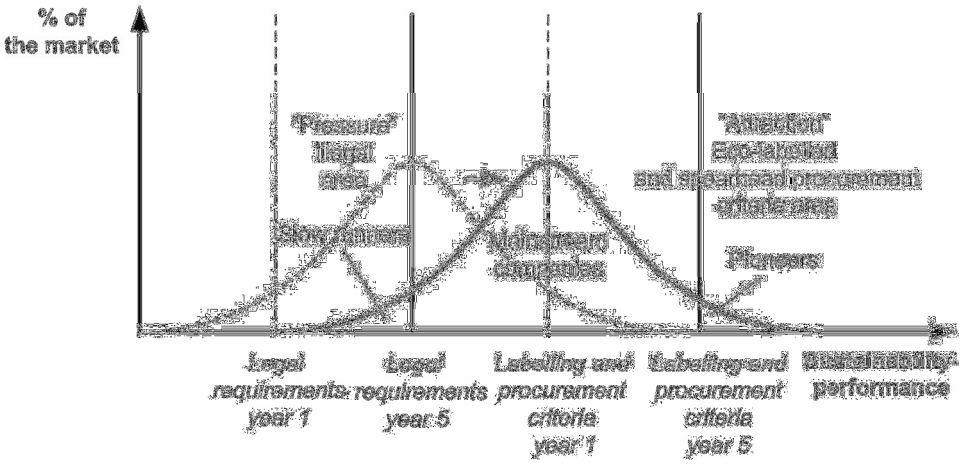

Figure 3: The intended role of Ecolabelling from a policy maker's perspective (Source: adapted from Tojo and Lindhqvist, 2010)

Support for Ecolabelling

Governments can support voluntary ecolabelling programmes with financing tools and consumer awareness-raising programmes (Stevens, 2010). A Global Ecolabel Monitor survey[24] of 113 ecolabels from around the world was carried out by the World Research Institute and Big Room Inc. in 2009, and found that the most important tools to help improve ecolabels' effectiveness were: financial requirements, staff and expertise resources, marketing and communications, and consumer awareness. The Global Ecolabel Monitor survey also noted that 58% of ecolabels were operated by non-profit organizations, while only 8% were run by government organizations. The transparency of ecolabel standards was available to the public 87% of the time, allowing for greater trust and a more informed, trustworthy purchase decision. Their research was very comprehensive and provided a much-needed update to the ecolabels website (www.ecolabelindex.com).

While ecolabelling requirements around the world tend to be voluntary in application, there are some exceptions. A 2006 survey by the Global Ecolabelling Network (GEN) found that some of the Asian governments tend to adopt a mandatory-based system under GGP programmes. Japan, Korea and Chinese Taipei have all enacted laws and regulations to enforce and regulate purchasing within governmental offices. However, in Europe, a more holistic approach of providing resources and support has persuaded businesses to voluntarily label their products.

[24] *http://www.ecolabelindex.com/downloads/Global_Ecolabel_Monitor2010.pdf*

Effectiveness of Ecolabelling

An EU study of the three types of ISO labels by Allison and Carter (2000) found that, for ecolabelling to be effective, invalid claims must be controlled and eliminated through government action, such as regulation, monitoring and eradicating false environmental claims. Ecolabels will fail if consumers become sceptical and uninvolved in purchasing green products and feel that self-proclaimed green products make false claims. Self-proclaimed, non-certified, 'fake' labels as methods of 'greenwashing'[25] are rampant and deter consumers from purchasing genuine green products. Each ecolabel must have distinct goals and objectives with clear and transparent guidelines, and there must be thorough labelling arrangements with manufacturers and producers. If there is a lack of direction and central organization, fewer producers will voluntarily label their products, resulting in a market full of false labels and certifications (Schumacher, 2010).

The effectiveness of ecolabelling has been hard to prove and research on this is limited. One recognized reason for this is the inherent difficulty in coupling the effect to the cause, i.e. in this case to distinguish the effects of an ecolabel from the effects of other measures (Thidell, 2009). Furthermore, although direct benefits, e.g. lower resource use per unit, are relatively easy to quantify, the indirect benefits, e.g. from an increased environmental awareness in general, are harder to quantify. No solid methodology to do this is established. However, some studies have been conducted and indicate some effects. Cadman and Dolley (2004) describe different scenarios based on different market penetrations for EU-flower-labelled products substituting an "average" product.

[25] *"greenwash" items refers to false, misleading uncertified environmental claims on a product in an attempt to lure misguided consumers into purchasing uncertified product. Terrachoice from Canada has done extensive research on greenwashing and has identified the seven sins, which is now the most referenced definition of greenwash.*

The conclusion is that, even at a modest 5% market share, appreciable savings in terms of energy, water and raw material consumption could be achieved. Studies of the Nordic Ecolabel also state that indirect effects such as improved performance of non-labelled products and increased environmental awareness in general are generated by the ecolabel (Leire and Thidell, 2005, Thidell, 2009).

Survival of Ecolabels

A separate independent study on the survival of ecolabels found that success depended on how and when the ecolabel was launched, cost, market attractiveness and alternatives readily available in the market (Lozano *et al.*, 2010). Successful certified firms were found to eliminate uncertified environmental initiatives in the market over time. The ecolabel effectively became a brand with marketable criteria, and consumers came to trust in the label enough to invest their money in greener goods. A study by Horne (2009) found that an ecolabel's success was also dependent on its coverage of environmental issues, the participation of stakeholders, acceptance and independence, and measurable sustainable consumption efforts. From a producer's perspective, the decision to pursue ecolabels is often due to regulatory gains, demand effects, cost efficiency and technical assistance (Lozano *et al.*, 2010). Through strategic marketing, ecolabels offer alternative products and services in the same category available in the market, encouraging manufacturers to develop and supply environmentally preferable products. It is an indirect environmental policy enforcer, rather than an explicit demand or control.

In summary, ecolabels serve to be an identification tool for environmentally preferable products and services, thus making it easier to procure such items when conducting

government green purchasing. The contributions of GEN to the ecolabelling sector have been substantial in consolidation and ratification of common criteria. Table 2 below identifies Type I ecolabels around the world; the vitality of an ecolabel can be assessed by the year it was established and the number of certified products/services.

Table 2: Type I Ecolabels around the World (2008)

Country	Ecolabelling Programme	Year Established	Licenses Issued to Companies	Certified Products/Services
Australia	Good Environmental Choice Label (GECA)	2000	180	1,600
Canada	EcoLogo Programme	1988	386	7,000
China	China Environmental Labelling	2001	1,059	40,245
Chinese Taipei	Green Mark	1993	250	4,400
European Union	European Ecolabel/ "The Flower"	1992	400	754
Hong Kong	Hong Kong Green Label	2000	23	64
Japan	EcoMark Programme	1989	1,631	4,544
Korea	Environmental Labelling Programme	1992	1,281	6,005
Germany	Ecolabel Blue Angel	1978	545	4,200
New Zealand	Environmental Choice New Zealand	1990	37	1,064
Nordic Countries[26]	Nordic Swan	1989	1,619	5,000
Singapore	Green Label	1992	-	550
Thailand	Green Label	1993	37	18 (213 Models)
United States	Green Seal Inc.	1989	286	3,300
	Energy Star**	1992	3,000+	40,000+

(Source: GEN, 2008 Annual Report, P.6,

** Energy Star Source: EPA, 2010)

[26] *Nordic countries are Denmark, Finland, Iceland, Norway and Sweden.*

2.9.3 Synergistic Relationship between Green Purchasing and Ecolabelling Programmes

An ecolabelling scheme has been an essential part in Government Green Purchasing (GGP) in many parts of the world (Chen, 2005; Bjorner *et al*., 2004). Green labelling may be used effectively to fill the information gap, clearly identified by many government purchasers as a major obstacle in implementing green procurement. This could be done through the adoption of ecolabelling product criteria in the tendering language and technical specifications for government procurement or even direct identification of ecolabelled products as green products.

The importance of public procurement on the growth of the consumer market of ecolabelled products

The practice of GGP often has a tremendous effect on the growth of the ecolabelled products' market, which would otherwise have a small market share. Ecolabelling practitioners and observers have noted that, once an ecolabelling programme's product categories are identified as a purchase target in a GGP programme, the level of procurement interest and actual sales levels may rise dramatically. This is because a government mandate offers government purchasers concrete and solid incentives to purchase ecolabelled products. While not well documented and as yet unproven, it seems there can also be something of a "ripple effect" where products perceived as preferable by government authorities may be similarly given preferential treatment by purchasers in other sectors (Salzman, 1997). In addition, since GGP programmes typically have some performance-tracking mechanisms, they help the ecolabelling programme in tracking its implementation effectiveness.

Development of categories

In deciding on the targeted product categories, the GGP and ecolabelling programmes often look to each other in deciding future product categories to work with. The GGP programmes will often pick product categories that are available in an ecolabelling programme. And, when a government selects product categories that are not yet in an ecolabelling programme, the latter would often have to work hard to develop product criteria for such a category.

Development of green products

GGP encourages the development and advancement of green products by the nature of a competitive free trade market. As advancements take place in resource efficiency and ecodesign of products, the step-by-step development of criteria gradually shifts the market towards more efficient products and services. As an ecolabel programme establishes product standards, it also is able to determine the percentage of manufacturers able to meet these standards. Over time and pressure, the market shifts to "more efficient" being the norm. Thus, the product standard shifts higher, towards lower toxic chemical concentrations/emissions, better producer take-back programmes, etc. Through the evolving product standards, manufacturers constantly have to alter their product, raising the bottom line. This process helps the gradual quality improvement of GGP, and the ecolabelled products that are emerging in the market.

2.9.4 International Relationship between GGP and Ecolabelling

While individual governments direct and regulate their own GGP, the export/import and international marketing of an increasing number of green products encourages and

requires greater consistency and some degree of "harmonization" between national and regional (i.e. multinational) GGP programmes and initiatives (as well as in the complementary areas of ecodesign and green technology advancement). The Global Ecolabelling Network (GEN) and the International Green Purchasing Network (IGPN) are the two main NGOs working to establish and utilize an international network of green purchasing and ecolabelling programmes to consult, collaborate and harmonize their efforts towards a unified global green purchasing framework.

One prominent example of an international consultation, cooperation/collaboration and mutual recognition system is the Global Ecolabelling Network's Internationally Coordinated Ecolabelling System[27] (GENICES), which was initiated in 2003. By sharing ecolabelling management and operational techniques, worldwide collaborative effort towards efficient and durable ecolabels will aid governments in pursuing and making environmentally sound purchases on an international scale. Currently, the establishment of GENICES is particularly useful for those GEN members in their early stages of developing product criteria as they can consider and adopt best practices and credible product-specific core ecolabelling criteria from other leading, more established ecolabelling programmes.

Through mutual recognition agreements between countries, green product specifications can evolve to have common denominators. With international trade so prevalent, products sharing common core environmental aspects and performance attributes become recognized and accepted in numerous countries. Increasing the flow of relevant knowledge, experience sharing and technology advances around the world

[27] *http://www.globalecolabelling.net/docs/genices/genices.pdf*

will further expand and evolve the international market for, and supply of, environmentally preferable products. The application of known and familiar environmental performance certification/verification ecolabels increases consumers' trust and confidence in their green purchases.

2.9.5 National Integration of Green Purchasing and Ecolabelling

As an instrument to promote and implement sustainable consumption, ecolabelling benefits from government involvement. Consumers distrust many independent industry-led labels because they believe that large corporations have no morals or ethics (Horne, 2009). Generally speaking, citizens trust and often expect their governments to guide them towards a sustainable future in an unbiased, "public interest" and helpful way, including in circumstances where GGP programmes identify, recognize, promote and sometimes even incorporate third-party ecolabels (i.e. ISO Type I and III labels).

It is noteworthy that governments can also impose various measures that complement and benefit ecolabelling programmes, including: strict product bans and standards; taxation, levies and subsidies; incentive programmes such as take-back programmes and deposit-refunds; and extended producer responsibility requirements.

Governments have increasingly recognized the merits of ecolabels as voluntary instruments to guide the greening of products and their processes as well as services. Ecolabelling programmes' product criteria and certifications, due to their need to remain relevant and responsive to ever-changing market and technology conditions,

undergo routine review and occasional revision in order to remain "leading edge", as well as to facilitate precise, quantitative and clear distinction from alternative products in the marketplace on an ongoing basis. While traditional "top-down command and control" methods have been and continue to be used by national governments in some instances to guide, monitor and improve the quality of environmental products promoted for production and selected for procurement, governments are unable to continually update such instruments to remain relevant and appropriate under rapidly evolving international technological, industrial and market dynamics and conditions. Due to international political dynamics, government generated and imposed product environmental specifications and requirements are also more susceptible to international challenges associated with economic globalization and free trade considerations (Müller, 2002).

Relationship between Green Purchasing and Ecolabelling in Europe

Broadly speaking, many countries in Europe have well implemented GGP programmes that have benefited greatly from three key factors: strong and sustained government commitment and activity; substantial consumer demand and support for such initiatives; and the success of the EU Flower and various national governments' own voluntary ecolabelling programmes leading influence in the marketplace.

Relationship between Green Purchasing and Ecolabelling in North America

US' incentives and pressure on the IT industry reinforced the use of Energy Star certification in 1992. The proclaimed energy savings allowed the government to publically announce estimated overall savings and commitment to energy savings in offices around the country. Without the government's demand for Energy Star IT products, perhaps the single attribute label would not have been internationally recognized as it is now. Energy Star is now the most widely recognized energy savings label and has become broadly accepted and relied upon as a green purchasing tool for governments, private businesses and the general public.

Relationship between Green Purchasing and Ecolabelling in Hong Kong SAR

To promote green purchasing to businesses, industries and major consumer groups, government officials commissioned the Green Council to develop, launch and begin promoting and administering a Hong Kong Green Purchasing Charter (HKGPC)[28] in October 2007 (Ho *et al*., 2010). The Hong Kong Green Labelling Scheme (HKGLS) was also created, associated with the HKGPC. The Green Council's role is to administer the label and provide guidance and assistance for benchmarking and determining green purchasing specifications so that purchasing officers can concentrate their efforts on surveillance, supply chain management and other green purchasing aspects (Ho, 2008).

To promote energy efficient products, the Electrical and Mechanical Services Department (EMSD)[29] developed the Mandatory Energy Efficiency Labelling Scheme.[30] In 2009, only three types of products were enforced: room air conditioners,

[28] More information regarding the Hong Kong Green Purchasing Charter is available at www.hkgpc.org
[29] Electrical and Mechanical Services Department provides Government departments and public institutions' electrical, mechanical, electronic engineering and building services.
[30] http://www.gov.hk/en/residents/environment/energy/efficiencylabel.htm

refrigerating appliances and compact fluorescent lamps. The EMSD further specified that, starting in March 2010, washing machines and dehumidifiers would also join the ecolabelling scheme. The Government has been incorporating "energy label" recognition as a mandatory tender requirement in its purchases of office equipment and electrical appliances, such as photocopiers.

Relationship between Green Purchasing and Ecolabelling in the People's Republic of China

The Government Procurement List for Environmentally Labelled Products, which requires preferential purchases of ISO Type I ecolabelled products, was implemented for central government agencies and provincial level governments in 2007 and was extended to all levels of government as of 2008 (Deng, 2006). Close to 3,000 products are listed in 14 categories under China's ISO Type I Environmental Labelling Programme, and the total value of GGP in China amounts to RMB3.5 billion (USD538 million).

Relationship between Green Purchasing and Ecolabelling in Chinese Taipei

Chinese Taipei has a government-supported labelling programme. A Review Committee and Implementation Body, which approves product categories, monitors the Green Mark Programme and criteria, supervises the use of the Green Mark logo, and conducts product testing and inspection (Yu, 2003). The Green Mark Type I ecolabelling programme certified products enjoy top priority purchasing status. Annual GGP spending in Chinese Taipei increased from NTD2.6 billion (USD89 million) in the latter half of 2002 to NTD5.6 billion (USD1.89 million) in 2003 and NTD6.77 billion (USD232.88 million) in 2008. For the Green Mark programme, the number of certified products increased from 576 in 2002 to 876 in 2008.

In the private sector, the Chinese Taipei: Taiwan Green Purchasing Alliance (TGPA) promotes green purchasing by operating an online green product store[31]. It offers hundreds of certified products to consumers and retailers. There are also 863 retailers registered as 'Green Stores' at the Environment and Development Foundation (GEN, 2008). One of the ways the Foundation promoted GP to the public was through an Eco Hotel Contest in 2008, in which 43,000 online voters selected the 19 most environmentally friendly hotels in Chinese Taipei (GEN, 2008).

Relationship between Green Purchasing and Ecolabelling in Japan

The Eco Mark Programme was founded in 1989 and meets the principles of ISO 14020 (environmental labelling and declaration) and ISO 14024 (Type I environmental-label display). The programme emerged out of concerns about urban pollution and global environment issues during the 1980s (Eco Mark, 2007). A working group composed of industry members, consumers and specialists was formed to establish the certification criteria, and the Japan Environment Association manages the programme. The certification criteria focus on the life cycle of products, taking quantitative analysis into consideration to ensure selection of the least environmentally damaging product and one that works towards sustainability (Eco Mark, 2007). The working groups make recommendations on sustainable products to the Eco Mark Committee on Product Categories and the public is eligible to comment on the proposal for a period of sixty days on the Eco Mark News and Home[32] pages. The Japanese GGP has adopted 94% of the product criteria from the Eco Mark programme to guide government purchases in deciding and selecting preferable and identifiably green products.

[31] *TGPA online store: http://www.buygreentw.net*
[32] *http://www.ecomark.jp/english/index.html*

Relationship between Green Purchasing and Ecolabelling in South Korea

The Korean Government developed the Korean Environmental Labelling programme (KELA), which launched in 1992 and complies with ISO 14024 standards. It offers a Type I KELA Ecolabel, and there is also an EDP (Environmental Declarations of Products), which complies with ISO 14025 Type III Environmental Labelling, and bases certification on LCA and quantifiable information (KELA, 2002). The EDP programme was established in 2002 and covers nine environmental impact categories, such as resource depletion, global warming potential, ozone depletion potential, acidification potential, eutrophication potential and photochemical ozone creation potential (KELA, 2002).

The Good Recycled Mark was created in 1997 under the "Act on Promotion of Saving and Recycling of Resources" and is operated by the Korean Agency for Technology Standards, while the Energy Saving Mark was created in 1998 under the "Act on Energy Use Rationalization" and is managed by the Korea Energy Management Corporation (Im, 2006).

In 2009, the Korea Environmental Industry and Technology Institute (KEITI) launched all existing Korean ecolabelled products; as a subsidiary organization of the Ministry of Environment it allows for a more harmonized movement towards GGP.

Relationship between Green Purchasing and Ecolabelling in Malaysia

Malaysia does not have a national ecolabelling programme. However, KeTTHA is working closely with the Standards and Industrial Research Institute of Malaysia (SIRIM) to develop standards, certifications and labelling mechanisms that would

facilitate the government and private sector in moving towards GP (Silivarajoo, 2010). KeTTHA focuses primarily on green technology development. The SIRIM QAS International[33] is Malaysia's leading certification, inspection and testing body and it has created its own ecolabelling product criteria based on Malaysian Standards for degradable plastics packaging material, recycled paper, biodegradable cleaning agents, electrical and electronic equipment, and components with restricted hazardous substances (SIRIM, 2010).

Despite these initiatives, GGP is still in its development stages in Malaysia. An NGO, the Green Purchasing Network Malaysia (GPNM), was founded in September 2003, and stepped in to the breach to promote GP to buyers, suppliers and manufacturers, and to encourage sustainable consumption and production methodologies (GPNM, 2011). GPNM's criteria for Basic Green Purchasing consist of environmental sustainability/conservation with consideration of price and quality, consideration of LCA from manufacturing to disposal, energy/resource efficiency, use of materials that are or can be recycled, a commitment to long-term use, correct utilization and appropriate disposal of procured goods and services, reduction of pollution, and efficient utilization of goods and services to reduce environmental impacts (GPNM, 2011). When a product complies with one or more of the Basic Green Purchasing Criteria, it is deemed an eco-product, although GPNM does not enforce or certify products or services.

However, as we see with other countries, an ecolabel provides a credible and identified source of an environmentally preferable programme. The SIRIM ecolabel is a marketing

[33] *http://www.sirim-qas.com.my/*

tool which allows a company to position its products as environmentally friendly, and give its products a competitive edge over the others (GPNM, 2011). The Malaysia EcoLabel[34] provides product certification from SIRIM under a non-descript programme.

Relationship between Green Purchasing and Ecolabelling in Singapore

The Singapore Environment Council launched the Singapore Green Labelling Scheme (SGLS) in May 1992, which is a non-profit organization working to develop and administer green product certifications. An advisory committee supports the SGLS with representatives from government, private and academic sectors, and statutory boards. Singapore's Building and Construction Authority also administers a Green Mark which endorses environmentally friendly buildings, much like the LEED certification in the US. Tremendous energy savings are expected from Singapore's Green Mark[35] Green building scheme, with support from the Singapore Green Building Council, by the provision of environmentally preferable construction products[36]. Existing government buildings with an air-conditioned floor space of greater than 10,000 m^2 will have to attain the Green Mark Gold^{PLUS} standard by 2020, which is expected to reduce energy consumption by 25-30% with a payback period of six to ten years (MEWR & MND, 2009).

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[34] SIRIM Ecolabelling Scheme Brochure available at http://www.sirim-qas.com.my/pdf/2011/brochure/SIRIM%20Eco-Labelling%2017%20Nov%202011.pdf

[35] Building and Construction Authority's Green Mark Scheme launched in 2005 to initiate the green building sector in Singapore (Comparable to US' LEED)

[36] Singapore Green Building Council is composed of construction companies in support of the government to push for the construction of green buildings in Singapore http://www.sgbc.sg/

2.9.6 Key Elements for successful coupling of Green Purchasing and Ecolabelling

Drawing from points raised and discussed earlier in this study, and from the 2006 survey by the European Commission and the Global Ecolabelling Network (GEN), certain key elements for success in implementation and advancement of both GGP and ecolabelling programmes can be identified. These include:

Political support: a common main driver behind the early development and launch of green purchasing internationally appears to have been/continues to be the introduction and implementation of new and significant legislation (either at a national or local level). Further, all of the well-established and positive programmes have benefited from strong political support and endorsement not only at the outset, but on a continuing and sustained basis. Research by Lozano *et al.* (2010) shows an ecolabel's lifespan is determined by the initial amount of support as well as continual support from participants.

Establishment of complementary supply and demand stimulation and facilitation programmes/initiatives: both types of programmes seem to evolve and succeed more quickly and to a greater extent when complementary GGP and ecolabelling programmes are in place and somewhat integrated. While GGP programmes can function and progress without ecolabelling and some ecolabelling programmes operate in jurisdictions that have not implemented major GPP programmes, these "stand-alone" programmes seem less influential and successful. The Hong Kong Green Label Scheme's growth and expansion is limited by the non-existence of a GGP policy.

Programmes should be fundamentally similar to others, but customized to accommodate and address local circumstances: the evolution of most of the more

entrenched and productive GGP and ecolabelling programmes investigated has involved an initial pilot programme and the subsequent development, implementation and refinement of a full-scale programme tailored to suit the local conditions (i.e. physical, demographic, social and regulatory). Clearly, programmes have been successfully developed and implemented under a wide range of national cultures and local conditions (i.e. urban, rural, and mixed). This suggests that, in principle, there are no particular reasons why such programmes could not be applied successfully elsewhere, provided that sufficient account is taken of local conditions during their development and operational management.

Importance of a public education campaign: a common point of emphasis has been the importance of carrying out an effective public education campaign prior to and during the implementation of the programmes. In some cases, the public education campaign has been continued to sustain and enhance programme awareness, interest, and involvement levels.

2.9.7 Limitations of ecolabelling

One main inherent limitation with ecolabels is that they do not address the total consumption and the consumer behaviour. Information on the sustainability performance of a product will not be enough, since in many situations the most sustainable alternative is no purchase at all. The need for more research on how to motivate and foster sustainable consumption is recognized, and this issue needs to be addressed in a trans-disciplinary approach. As regards green procurement criteria, these too do not directly address the total consumption of the procuring organization. However, the full mission of green procurement does, as part of an organizational

strategy for procurement processes. Further, although both instruments strive to take a life cycle perspective, neither of the instruments is today efficiently affecting the user phase and the end-of-life phase of the product, since these phases take place after the verification. However, the actors within those phases are important participants in the recommended enhanced criteria development process and in the resulting stakeholder dialogues. It should be possible to require suitable user information and disassembly manuals in the criteria (Thidell, 2009).

Another problem for both ecolabelling and green procurement is the verification possibility. Since every criterion should be possible to verify, either by a labelling programme or by some other authorized body with higher local presence. This process restricts the way in which the criteria can be phrased and the aspects that are possible to include in them.

Mandatory labels via government interventions may be a better solution in the following circumstances:

1. For sectors with imminent sustainability impacts such as the building or energy industry.
2. Products which the labelling programmes do not want to make 'legitimate"' as an ecolabel may stimulate greater consumption of these products and result in a negative overall impact on the environment (Dosi and Moretto, 2001). Examples of these products are cigarettes and weapon.

2.10 Summary

The subject literature review has examined the current literature in relationship to the models of success in green purchasing in various countries and the criteria used to judge success. This review has identified the current stakeholders involved in order to

have an optimal outcome. Due to the international scope of this thesis, all monetary figures have been converted to USD; rates are based circa January to May 2011. Although the current literature neither presents a unanimous single model nor method of measuring success, the review has shown the various stages in the development of constructs, and articulated the latest theories and challenges to them.

Chapter 3 Research Methodology

3.1 Introduction

The research question and research objectives were outlined in Chapter 1. The purpose of this chapter is to:

- Discuss the research philosophies;
- Explain the research approach;
- Expound the research strategy.

Within the literature review there are various research models on green purchasing for public (Gelderman, 2006) as well as business sectors (Bansal, 2000). This chapter details the development of the current hypotheses and the statistical methods employed to test them. This will enable the reviewer to consider the reliability and validity of the methods used.

3.2. Research Philosophy

A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analyzed and used. The term epistemology (what is known to be true) as opposed to doxology (what is believed to be true) encompasses the various philosophies of research approach. The purpose of science, then, is the process of transforming things believed into things known: doxa to episteme. Two major research philosophies have been identified in the Western tradition of science, namely positivist (sometimes called scientific) and interpretivist (also known as anti-positivist) (Galliers, 1991).

3.2.1. Positivism versus Interpretivism

Positivists believe that reality is stable and can be observed and described from an objective viewpoint (Levin, 1988), i.e. without interfering with the phenomena being studied. Interpretivists contend that only through the subjective interpretation of and intervention in reality can that reality be fully understood. The study of phenomena in their natural environment is key to the interpretivist philosophy, together with the acknowledgement that scientists cannot avoid affecting those phenomena they study.

Positivism adopts a clear quantitative approach to investigating phenomena as opposed to interpretivist approaches, which aim to describe and explore in depth phenomena from a qualitative perspective. As stated by some contemporary scholars, while quantitative and qualitative research methods are often seen as opposing and polarized views, they are frequently used in conjunction with one another (Webb 1989, Polit, 2001).

3.2.2 Discussion and Rationale for Choice of Approach

This researcher's over-riding concern is that the research undertaken here should be relevant to the research question. Green purchasing is a human behaviour with feelings beyond the scope of positivism. This thesis has adopted a mixed approach with multi-methods for data collection. This has been described as critical multiplism (Guba and Lincoln 1998). It implies that, as in positivism, the need for rigour, precision, logical reasoning and attention to evidence is required, but, unlike positivism, this is not confined to what can be physically observed. Multiplism refers to the fact that research can generally be approached from several perspectives. In this research, the researcher has tried to avoid what may be characterized as methodological monism, i.e. the

insistence on using a single research method. This is not due to an inability to decide between the various merits and demerits of the various alternatives. Instead, the researcher believes that all methods are valuable if used appropriately; that research can include elements of both the positivist and interpretivist approaches, if managed carefully.

3.2.3 Research Strategy

In testing the validity of the hypotheses on the uptake of green purchasing, the researcher has embraced the positivist philosophy to verify statements through examination and observation of external reality. As this research seeks to have a broad overview of the uptake of GP domestically, 'survey methods' have been selected. Survey methods have the major advantages of overcoming geographical limitations and are accessible to a large number of organizations. A short questionnaire with four questions (Appendix B) was prepared and distributed in three formats - an online version, MS Word and PDF to target groups. Quantitative analytical techniques were then used to draw inferences from this data regarding existing relationships. The later part of this chapter will explain the construct measurement of research constructs and hypotheses to be tested.

A key weakness in the quantitative survey is that it is very difficult to understand the causes of or processes involved in the phenomena measured. Hence, a qualitative survey with open-ended questions on green purchasing was delivered to respondents in a follow-up study. The use of flexible and multiple methods is desirable when studying a small sample in depth over time. The researcher interacts with those being researched, and findings are the outcome of this interactive process, with a focus on meaning and understanding the situation or phenomenon under examination.

In summary, this thesis is composed of two phases. Phase I study uses a quantitative approach to verify the hypotheses whereas Phase II study is a qualitative study to investigate the opinion of the respondents on the barriers and possible solutions to engaging green purchasing.

3.3 Theoretical framework

This section proposes hypothesized variables to explain the implementation and non-implementation of green purchasing in the private sector, which are based on the literature study and the interviewing of 12 experts. These 12 experts come from government, international theme parks, academic institutions, property development and transportation. The average number of purchasing staff directed by these experts is 47. The exploratory variables in this study are clustered into four groups: Institutional Guidance, Requirement and Commitment, Competitors' Influence and Barriers.

The point of departure for the hypotheses is the professional engagement of the author as an executive in a non-government organization for 'environmental causes' in Hong Kong. The researcher has crossed paths with local and overseas corporations, government agencies and other NGOs. This professional engagement provides the author with a bird's eye view as well as an insider's view of the development of green purchasing in Hong Kong and its neighbouring countries. It also allows the author to comprehend the limitations of the business sector in a pragmatic manner. In view of the explorative nature of this study and the relatively primitive state of GP in the domestic business sectors, the conceptual model focuses on environmental and economic dimensions only. Discussion of social and ethical issues is limited to dialogue with professional procurers in the follow-up study.

The establishment of a theoretical foundation is critical for all scientific research since it serves an important role in defining, establishing and explaining relationships between concepts or constructs. It is difficult to develop meaningful relationships from empirically generated data without theory. Based on the hypothesized variables, the researcher has proposed a conceptual framework (Figure 4) that draws on a model of the influences of procurement directives upon compliance among procurement professionals in the EU (Gelderman *et al*., 20063). The current model provides a general framework to examine the facilitators and barriers of implementing green purchasing policies in companies. The thesis will then present the design of a survey among purchasing officers/managerial officers to test the hypothesis. The result will answer the research question: "What are the drivers and barriers of green purchasing in the business sector of Hong Kong?". It provides evidence-based direction to help companies in Hong Kong from the perspective of a third-party NGO.

Procurement studies in European firms and the US are voluminous; this study is the first of its kind in Hong Kong. It seeks to contribute to green purchasing literature in regions with a similar dilemma to Hong Kong. This study makes one particular contribution: the researcher has modified a conceptual model designed for Government Green Purchasing to study private green purchasing. This framework could be used for analysing other factors that may affect green purchasing in public and private sectors. Secondly, the investigation and result discussion is analysed from the perspective of an NGO who has a mission to support the private sector. The list of facilitators and barriers for study is not designed to be exhaustive. Selection depends on whether the result is going to help a local NGO to plan a strategy in supporting the business sector in green purchasing. For example, a third party has no immediate influence on a business'

financial capability regarding environmental management cost, although it is one of the major barriers studied in major literature (Min and Galle, 2001).

Sustainability is a three-pillared principle of harmonizing social, economic and environmental systems and goals in the form of efficient resource use, ecological balance, social equity, economic stability, and environmentally accountable production and consumption patterns. The three areas are so strongly interdependent that only progress that is parallel will be successful over the long term (Schrader, 2010). However, this is an exploratory study of a group of subjects where the investigator was unsure of their understanding of sustainability purchasing. It was therefore decided not to push too far for the time being and social equity was left out of this study.

Interrelationship among Research Constructs

Exploratory Variables

This section proposes hypothesized variables to explain the implementation and non-implementation of green purchasing in the private sector. The exploratory variables in this study are clustered into four groups: Institutional Guidance, Requirement and Commitment, Competitors' Influence and Barriers.

Carter *et al*. (1998) tested the company-specific factors of top and middle management support, mission statement, departmental goals, and training and evaluation for their respective impacts on environmental purchasing. Also, they compared German purchasing managers' involvement in environmental purchasing with that of US purchasing managers. Their findings suggest that middle-level purchasing managers can at least facilitate incremental adoption of environmental purchasing activities. Purchasing department goals had a significant relationship with environmental purchasing. This finding may be due to the need for functional and departmental goals to address organizational inefficiencies and provide strategic direction. Carter and Carter (1998) developed an empirically theoretical model that examines how inter-organizational factors both drive and constrain purchasing's involvement in environmental activities. Four external forces - customers, suppliers, competitors, and government agencies - were tested in relation to purchasing activities. The results indicated that the output sector (downstream channel members) was the primary driver of environmental purchasing, while the regulatory sector did not have significant impact.

Factor A: Institutional Guidance

With support from the United Nations Environment Programme (UNEP) and initiatives such as the International Green Purchasing Network, green purchasing in Asia is picking up fast. Many countries have formulated GP policies, regulations and guidance to promote green purchasing. Regulations and laws relating to green purchasing in the public sector are instituted in South Korea, Japan, and Taiwan. Government regulations are generally considered as important drivers of green purchasing (Walker, 2011). However, government regulatory green purchasing compliance has not been included in this study because there is no such law in Hong Kong. Lobbying for legislation is not the objective of this study, and the researcher has repeatedly stressed that this thesis is intended to study ways to help the business sector rather than finding ways to punish businesses for their non-compliance. Government involvement is a complex issue. Governments need to be involved if there is any expectation that they will integrate the voluntary initiatives into their own policy framework and incentive structures. Government involvement can also help foster public confidence in and acceptance of the initiative. However, it needs to ensure that government's initiatives are not construed as a non-tariff barrier to trade, which could happen if governments are seen to be imposing schemes with standards that foreign competitors are not able to meet.

However, the researcher does intend to investigate government policies that could support green purchasing in Hong Kong. At this moment, there is not much incentive in the form of recognition or financial aspects nor is there guidance from the government on GP in the business sector.

This thesis will examine the importance of institutional guidance in the uptake of green purchasing. Both government departments and NGOs are considered as institutions in this study. These five items are listed in the questionnaire (question 4):

Government "Lead by example" (Kunzlik 2003).

Identification of green commodities (Leire *et al.,* 2005)

Provision of training courses (Leung, 2003)

Information dissemination (Ramayah *et al*., 2010)

Recognition of achievement (Loo, 2004)

Hypothesis 1: Institutional guidance is an important facilitator of private green purchasing.

Factor B: Requirement and commitment

Government regulations and legislations have been traditionally considered as the most important external factors driving companies and government departments to go green (Green *et al*, 1998, Zhu and Sarkis, 2008). According to the guidelines set by the International Chamber of Commerce (ICC), the environmental audit programme should entail the implementation of a company-wide environmental policy that facilitates continuous environmental performance improvement and promotes green purchasing (Weinstock, 1993). With increased concern over environmental liabilities, the buying firms, which take environmental regulatory compliance more seriously, tend to get involved in green purchasing practices more actively than the others. Such a tendency seems to be more prevalent among large firms than small firms (Min and Galle, 2001).

Government green purchasing stems from national policy: if public purchasers do not comply with GP requirements, finance departments may refuse payment (Kataoka, 2006).

In the private sector the government is simply not able to enact financial penalty in accordance with the purchasing behaviour of the companies. Furthermore, compliance with environmental legislation is no guarantee for improved environmental performance (Bowen *et al*., 2001a; Carter and Carter, 1998). Hong Kong is thriving in a free market with minimal intervention and regulation from the government. Companies and society at large are generally sensitive to and against stringent regulations. Successful experience of strong government interventions may not be applicable in this city, and is one of issues studied in this thesis.

On the other hand, internal drivers such as top-level management commitment are found to be equally if not more important (Walker & Jones, 2012; Walker *et al*., 2008). The larger businesses have been the pioneers in embracing the concept of green purchasing and the focus of numerous studies (Zhu, and Sarkis, 2004). Large customers may influence smaller suppliers to meet sustainable SCM practices, and exert pressure in the supply chain (Baden, 2009). Specifically, the follow questions in this factor box will be explored:

Government requirement

Tendering requirement of clients

Top management's commitment

Hypothesis 2: Requirement from government or clients and commitment from top management are important drivers for green purchasing in companies.

Factor C: Competitor Influence

Gaining competitive advantage in terms of financial return and public image are important drivers for green management practices (Porter and Van de Linde, 1995; Walker 2008).

Proactive environmental strategy from competitors could set industry norms or legal mandates that drive technical innovations for other companies to follow (Caldwell *et al*., 2005). This is particularly important for large corporations that have to follow international trends. Competition pressure could also come from affiliated companies or divisions within a corporate organization (Hanna *et al*., 2000, Rao & Holt, 2000). A study (Bansal & Roth, 2000) indicated that the frequency of interactions and resource dependencies increased interconnectedness within the field, as organizational members transferred their understanding of the organizational environment, including the natural environment, to each other. Proximity further facilitated these transfers. As DiMaggio and Powell (1983) predicted, shared understandings resulted in the mimicking of each other's actions. In this box, the following questions will be explored:

- Efforts taken by other progressive Hong Kong companies
- Efforts taken by affiliated companies/divisions within the corporation
- Efforts by direct competitors
- International trends

Hypothesis 3: External and internal competitors have a positive impact on private green purchasing.

Factor D: Barriers of Green Purchasing

Historically, cost has been used as the prime performance measure. An investigation of green purchasing practices in US firms showed that cost concerns are the most important barrier for not taking environmental factors into account in the purchasing process (Min and Galle, 2001). It is not intended to include this factor in this study because it is not an item that could be helped by a third-party NGO even though the answer is written on the

wall. Beyond mere cost, the influence of environmental value for money in relation to GP (Rao and Holt, 2005) was considered equally important. Training and education are the prime requirements to achieve successful implementation of green initiatives in companies (Ravi & Shankar, 2005).

For instance, inadequate training leads to difficulty in preparing procurement specifications (Bowen *et al*., 2001). Purchasing managers also found it difficult to integrate ethical issues in their buying (Cooper *et al*., 2000) and 'environmental illiteracy' is widespread in small companies. Organizations may provide rewards for green employees. Employees may be helped when they face green problems and may be provided with support to learn green information (Cater and Dresner, 2001). Absence of green alternatives, lack of customer pressure and suboptimal socio-economic infrastructure are particularly detrimental to GP in developing countries (Luthra *et al*., 2011). In particular, the following barriers will be investigated:

- Perceived poor efficiency
- Difficulty in integrating GP policy
- Insufficient in-house knowledge
- Insufficient supply of product or service.
- Inadequate guidance
- Insufficient internal incentive

Hypothesis 4: Internal and external barriers have a negative impact on implementing green purchasing.

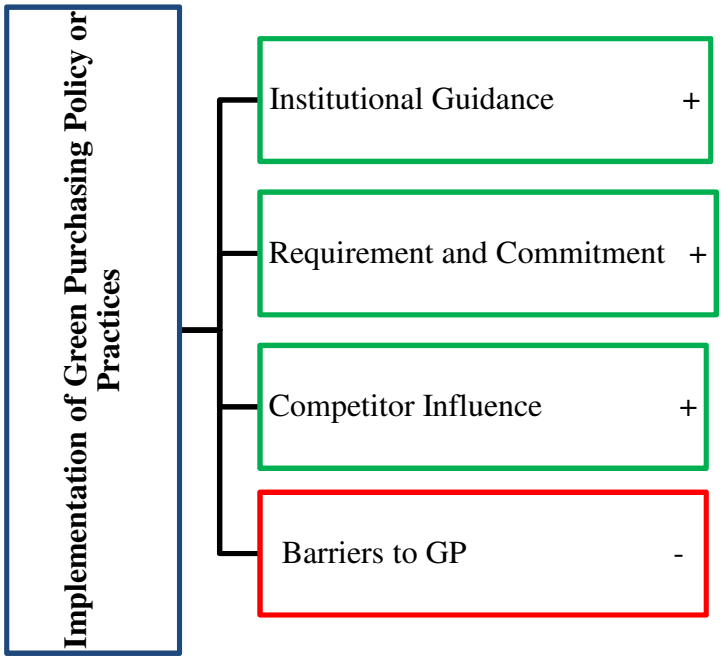

Figure 4: Conceptual model of the influence upon green purchasing in the private sector

The hypothesized variables impacting uptake of GP in private companies are illustrated in Figure 4. The model posits that institutional guidance, requirement and commitment, and competitor influence positively contribute to GP. In addition, the model predicts that companies tend to comply less with GP when they encounter the situations listed in the barrier box.

Hypotheses to be tested

Hypothesis 1: Institutional guidance is an important facilitator of private green purchasing.

Hypothesis 2: Requirement from government or clients and commitment from top management are important drivers for green purchasing in companies.

Hypothesis 3: External and internal competitors have a positive impact on private green purchasing.

Hypothesis 4: Internal and external barriers have a negative impact on implementing green purchasing.

3.4 The Survey

The most important methodological challenges of a survey methodologist include making decisions on how to:

- Identify and select potential sample members.
- Contact sampled individuals and collect data from those who are hard to reach (or reluctant to respond).
- Evaluate and test questions.
- Select the mode for posing questions and collecting responses.
- Train and supervise interviewers (if they are involved).
- Check data files for accuracy and internal consistency.
- Adjust survey estimates to correct for identified errors.

(Groves *et al.,* 2009)

3.4.1 Sampling Plan

Since there is no local database of procurement professionals in the private sector, the sample is based upon contacts of the Green Council gathered over the years. It could be postulated that at least some level of environmental awareness is present in the contacts, which decreases the strength of random sampling. This is not considered to affect the validity of this study, as it does not intend to explore the prevalence of companies with a green initiative.

The survey took place between February and October 2009. over 8,000 contacts were approached via email or telephone. Questionnaires were distributed and returned via email, facsimile and mail during the period from February to October 2009. At the same time, the questionnaire was posted on the Green Council and Hong Kong Green Purchasing Charter (HKGPC) websites in order to expand the spectrum of the potential recipients. As a further measure to increase the response rate and ensure responses from key sources, telephone surveys were conducted incorporating the simple questionnaire.

Methods to increase response rates:

1. Respondent-friendly survey questionnaire - a brief, closed-ended dichotomous format.
2. Invitations were sent out from the Green Council, which is a contact of the respondents.
3. Multiple requests.
4. Convince respondents that they can make a difference.

3.4.2 Questionnaire Design

The questionnaire targets firms' representatives; there are 20 items for the five constructs. The respondent has to answer in a closed-ended dichotomous format for the purpose of statistical analysis. The constructs are: (1) Implementation of Green Purchasing, (2) Institutional guidance, (3) Requirement and commitment, (4) Competitor influence, and (5) Barriers. Among the 206 respondents, 60 procurement officers were invited for a phase II qualitative survey using the same set of questions but put in an open-ended format.

3.4.3 Response

There were 206 respondents (response rate: 2.5%) from different business sectors (Table 3). One hundred and four respondents (50.5%) came from small and medium-sized enterprises' (SMEs) personnel and 102 (49.5%) from large corporations (LCs)[37] All respondents were managerial level or above, but were not limited to procurement officers. Around 50% of all the respondents identified that their companies had GP in place.

The potential for non-response bias was tested using the procedure recommended by Armstrong and Overton (1977) in which the data is classified into a first category of returned questionnaires (first-wave, early respondents) and a second category of returned questionnaires (second-wave, late respondents). To establish the presence of non-response bias, first-wave respondents were compared with second-wave respondents on relevant variables. All tests indicated that no statistically significant differences were found between the first wave and the second wave of respondents. Based upon the assumption that late

[37] *In accordance with the Industrial Department's definition, an SME is: a) any manufacturing business which employs fewer than 100 persons in Hong Kong; or b) any non-manufacturing business which employs fewer than 50 persons in Hong Kong*

respondents are similar to non-respondents, it is concluded that the study does not suffer from non-response bias.

Table 3: Composition of Respondents (total 206) from Different Business Sectors

Business Sectors	Number of Respondents	Percentage (%)
Accountancy	1	0.5
Architectural, surveying and planning	6	2.9
Agriculture and fisheries	2	1.0
Commercial	5	2.5
Education	8	3.9
Engineering	12	5.9
Finance	3	1.5
Financial services	1	0.5
Health services	2	1.0
Import and export	14	6.9
Industrial	19	9.3
Information technology	14	6.9
Legal	3	1.5
Medical	5	2.5
Real estate and construction	16	7.8
Social welfare	12	5.9
Sports, performing arts, culture and publication	3	1.5
Textiles and garment	1	0.5
Tourism	4	2.0
Transport	7	3.4
Wholesale and retail	10	4.9
Catering	3	1.5
Consulting	9	4.4
Government affiliated bodies	2	1.0
Laboratory	2	1.0
Manufacturer	10	4.9
Utilities	5	2.5
Certification Service	3	1.5
NGO	5	2.5
Other[38]	17	8.3

[38] *Other industries included art production and supply, office retail, cleaning supplies/services, electronic industries, event/exhibitions management, interior design, pest control, printing, public services, research, and trade promotion.*

3.4.4 Data Analysis Procedure

SPSS for Windows version 17 was used for analysis.

The correlation between SME and LC and the existence of green purchasing policy ANOVA was examined with analysis of variance between the means of groups.

Exploratory Factor Analysis

In conducting a survey study, it is necessary to generate a large dataset, as it is difficult to interpret results from scattered questionnaire items. In view of that, social scientists often utilize statistical methods to extract meaningful items. 'Exploratory Factor Analysis' is developed aiming to constitute underlying 'factors' from the large dataset and it is always used to test the dimensionality of the dataset in order to generate new factors for further analysis. Exploratory factor analysis was used to assess the validity of the constructs and to identify a possible underlying factor structure.

Factors with underlying meanings are constituted by EFA based on the pattern of responses. Factor loadings of each item show the association between those particular factors with question items. It should be cautioned that only a factor loading greater than 0.4 should be considered during interpretation. The factor solutions confirmed the intended factor structure, i.e. the resulting components were clearly related to the items that were supposed to constitute the corresponding constructs. Indeed, the items that should be related were strongly correlated (convergent validity); the items that theoretically should not be related did not correlate (discriminant validity).

It is often found that one question item loads on two or more factors significantly. Rotation can be adopted in this condition to differentiate it from others. Varimax rotation, aiming to minimize within factor variation, but to maximize the variations between factors, is often used to generate distinctive factors.

Regression Analysis

To find out causality is always the objective of research study. Multiple regression analysis, a more advanced method than correlation, can explain how the independent variable could explain the dependent variable and whether it is statistically significant or not.

Regression coefficient indicates the effect of independent variable on dependent variable, with the range from -1 (perfect negative relation) to +1 (perfect positive relation). The closer to 1, the higher the possibility that the variance of dependent variable could be accounted for by that independent variable.

Multiple regression analysis has commonly been used in green procurement studies to reveal the determinants of companies in implementing green procurement policies (Gelderman *et al*., 2006; Min and Galle, 2001). Similarly, this research adopts the same approach to understand those determinants in a local context.

3.5 Chapter Summary

Following a review of the literature this chapter provided the rationale for considering the methods appropriate to answering the researcher's question and objectives. The researcher has articulated the research approach to be adopted and provided clear justifications throughout this chapter of why certain research choices were preferred over others.

Chapter 4 Results

4.1 Introduction

This chapter outlines the findings of the questionnaire surveys. Details of statistical methods and analysis are laid out.

4.2 Effect of company size on green purchasing implementation

Question 1 looked into the relationship of green purchasing implementations in SMEs and large corporations. A one-way between subjects ANOVA was conducted to compare the effect of company size on green purchasing implementation (Tables 4 and 5). There was no significant effect of company size on the implementation of green purchasing policy at the $p<.05$ level for the three conditions [$F(1, 204)=2.343$, $p=0.127$].

Table 4: Response rate of GP policy implementation to size of company

Study group	Yes GP	No GP	Total
Large Corporation	54	48	102
Small Medium Enterprise	50	54	104
Total	104	102	206

Table 5: ANOVA results between LC and SME on GP

q1					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.585	1	.585	2.343	.127
Within Groups	50.910	204	.250		
Total	51.495	205			

4.3 Construct validity

Exploratory factor analysis was used to assess the validity of the constructs and to identify a possible underlying factor structure. To simplify the dataset and to identify a possible underlying factor structure, exploratory factor analysis was applied for items related to the hypothesized facilitators (Questions 2, 3 and 4) and barriers (Question 5) respectively.

Hypothesized Facilitators (Factor A-C)

For the hypothesized facilitators, two rounds of Exploratory Factor Analysis (EFA) were used (Tables 6a and 6b). In the first run, most items loaded heavily on more than one factor and distinct factors with underlying structure could not be identified (Table 6a). Therefore, EFA with varimax rotation was performed. Varimax rotation can maximize the difference inter factors. It also serve to minimize variation within that particular factor so as to gauge more distinct factors for further analysis (Table 6b).

Table 6a: First run of EFA – no distinguishable results

	Factor A	Factor B	Factor C
q2a	.503	.653	.291
q2b	.592	.567	.084
q2c	.414	.465	.387
Q3a	.582	.052	-.574
Q3b	.669	.138	-.295
Q3c	.593	.162	-.515
Q3d	.302	-.433	.024
Q4a	.499	-.295	.139
Q4b	.510	-.245	.337
Q4c	.657	-.413	.127
Q4d	.605	-.372	.145
Q4e	.672	-.263	.090
Eigenvalues	3.764	1.725	1.102
% of Variance	31.363	14.373	9.182

Table 6b: Second run of EFA with varimax rotation

	Factor A	Factor B	Factor C
q2a-gov	.025	***.859***	.160
q2b-Tendering	.071	***.737***	.362
q2c-Top	.118	***.724***	.000
Q3a	.169	.032	***.801***
Q3b	.269	.270	***.639***
Q3c	.126	.148	***.778***
Q3d	***.494***	-.173	.078
Q4a	***.579***	.076	.119
Q4b	***.622***	.213	-.027
Q4c	***.759***	.055	.197
Q4d	***.703***	.070	.161
Q4e	***.660***	.156	.261
Eigenvalues	3.764	1.725	1.102
% of Variance	31.363	14.373	9.182
Cronbach's alpha	.738	.730	.702

After the second round of EFA, three distinct factors could be generated and all the factors could account for 55% of variance. The first factor comprises Q6d and all the items from Q4, while the second factor contains only items in Q2. And the third factor consists of question items Q3a to Q3c, which are of similar properties.

A reliability analysis has been performed in order to ensure the internal consistency of the indicators that constitute each construct. Cronbach's alpha is a measure of the degree to which the items reflect the same underlying construct and therefore the scale's internal consistency. The Cronbach's alpha coefficient of a scale should be above 0.6. Cronbach's alpha is:

- 0.738 for Institutional Guidance (Factor A)
- 0.730 for Requirement and Commitment (Factor B)
- 0.702 for Competitor Influence (Factor C)
- 0.719 for Barriers (Factor D).

The result of the reliability analysis indicates an acceptable internal consistency and reliability of the constructs.

Hypothesized Barriers (Factor D)

Similarly, EFA has been performed for Q5a to Q5f, which were designed to measure the deterrents of GP implementation (Tables 7a and 7b). The result shows that all the items fall heavily on the first factor and the percentage of variance explained could be as much as 42%.

It may be argued that this box should be divided into two factors, yet the eigenvalue of factor 2 is barely above 1 and the explanatory power is 25% lower than the first factor. In addition, the item-total statistics obtained by the reliability test of the first barrier factor (Table 7a) show that any deletion of questionnaire items would lower the Cronbach's alpha. In that case, it is advised that all these six items should be treated as one combining factor.

Table 7a: Barriers' EFA

	Factor 1	Factor 2
q5a	.478	.493
q5b	.635	-.486
q5c	.782	-.020
q5d	.587	.614
q5e	.781	-.030
q5f	.581	-.429
Eigenvalues	2.536	1.042
% of Variance	42.261	17.370
Cronbach's Alpha	.719	

Table 7b: Cronbach's alpha for Item-Total

	Cronbach's Alpha if Item Deleted
q5a	.718
q5b	.686
q5c	.638
q5d	.697
q5e	.637
q5f	.700

4.4 Regression Analysis

Multiple regression analysis has been performed to determine the influence of the above variables on the implementation of Green Purchasing policy. Three distinct regression equations, one for all companies and the other two for large corporations and small-to-medium sized companies respectively, have been generated using Q1 (implementation of GP) as the dependent variable, and the coefficients of the above factors generated in the factor analysis formed independent variables (Tables 8a, 8b and 8c).

These three distinct equations could be used to identify the facilitators and barriers for all companies in general and also the factors for large corporations and SMEs separately.

Table 8a: Step One: Hypothesized Facilitators of GP

Factor / Question	A: Institutional Guidance	B: Requirement & Commitment	C: Competitor Influence
Q2a-Gov	.025	***.859***	.160
Q2b-Tendering	.071	***.737***	.362
Q2c-Top	.118	***.724***	.000
Q3a-Other HK	.169	.032	***.801***
Q3b-Within Corp	.269	.270	***.639***
Q3c-Direct Competitors	.126	.148	***.778***
Q3d-Intl Trends & Efforts	***.494***	-.173	.078
Q4a-Lead Example	***.579***	.076	.119
Q4bb-Identification	***.622***	.213	-.027
Q4c-Training	***.759***	.055	.197
Q4d-Information	***.703***	.070	.161
Q4e- Recognition	***.660***	.156	.261
Eigenvalues	3.764	1.725	1.102
% of Variance	31.363	14.373	9.182
Cronbach's Alpha	.738	.730	.702

Table 8b: Step 2: Hypothesized Barriers of GP

Factor/Questions	Barriers
Q5a Perceived inefficiency in expenditure	.478
Q5b Difficulty in integrating policy	.635
Q5c Insufficient knowledge	.782
Q5d Inadequate supply of products/service	.587
Q5e Inadequate guidance/training	.781
Q5f Insufficient internal incentives	.581
Eigenvalues	2.536
% of Variance	42.261
Cronbach's Alpha	.719

Question 5 investigated the major deterrents to GP implementation.

In order of strongest to weakest barrier, they were:

(e) Inadequate guidance and/or training on GP implementation

(c) Insufficient in-house knowledge for identification of "green" products/services

(b) Difficulty in integrating GP policy into the company's existing policy

(d) Inadequate market supply of "green" products/services for comparison and selection

(f) Insufficient internal corporate incentive

(a)Increases in expenditure without significant improvement in environmental performance

Step 3: Regression Analysis

Multiple regression analysis has been applied, in order to determine the influence of the exploratory variable on the uptake of GP. The overall fit of the model can be assessed using the F-value and is statistically significant at $P < 0.01$. The researcher developed three equations to assess the model in three situations. Using Q.1 (implemented GP or not) as the dependent variable, the following analysis examines the effects of exploratory factors A to D (Tables 9a, 9b and 9c).

Equation 1 assessed all companies irrespective of size; equations 2 and 3 assessed LCs and SMEs separately.

Table 9a: Regression Analysis for all respondents

Equation 1: All respondents (n=206)

	Beta	Sig.
Constant	.502	.000
Factor A (from step 1)	.286	.000
Factor B (from step 1)	.351	.000
Factor C (from step 1)	.150	.041
Factor D (from step 2)	-.183	.022

F = 14.063** Note: ** p=.01

Note: The above equation could explain 22% of all variance (with $R^2 = 0.22$)

Table 9b: Regression Analysis for Large Corporations

Equation 2: Large corporations (n=102)

	Beta	Sig.
Constant	.490	.000
Factor A (from step 1)	.243	.031
Factor B (from step 1)	.316	.003
Factor C (from step 1)	.143	.255
Factor D (from step 2)	-.117	.419

F = 4.041** ** p=.01

Note: The above equation could explain 14.7% of all variance (with $R^2 = 0.147$)

Table 9c: Regression Analysis for SMEs

Equation 3: SMEs (n=104)

	Beta	Sig.
Constant	.498	.000
Factor A (from step 1)	.286	.003
Factor B (from step 1)	.420	.000
Factor C (from step 1)	.123	.207
Factor D (from step 2)	-.279	.007

F = 9.622** Note: ** p=.01

The above equation could explain 28.8% of all variance (with $R^2 = 0.288$).

4.5 Summary of Results

This study shows that, in Hong Kong, the size of the companies does not affect the adoption of green purchasing policy.

The following variables are found to exert significant influence on green purchasing implementation:

- Institutional Guidance (positive).
- Requirement and commitment (positive).
- Perceived barriers (negative).

These results imply a confirmation of Hypotheses 1, 2 and 4. For the competitor influence construct, no significant impact could be established in this model. Based on the regression analysis, hypothesis 3 is not supported.

Chapter 5 A Follow-up Survey

5.1 Background

To further evaluate the barriers and facilitators identified in the returned questionnaire, the respondents were invited to participate in a more in-depth survey through either face-to-face or telephone interviews.

5.2 Method: Descriptive Research

The researcher employed Descriptive research w in this survey. In survey method research, participants answer questions administered through interviews and researchers describe the responses given. In order for the survey to be reliable and valid, it is important that the questions are constructed properly. Without any clear guidelines, a conversational interview in this setting might not give the answers needed in the analysis. And analysing without any factors supporting and directing the analysis might give it a lack of focus into a loose sample of quotes and statements.

The interview protocol in this follow-up survey is developed on the basis of reviewed literature and the discussions with two green management experts from large corporations. The major aim is to explore the ways to overcome the obstacles of green purchasing and putting the drivers into action. The conceptual model is used as a framework supporting the structure of the interview.

To allow for a greater variety of responses from participants, the researcher used the open-ended question format. Interviews were taped and transcribed. Secondary data were collected such as annual environmental and financial reports, environmental policies, supplier evaluation questionnaires and internal newsletters. The transcripts

were coded using themes identified in the literature and from actual terms used by interviewees. There were two interviewers, who independently coded and compared their coding structures to ensure similar themes were emerging. Quotes that best explained a particular situation were chosen to illustrate key points.

5.3 Sample Data

A total of 60 respondents agreed to participate – thirty-three affiliated with SMEs and twenty-seven affiliated with large corporations. All organizations were from Hong Kong. One-third of the respondents were operational management representatives of their companies including managers, general managers, senior managers, marketing managers and assistant general managers. The remaining respondents comprised: executive management officials including executive directors, principal management directors, chief executive officers and directors (17%), procurement and finance department officials (15%), environment department officials (10%), corporate services officials (10%), and company officials representing other divisions. Based upon the responses recorded, twenty-seven of the sixty companies represented already had GP policies, procedures and/or regulations in place.

5.4 Findings

5.4.1 Obstacles in the words of procurers

Increases in expenditure without significant improvement in environmental performance

A common opinion expressed was that companies should be willing to continue GP practices for the sake of the environment. It was also suggested by several commentators that, with product design improvements, technological advancements and potential scaling up of market size, green products and services' prices would likely decrease. One other comment was that continued purchasing of a particular and more expensive "green alternative" product would be contingent upon not only price and environmental performance considerations, but also upon determination of good overall product quality and fitness for purpose.

> *"Constraints on technological advancement, incompatible price cost and availability of green products hinder GP development"*

Difficulty in integrating GP policy into a company's existing policy(ies)

Several respondents suggested that green purchasing (GP) initiatives and activities could be introduced and embarked upon through a "case-by-case" arrangement, with efforts subsequently made to try to integrate the GP processes and procedural initiatives as far as possible into the existing core policy (ies) of the company. It was pointed out that this would provide time for pertinent management and staff to establish and get comfortable with the new systems and efforts as well as to arrive at suitable means to integrate GP policy aspects into or formulate complementary policy to existing core policy. There was a strong view expressed and shared that senior

management commitment and instruction to formulate and integrate policy is/would be essential. One final comment was that, if green purchasing were to become a legislated private sector requirement, it is probable that all Hong Kong companies could and would find a way to achieve policy integration.

> *"Sharing of GP information is difficult as companies tend to keep information confidential because green product can benefit themselves and also their competitors"*

<u>Insufficient knowledge on identification of "green" products/services</u>

It was proposed that support - training, information dissemination, etc. - from other professional, non-profit and government entities could greatly assist business managers in introducing and educating their staff on GP considerations and practices. Further, the commentators suggested that GP would become much more significantly and broadly adopted if public authorities would: (i) take the lead in determining "greener" products and services, (ii) identify and distinguish these environmentally preferable products and services through the application of a standardized environmental label (or some other recognition means), and (3) provide private sector purchasing authorities and officials with corresponding awareness-raising sessions (e.g. workshops, seminars, etc.) and training opportunities.

> *"Inadequate knowledge of GP"*
>
> *"Sharing of GP information is difficult as companies tend to keep information confidential because green products can benefit themselves and also their competitors"*

Inadequate supply of "green" products/services for selection in the market

While suggesting that, by acting collectively, companies may be able to apply some pressure/influence on suppliers to offer "green" alternatives, an interesting perspective offered by several commentators was that the Government should lead in this regard and is well positioned, as a very large volume purchaser of a wide range of products and services, to exert much greater influence and positively stimulate market supply and demand. Another interesting suggestion was that there should be greater effort and attention applied to educational and promotional initiatives targeted at and for the benefit of locally-based supply industries and businesses. This suggestion was based upon an observation that most GP practitioners in Hong Kong were generally seeking and sourcing green products and services from overseas suppliers.

> *"Constraints on technological advancement, incompatible price cost and availability of green products hinder GP development"*

Inadequate guidance and/or training on GP implementation

Several commentators suggested that current and potential GP practitioners should seek information, raise awareness, and share experiences and accomplishments through various means including: the Internet, workshops, exhibitions and seminars. While recognizing that such efforts could be time consuming and may incur costs, they stressed that valuable insight and guidance could be achieved through these means. Further, and in this regard, they expressed a desire to have the Government and other relevant professional bodies consult with local companies and other relevant

stakeholders and then prepare and offer comprehensive GP guidelines and training courses customized to recognize and address local conditions and needs.

> *"Lack of support from the government (e.g. policy) and social concern about GP"*

Insufficient incentive in terms of financial support and commitment from top management

It was proposed that, if strong senior management support and incentive does not exist within a company, the implementation and application of GP practices may still be stimulated by external forces/developments. In this regard, it was suggested that, if Government officials were to establish and facilitate a green products/services supply chain and take a lead role in implementing, promoting and supporting green public purchasing, this might lead to greater interest and support from top management officials.

> *"Absence of viable incentive to practise GP except for ethical reasons"*
>
> *"Not a major factor to be considered at the operational level for different industries - time is more important"*

Socio-economic environment may impact upon the sustainability of GP implementation

A specific suggestion offered was that consideration for tax reductions and subsidies related to the purchase and use of greener product and service alternatives, along with the development and deployment of an educational and promotional campaign – i.e.

"*pay for the priceless environment*" – could make GP more attractive, popular, sustainable and well implemented in the private sector.

5.4.2 Possible solutions from the words of procurers

Environmental Labels

Ecolabelling was said to benefit producers in four different ways. Firstly, ecolabelling helps producers to develop products and production processes in the 'right direction' - towards increased environmental efficiency. Ecolabelling standards are typically a good indicator of the future environmental framework within which an industry will operate.

Close contact with ecolabelling organizations gives producers an early start in making process changes that often become future regulations. Secondly, for producers who are proactive in pursuing change, ecolabelling reduces their risk by demonstrating a workable change in processes. It may also have a multiplier effect as producers compete to surpass existing criteria. Thirdly, ecolabelling provides a high standard of guidance for producers who could not afford an internal environmental management programme, or producers who otherwise shy away from eco-design. Ecolabelling again provides producers with workable guidelines by which to operate. Finally, producers benefit from ecolabelling if they exercise the first mover advantage in ecodesign and environmentally friendlier production processes. The ecolabel licence gives such producers third-party verification and recognition in environmental stewardship.

Collaboration with suppliers

A general view expressed by the respondents was that they individually and on a single company basis had minimal clout and influence with their suppliers in terms of

encouraging and directing the provision of greener alternative products/services. Nevertheless, over 60% of the respondents identified that they had made efforts to encourage their suppliers to begin generally offering green product/service alternatives, and approximately 75% of this sub-group of respondents had actually tried to alter their product supply chains by incorporating product/service environmentally preferable specifications in their requisition and purchasing processes. Regarding another initiative suggestion, 88% of the respondents expressed interest and willingness to formally network in order to share their information and experience and gain insight from others.

Initiation from a small scale

In reaction to four strategy suggestions (and an invitation to offer additional suggestions), approximately 35% of the respondents advocated sector-wide but company-specific GP schemes focused initially upon office stationery supplies (i.e. commonly and frequently bought and high volume consumed products such as paper, etc.). Somewhat complementary, 18% saw greatest merit in taking a *"project-by-project" and "expanding scope over time"* approach rather than trying to embark on comprehensive and extensive full company implementation initiatives. In contrast to the two sector-wide GP initiation strategy suggestions, about 30% recommended that greatest attention and focus be given specifically to the product manufacturers [possibly as a strategy to simultaneously stimulate and begin facilitating both greener production and consumption], while 9% recommended special and initial attention and focus be directed and applied to service companies [possibly as a strategy to simultaneously stimulate and begin facilitating both greener services' provision and consumption].

Senior Management Support

Notably, and not unexpectedly, 93% of the respondents identified that senior management commitment plays a crucial role in GP implementation, and proposed the following key management roles and functions:

- Broad and significant decision-making, including making the critical decision to initiate green purchasing as well as determining and establishing the [re-]allocation of financial and personnel resources to properly entrench it;
- Consideration, establishment and dissemination of policy direction and guidance;
- Arrangement for and overseeing of regular performance monitoring in order to potentially direct changes and enhancements;
- Encouraging, directing and facilitating staff training;
- Contemplating, organizing and possibly enabling knowledge sharing and awareness-raising schemes and initiatives; and
- Devising and implementing an “award and penalty system” in order to trigger and foster staff support for and strong effort in GP implementation and delivery.

Promotion, training and workshops

A common suggestion was that a broad "*promote and demonstrate by example*" strategy could be a major and effective way to encourage and guide increases in GP adoption and activity levels in Hong Kong. To pursue and act upon this strategy, it was proposed that private sector officials and companies increase support for and get involved in existing and future ‘green’ events and initiatives (e.g. green carnivals, knowledge sharing/awareness-raising and training workshops and seminars, etc.), at which green purchasing approaches, processes and reference materials could be presented and discussed.

Government Efforts

In this regard, the respondents provided the following three suggestions:

- Government authorities should formulate, legislate and offer tax deductions or subsidies for green product suppliers and/or purchasers/users;
- Government authorities could consider and potentially make green purchasing a legislative requirement;
- Government officials should commit resources to and put greater efforts into green purchasing promotional, instructional and monitoring/assessment campaigns; and
- Government officials should increase promotional and awareness-raising efforts, support for, and application and facilitation of greener products and services' recognition and labelling schemes (e.g. the Hong Kong Green Label Scheme[40]), as well as other environmental systems (e.g. Environmental Management System) and resources.

Recognition of Green Purchasing As 'Basic Good Business Practice'

- Asked to support or refute this position, the respondents generally agreed with it, and suggested that its implementation can help develop or enhance a company's positive public image and provide long-term economic benefits through cost avoidance and savings.

[40] *Details of the Hong Kong Green Label Scheme can be found at www.greenlabel.org.hk.*

5.5 Summary of Findings

The participants reflected that the most notable barrier is lack of guidance from government or professional bodies. Without adequate knowledge, the participants found it difficult to integrate GP policy in their companies, which is the most fundamental step to start. The participants generally agreedd that an ecolabelling system and Green Database would help them to identify green products and seek suppliers.

5.6 Limitations

1. This opinion survey is performed for ease of administration and economical utilization of the existing sample and resources. It should be regarded as for reference only.
2. This opinion survey is subject dependent and may have validity issues, errors due to non-response, and is limited by response choices.
3. It is important to emphasize that descriptive research can only describe a set of observations or the data collected. It cannot draw conclusions from that data about which way the relationship goes.

Chapter 6 Discussion

6.1 Introduction

A review of literature shows that, apart from Japan and Taiwan, studies on green purchasing in the business sector in Asia are scarce. Research into facilitators and barriers on private GP is virtually non-existent in Hong Kong. This research is intended to contribute to the collection of generic data that could help the development of strategies for the business sector to take off in green purchasing.

The researcher examined a number of interdisciplinary theories and existing models for relevance and theoretical directions to assist in developing a conceptual model. This model was tested for relevance via a quantitative survey. After the hypothesized facilitators and barriers were validated, solutions were formulated with primary data collected from a follow-up descriptive survey and secondary data collected from literature and experience of other countries.

Based on the findings of our study, the researcher selected “guidance” for in-depth discussion because it is the place where a third-party professional body, notably an NGO, could provide assistance. The following section will link the findings to the possible reactions from different stakeholders and uncover the clues to guide an NGO in strategic planning to advance green purchasing in the local business sector.

6.2 Drivers and Barriers from the perspective of an NGO

6.2.1 Requirement and Commitment

The importance of government regulation and policy as external drivers has not received significant challenges since its establishment in literature (Carter and Eltram, 1998; Min and Galle 2001). Tendering requirement is also widely recognized as a crucial factor (Sharfman and Anex 2007; Vachon and Klassen 2008; Vachon and Klassen 2007). Top management commitment as an important internal driver is also in line with other studies (Min and Galle 2001; Wycherley 1999).

This study offers no dispute with the indispensability of these three factors but there is little that a third-party NGO could contribute to these three items.

6.2.2 Institutional guidance

Institutional guidance is a statistically significant factor in both the facilitator and the barrier constructs. Adequate guidance and knowledge facilitate green purchasing whereas insufficient hinders. The effect is particularly strong in SMEs, which is congruous with other studies (Hervani and Sarkis 2005; Walker and Presuss 2008). Barrier items like insufficient knowledge, green products, and internal incentives are also more or less consequences of insufficient guidance. The managerial implication is that providing education, information and training programmes would be the strategic directives for an NGO.

Literature has shown that ecolabelling could work synergistically with green purchasing in public and private sectors. Despite its limitations and setbacks, environmental labelling has been widely practiced and is time proven in developed countries. There is

an existing Green Labelling Scheme in Hong Kong but its full potential is grossly under-utilized. The responses from the interviewees in the supplementary survey support the view that environmental labels should gain greater importance in Hong Kong. The following section will examine the key elements of ecolabelling and how it could play an important role in Hong Kong.

6.2.3 Ecolabelling and NGOs

It should first be noted that there is a difference between criteria setting and promotion of the programme, and the certification or label award process. The first is operational and represents the 'spirit' of the organization. The second is functional and represents the credibility of the programme.

Non-government organizations (NGOs) can effectively serve as a communication bridge between consumers and retailers with a sustainable agenda and create a green market demand by influencing the consumer sector towards sustainable products (Kong *et al*., 2002). They can work with retailers to connect them to consumers, and work on behalf of consumers by pressuring producers to produce sustainable products. In the end, they help to empower consumers by promoting the availability of greater choice. An d success can be highly correlated to the presence and active involvement of an NGO, which can make a difference in gaining public awareness, recognition and acceptance.

NGOs can work alongside business/industry to develop ecolabelling programmes for the consumer. As Mont and Peplys (2008) have noted, the combined effect of inter-governmental, business and NGO activities can be an effective strategy for moving towards more sustainable consumption. NGOs can help to promote ecolabelling through such methods as campaigning, consumer information and education, consultation on

policy design, criteria development, verification, product testing of ecolabelled products, stakeholder representation on ecolabelling boards, and the promotion of corporate social responsibility (CSR) (UNEP, 2009).

NGOs have also launched GP programmes and ecolabels around the world to encourage the purchase of environmentally preferable goods in public and private sectors. Such efforts have been seen in Australia (Good Environmental Choice Australia), Hong Kong (Green Council), and Singapore (Singapore Environment Council). These NGOs have implemented ecolabelling systems in the absence of government-led initiatives.

The Global Ecolabelling Network (GEN) is a non-profit international organization founded in 1994, comprised of ecolabelling practitioners managing and/or delivering ISO Type I ecolabelling programmes around the world. The GEN supports its members by compiling and disseminating current information and connects ecolabelling organizations around the world so they can co-operate and share their experiences and product knowledge. In 2003 the GENICES - Global Ecolabelling Networks' Internationally Coordinated Ecolabelling System[41] - was launched to promote the sharing of best practices, especially among GEN members in the early stages of adopting ecolabels.

The GENICES has five guiding principles: (1) participation is voluntary and open solely to GEN members; (2) multilateral mutual trust will be developed through formal methodologies; (3) members will cooperate and collaborate on product certification, criteria development and reviews; (4) common product certification, criteria development and reviews will be carried out using formal methodologies; and (5)

[41] *http://www.globalecolabelling.net/docs/genices/genices.pdf*

GENICES will continue to evolve. Ecolabels serve to be an identification tool for environmentally preferable products and services, thus making it easier to procure such items when conducting government green purchasing. The contributions of GEN to the ecolabelling sector have been substantial to consolidate and ratify common criteria around the world. Table 9 identified Type I Ecolabels around the world, identifying the vitality of an ecolabel with the year established and the number of certified products/services.

Some NGOs focus on one single environmental/social attribute. Examples include forestry (Forestry Stewardship Council), marine (Marine Stewardship Council), organic (International Federation of Organic Agriculture Movement), and other attributes to ensure credibility of standardized labels and stakeholder interests (Sustainability Purchasing Network, 2008). The Forestry Stewardship Council (FSC) issues one of the most prominent NGO endorsed labels. The FSC was established in 1993 in the wake of worldwide concern over global deforestation. Its role is to oversee and guide appropriate consumption and production of forest products and it provides a label managed through third-party accreditation. This label indicates if a product, process or service conforms to standards set by international consensus (FSC, 2011). The FSC now manages forests all over the world and its label is recognized and respected for sustainable forestry practices.

6.3 Administration of Ecolabelling scheme by NGO - the Singaporean Model

The Singapore Environment Council (SEC)[42] is an independently managed, non-profit NGO set up in 1995 to coordinate and promote environmental causes through community, education and industrial activities.

Advisory Committee

The SEC has an advisory committee of representatives from the government, private sector, academic institutions and statutory boards. These include the National University of Singapore, Nanyang Technological University, Consumers Association of Singapore, Singapore Retailers Association, National Environment Agency (NEA), Public Utilities Board, and Ministry of Environment and Water Resources.

Funding

The Lee Foundation and The Shaw Foundation[43] both donate to the SEC to support green programmes. The NEA also provides funds for activities that support government-initiated policies and programmes.

Activities

The SEC organizes numerous on-going activities and programmes to promote environmentally responsible practices by businesses and citizens, with some emphasis on the use and merits of ecolabels and other credible and formal environmental certifications (i.e. 'ecocertifications').

[42] *http://www.sec.org.sg/*
[43] *The Lee Foundation and The Shaw Foundation are both charitable organizations in Singapore for the betterment of the community and welfare of its people*

Ecolabels

A distinctive eco-certification is the **EcoOffice Label** which encourages public and private offices in Singapore to comply with the Online EcoOffice Rating System. To help businesses achieve the Green Office Label, an Eco-Office kit, a Green Procurement Guidebook[44], and a much more comprehensive step-by-step guide on *How to Green Your Office*[45] have been produced, highlighting and guiding what environmental specifications to look for when making alternative choices. Some governmental offices have also taken the initiative to attain the EcoOffice Label, including the National Parks Board, NEA, Public Utilities Board and Southwest Community Development Council.

The EcoOffice Label has had the desired effects of encouraging owners and managers of regular offices in Singapore to re-evaluate their environmental footprint and make substantial changes to their office supplies and equipment, as well as raising employees' level of awareness regarding environmental impacts and consequences of their decisions and actions.

One of SEC's major contributions to GP is their administration of the Singapore **Green Labelling Scheme (SGLS)**. The SGLS was initiated in 1992 by the Ministry for the Environment and Water Resources and has been administered by the SEC since 1999. This national ISO Type I ecolabel encourages manufacturers in and around Singapore to become Green Label-certified and offer their environmentally preferable products for procurement and use in both the public and private sectors. A good example of the link that has been established between the SGLS and GP initiatives has been the call for and

[44] *http://www.ecooffice.com.sg/templates/madeyourweb/pdf/ecooffice01_proc_guide.pdf*
[45] *http://www.ecooffice.com.sg/templates/madeyourweb/pdf/Step_by_step_guide_How_to_green_your_office.pdf*

use of SGLS certified/labelled products[46] during construction or retrofitting of buildings, especially with the Grant for Energy Efficient Technologies (GREET) programme offered by the NEA.

6.4 Lessons for Hong Kong

The Governments of Hong Kong and Singapore agree on an important aspect in Green Purchasing: providing free and open markets to enhance the willingness of companies to sign voluntary initiatives. However, their approach differs on a very important issue: the funding and incentives provided by government to its agencies to consider and conduct environmentally preferable purchasing.

It is generally acknowledged and realized that GGP can be a major incentive in the development and growth of markets for green products. If public agencies are expected (i.e. encouraged but not required) to re-allocate part of their core annual budgets for green purchases, then the likelihood of self-motivation and initiative may be very low. However, if they can receive grants and funding from their central governments tied specifically to green purchasing activities and initiatives, then it is more likely they will invest effort in eco-fitting their facilities and changing purchasing practises to reduce costs along with water and energy consumption. Through such targeted funding and incentives, a government can indirectly encourage green purchasing and green markets without having to introduce laws or regulations that would otherwise take years to implement.

[46] *It is a mutual relationship between the two programmes, one of providing an incentive to purchase and the other to provide the service of an online database enabling purchases of SGLS products..*

Despite the funding differences, there are many common initiatives and themes for Hong Kong and Singapore. Green purchasing programmes are developing out of the two respective NGOs' initiatives and activities. The Green Council and SEC are aiming to achieve complete GGP by establishing their private sectors' interest levels first and producing substantial green product databases for their governments to garner interest in and promulgate GGP policies and regulations. Complete GGP is achieved when the governments proactively engage in green purchasing of ecolabelled goods, embracing the social, environmental and economic benefits of doing so. Through the establishment of the internationally recognized Type I ecolabels, the Green Council and SEC hope to encourage and guide their respective governments to recognize the potentials and favourable conditions created for green purchasing.

6.5 Chapter Summary

This chapter described the results of the study and the testing of the conceptual models. In doing so, it confirmed or contradicted some of the current literature with regard to the barrier to and facilitators of green purchasing.

Table 10: Private Sector Participation in Singapore Green Purchasing – SGLS

Singapore Green Labelling Scheme	
Year Initiated	1992
NGO Affiliation	Singapore Environment Council
Labelling Objectives	Help consumers to distinguish green-labelled products from those which are less environmentally friendly or uncertified, so they are able to make a more informed choice in their purchase. Add value to products by helping with market access to countries that require third-party validation of the environmental attributes of imported products.
Number of Product Categories	15 Categories 1,500 Products
Public Events	Singapore Environmental Achievement Awards (annually since 1996)
Awards and Endorsements	Schools' Green Audit Awards Project EcoOffice Singapore Green Labelling Scheme Singapore Environmental Achievement Awards Energy Smart Hotel Award Water Efficiency Labelling Scheme Green Label Community Club Certification Green Label Food Court Certification Green Label Hotel Certification (in development)

Source: Singapore Environment Council http://www.sec.org.sg/index.php

Chapter 7 Conclusions

7.1 Introduction

Hong Kong is a highly sophisticated city; the commerce and academic accomplishment is prolific. Incongruously, the attention given to green purchasing is not at the level that it should be. Academic studies on this subject are virtually non-existent. This study sought to fill this gigantic knowledge cavity by investigating private sector green purchasing from various perspectives.

This chapter reviews the original objectives set out in the introductory chapter; it presents a summary of the main findings and discusses the guidance that could be provided by an NGO in achieving green purchasing in the private sector.

7.2 Research question and objectives

The ultimate ambition of academia is to shape the biggest picture and weave the essential elements together on a monumental subject. From this grand theoretical framework, later researchers select puzzle pieces that they think relevant for their own subspecialty. Green purchasing is one of the essential components of environmental chain management practice in the business world and is the primary subject in this study.

The aim of this thesis was twofold. The first objective was to identify the various internal and external factors that encourage or constrain firms in engaging in green purchasing activities, which is the first research question of this thesis. Initial investigations of green purchasing trends in Government and mega corporations as well as a population survey serve as the background. A literature survey review provides a basis on the understanding of the positive and negative elements in implementation of green purchasing in firms. Key enablers were customer

requirements, reputational risk, organizational factors including strategic, people and functional issues, and stakeholder involvement (including NGOs and Government). Barriers to progress included pressures to reduce costs, other organizational priorities, the ability of buyers to tackle the subject, and accounting methods that focus on short-term measures.

When the data collection and analysis were conducted, the researcher found that all of the factors identified in the literature were corroborated as they were mentioned by at least one of the interviewees. This study did provide broad confirmatory evidence for the conceptual model but the ultimate agenda of the author goes to the second research question

-*how to help the business sector in engaging green purchasing from the perspective of an NGO?*

The researcher collected primary data from a follow-up descriptive survey and secondary data from a literature review looking at international experiences. It is concluded that an ecolabelling system administered by an NGO and supported by the Government would be a viable option. The entering of ecolabelling criteria into the tendering requirement of Government Procurement is important in the development of a labelling scheme.

7.3 Guidance

7.3.1. Guidance from NGOs

The results do not deviate from mainstream research that adequate guidance is a key factor to implementing green purchasing in the business sector. The result of this research leads the researcher to the following suggestions:

Green Product Database

A key element of successful guidance from NGOs is the establishment, maintenance and provision of a Green Products Database. The central purpose of a green products and services database is to provide potential purchasers with current information on the identity, key attributes and availability of environmentally preferable products and services being produced and offered for consumption. A thorough and comprehensive database that further indicates the environmental specifications or third-party certifications of leading products and services may significantly stimulate favourable production, provision, selection and consumption. The convenience of an online database encourages purchasing officers to browse and pursue the purchasing of environmentally preferable products and services that are available on the market from various supply sources.

Green purchasing guidebooks

To help public sector procurers to identify more sustainable products, the Government Procurement Service has introduced 'Greenticks' for online government purchasing in the United Kingdom. There are 3 different types of 'Greenticks' that indicate if a product meets 'minimum' or 'best practice' standard for sustainability. Government agencies are able to purchase pre-selected official procurement agency-approved green products.

Although there are numerous and varying definitions, reasons and conditions regarding green purchasing, guidebooks enable purchasers from the private and public sectors within countries, states, and cities to acquire credible, relevant and common awareness and information regarding environmentally preferable products and

services, which frequently leads to comparable and complementary efforts and decisions, and results in a national movement.

Training of procurers

This training could be installed as mandatory for all government sector purchasing authorities and officials. It should incorporate awareness raising and information-sharing regarding: product specifications, procurement procedures and legislations in place or proposed, existing challenges and proposed means and measures to address the challenges, etc. Such initiatives would contribute to keeping sector GGP goals and processes consistent and evolving in a coordinated and effective manner. Participation in these training events should not be restricted to government purchasing officials, but also include attendance and contributions from programme suppliers, green purchasing experts and NGOs to aid insight as well as share distinctive knowledge and experience.

7.3.2 Guidance from Government

1. Legislating green purchasing practices is a possible way to facilitate and accelerate the adoption of green production and consumption in the private sector;
2. Provide tax deductions and/or subsidies for companies which supply green products/services and/or select, purchase and use green products/services;
3. Establish a government-wide directive and mechanism to guide and enable government purchasers to give consideration and preference to green products and services. These products and services may have slightly higher initial costs but this could be balanced by lower life cycle operating and disposal costs.
4. Provide “know-how” guidance to local private sector GP practitioners and other

interested parties, including making readily available public sector green specifications and outlines of public sector green purchasing processes, procedures and other initiatives;

5. Increase and enhance public and private sector as well as general public promotional and educational efforts regarding green purchasing;
6. 'Lead by example' in order to create and sustain sufficient market demand so that suppliers/distributors/manufacturers are motivated to offer greener products and services, while also providing strong guidance and proven results for the private sector purchasing community;
7. Provide more substantial and formal promotion and support of existing environmental performance recognition and labelling (i.e. "ecolabelling") schemes and systems, like the Hong Kong Green Label Scheme, and consider developing and introducing complementary environmental labelling schemes as well as other guides and tools to assist in green purchasing initiatives and activities.

7.3.3 Suggestions to firms

1. Join and actively participate in the Hong Kong Green Purchasing Charter (and any other emerging or future green purchasing networks) in order to increase knowledge and awareness, gain guidance from other practitioners, and seek allies to cooperate and collaborate in this regard;
2. Implement and enhance GP efforts in a systematic manner that includes establishment and regular review of core policies, objectives, procedures, guidelines, and monitoring and audit measures; the monitoring and audit measures are essential for ensuring green products' quality and performance, and can guide any appropriate procedural revisions, additions and enhancements;

3. Ensure that sufficient management and operational staff time and resources are allocated for the purpose of GP knowledge acquisition.
4. Take advantage of local, regional, national and international ecolabelling schemes' environmental performance leadership criteria and ecolabelled products lists and databases when formulating purchasing specifications and/or seeking credible third-party recognition and certification of "greener" products and services;
5. Arrange, schedule and conduct regular GP training workshops and other initiatives in order to establish and increase staff knowledge, awareness and competency in the GP field;
6. When and as appropriate, employ qualified and recognized professional organizations and experts to providing consultancy services on GP;
7. To the greatest extent possible, seek out and incorporate green specifications into the company's tendering 'terms and conditions' to encourage staff to partake in green purchasing and suppliers to provide green products and/or services.

7.4 Contribution to knowledge

From a local perspective, this study is the first of its kind in Hong Kong; it contributes in building a knowledge base on green purchasing in the business sector of Hong Kong. The research questions that the study sought to answer explored how companies vary in perceptions of facilitators and barriers to green purchasing practices and the possible solutions. The result indicates vividly that guidance is the key factor in the development of green purchasing. In this study, SMEs and Large Corporations do not differ significantly in their perceived importance of green purchasing. The findings thus provide important evidence-based directions to institutions that are committed to advance green purchasing in Hong Kong. From the literature review and study of

international experiences, this research posited that ecolabelling is an essential component of guidance and that could be effectively administered by NGOs.

The targeted audience of this thesis includes academics, policy makers, leaders and product developers in the public and private sectors, procurers and consumer organizations. The research forms a foundation for better utilization of the full potential of these existing and well-proven instruments to support green purchasing in Hong Kong's business as well as public sector.

From an academic perspective, the conceptual model adapted from Government Green Purchasing (Gelderman *et al*., 2006) is proven applicable in the private sector. The model posits that institutional guidance, requirement and commitment, and competitor influence positively contribute to GP. In addition, the model predicts that companies tend to comply less with GP when they encounter the situations listed in the barrier box. This model could serve as a framework to investigate other variables in future studies.

7.5 Chapter Summary

This chapter provided conclusions by summarising the results and discussions of the previous two chapters and brought together the various topics researched in a coherent and logical manner. The chapter also discussed the research's contribution to knowledge.

The next chapter highlights limitations to the current research and suggests areas of further research.

Chapter 8 Limitations and further research

8.1 Introduction

The researcher acknowledges that there are some limitations of this study, which are discussed in the next section, and then suggests areas for further research.

8.2 Limitations

1. Inherent in the survey method is the observation that only volunteers participate. This might mean that respondents are somewhat more aware of, or engaged with, the green purchasing agenda than non-respondents.
2. Second, the model is not fully specified. The constructs and their underlying relationships require greater precision in order to be predictive. To understand GP in the private sector, the researcher needs to further explore the contexts that precipitate these motivations and their interactions. In the current sample, purchasing companies far outnumbers suppliers, thus affecting the generalizability of results. This is quite inevitable as there has been a massive exodus of industries to China in the past decades.
3. Thirdly, only economic and environment dimensions were investigated in this study. The construct did not include social performance (SRP-socially responsible purchasing) even though little has been studied regarding the incorporation of social aspects into the procurement activities by both business and public sectors (Walker 2010).
4. Furthermore, this study was conducted in an Asian setting but only in one city; the degree of inference to the whole region is difficult to assess.

5. This is a cross-sectional study. A stronger causal relationship could have been drawn through the use of longitudinal studies.
6. Although a substantial portion of this study was allocated to ecolabelling, the value of the ecolabel is seen as being more relative in that it encourages consumers and producers to take that crucial step in respecting the environment. This research has not produced evidence to establish the correlation between ecolabelling schemes and environmental issues. Ecolabelling is a long-term initiative that dictates studies in its own right.

8.3 Future Research

To rescue the planet through green purchasing is a monumental issue; the list of research avenues is endless. The academicians envisage a sustainability framework; executives of consultancy firms or environmental NGOs decode the framework and develop strategies to follow the framework in ways that are pragmatic to the real business world. Given the complexity of the business world, a one-size fits all approach could not possibly allow a company 'doctor' to diagnose the most-needed facilitator or the most fearsome barrier, not to mention how to put it into 'clinical' practice and provide guidance.

Any researcher knows very well that 'Data is King'; the author has not yet done with the valuable respondents. The added value of this piece of work is the rapport developed with the respondents during the process of preparation; it delivers an opportunity to recruit them for future studies, and to expand the sample via a snowball effect. Any programme developed for 'Guidance' must be scrutinized in order to gain relevance. It is necessary to establish criteria for economic and environmental measurement and

form the basis of future longitudinal studies. Some of these measureable parameters (Harrison, 1999) include:

- Change in expenditure
- Change in the use of toxic substances
- Change in carbon footprint
- Change in energy and resource conservation
- Number of green alternatives from suppliers
- Staff awareness of GP and related green policy
- Business opportunities with clients

Green purchasing is a part of so many systems - to name a few: economic, non-discrimination psychological, national sovereignty, reverse subsidization, and local culture. The analysis here focused on the most elementary stage of green purchasing; its multi-disciplinary nature and impact far exceeds the scope of this study. Perhaps an important outcome of this thesis is to generate more studies on green purchasing from different facets; be it in Hong Kong or other Asian countries with suboptimal green purchasing practice. To the author, this study represents opening the door to a labyrinth of challenges.

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Appendices

Appendix A: Task Force Procurement Survey

Capacity Building Task Force Procurement Survey
February 22, 2011

Please identify which sector you represent:
○Property/Developer ○Transportation
○Government Authority ○Education

Where applicable please select which aspect of sustainable development (Economic, Environment, Social) is most dominant or considered.

1. To what extent is procurement *regulated* by plans/policies in your company?
   ○ There are no plans/policies
   ○ Applies to few procurement activities
   ○ Applies to most procurement activities
   ○ Plans/policies is very thorough and applies to all procurement activities

2. Does your company's procurement take sustainability into account?
   ○ Not at all
   ○ It is included in plans/policies
   ○ It is included and applied in SOME procurement activities
   ○ It is included and routinely applied in procurement

3. Is your company's procurement:
   ○ Centralized (purchasing is responsibility of single unit in particular products/services)
   ○ Decentralized (responsibility shard between departments)
   ○ Outsourced (separate private company carries out procurement on behalf of your company)

4. How many people are involved in your company's procurement department?
   ○ Please indicate: _____

5. Is procurement included in the company's approach to sustainable development?
   ○ Yes
   If so, which aspects does it cover? (check all that apply)
   ○Economic ○Environmental ○Social

   ○ No

6. For which of the following positions does your company provide training on procurement? (check all that apply)
○ Procurers ○ Budget Holders ○ Finance Managers
○ Senior Managers ○ Lawyers ○ None
○ Other: _____

7. Does your company provide tools on how to implement procurement strategies?
○ Some (standard specifications, risk assessment, product/services fact sheets)
○Tools covering key stages are in place (supplier selection, bid evaluation)
○ Systematic set of tools covering all stages of procurement are in place
○ Systematic set of tools are in place and regularly reviewed and updated

8. Would government incentives increase amount of sustainable procurement?
○ No ○ Maybe ○ Yes ○ Definitely
9. What forms would you like to see these incentives?
○ Tax exemptions ○ Rebates ○ Funding
○ Other: _____

10. Will government's proactive decision to implement government procurement encourage your company to fully integrate sustainable procurement?
○ No ○ Maybe ○ Yes ○ Definitely

11. Government policies and control will deter company from procurement
○ No ○ Yes ○ Yes only if they are very strict

12. Which of the following best describes your company's procurement budget management?
○ Annual (fixed amount but cannot be carried over into the next year)
○ Annual (fixed amount and can be carried over into the next year)
○ Multi-year budgets (fixed amount over more than one year)
○ Project/Task budgets (fixed amount for specific project)
○ Operating Costs are included in these budgets
○ Other: _____

13. Has your company identified products/services that have the highest economic, environment, and social impacts?

	Impacts of some are known (paper, stationary, energy)	Impacts of key purchases are known and targets have been set to reduce them	There is evidence of how impacts have been reduced	Impact reduction through purchases are measured and scrutinized
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

○ No

14. To what extent does your company provide staff with procurement training?

	Training on how to buy has been given to key procurement	Training includes sustainability issues (LCA, risk assessment)	Training includes sustainability issues and is given to all staff involved	Regular training delivered to key procurement staff

	staff			
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

○ None

15. To what extent does your company undertake sustainability risk assessments in procurement?

	Few Key sustainability impacts are identified and used to estimate risk	Few key sustainability impacts are identified and priority list and action is taken	Main sustainability impacts for all products are assessed and actions to reduce is undertaken	Sustainability criteria applied to all contracts. Detailed risk and impact assessment
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

○No sustainability risk assessments are done

16. To what extent does your company evaluate suppliers?

	Potential suppliers are not evaluated	Potential suppliers are evaluated to ensure they are fit to supply	Supplier evaluation includes main sustainability impacts	Suppliers demonstrate independent evidence, regularly accredited and standardized
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

17. Does your company evaluate bids from suppliers other than price?

	Evaluation based on price and other operating costs	Evaluation includes quality, durability and operating costs	Evaluation includes sustainability, durability and operating costs	Evaluation takes complete assessment including sustainability, carbon emissions, quality, etc.
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

Other Considerations:

18. To what extent does your company undertake monitoring and reporting on procurement?

	Internal auditing on savings	Internal auditing and includes sustainability aspects	Independent auditing systems, reported	Results of audits and procurement activities are published

			internally	externally
Economic	○	○	○	○
Environment	○	○	○	○
Social	○	○	○	○

○ No monitoring and reporting on procurement

19. Are suppliers involved with developing your procurement process?
○ Yes ○ No

20. Are you engaging suppliers to develop more sustainable products and services?
○ Yes ○ No

21. Are other stakeholders such as consumer organizations, general public involved with developing your procurement process?
○ Yes ○ No

22. Are you informing stakeholders of your sustainable procurement efforts/goals?
○ Yes ○ No

23. Was it difficult to encourage staff to become involved in sustainable procurement?
○ Yes ○ No
If Yes, please state why: _____

24. Which products/services are most difficult to sustainably procure?
(check all that apply)
○ IT Equipment ○ Cleaning Supplies
○ Paper ○ Electrical and Electronic Equipment
○ Furniture ○ Food and Hospitality
○ Construction ○ Others:_____

25. What benefits through sustainable purchasing is your company hoping to gain?
(check all that apply)
○ Carbon Reduction ○ Innovative Alternatives
○ Waste Reduction ○ Sustainable Development
○ Energy Efficiency ○ Corporate Social Responsibility
○ Health Improvements ○ Others: _____

Appendix B: 2006 Green Purchasing Population Survey

Introduction

The Government initiative on GP in Hong Kong started in 2000. The situation in the local business sector is largely stagnant. Understanding the attitude of the general populations on purchasing green products could help the business sector to construct their future planning. The purpose of this attitude survey is to address these gaps in the knowledge so as to inform policy development at the government and business sector.

Design

Cross-sectional street intercept questionnaire survey.

Setting

The interview took place in 3 major business districts and 7 major housing estates in Hong Kong. Each region was allocated 100 questionnaires.

Results

A total of 735 interviews were conducted. Depending on the district, the average response rate is 67% in the business districts and an average of 80% in the residential housing estates. The interview completion rate is 97%. Most of the interviews were completed in less than 5 minutes.

(i) 529 (72.0%) of 735respondents reported that they had purchased environmentally preferable products, with paper products being the most commonly identified product category;

(ii) 561 (76.7%) of 731 respondents stated that they would include environmental considerations -- especially on durability, toxicity, composition of recycled materials, and packaging -- during future purchasing activities;

(iii) 540 (74.6%) of 724 respondents agreed that cost differential is a prime factor in green purchasing decision-making;

(iv) 565 (79.4%) of 712 respondents expressed a willingness to pay more for green products, with a maximum payable upper limit at 22% greater than the average price for products within a functional category;

(v) 433 (59.5%) of 728 respondents identified that they had encountered difficulties -- e.g. identification of genuine 'green' products, small market coverage and narrow range of choice of environmentally preferable products, etc. - in attempting to source environmentally preferable products;

(vi) 644 (88.1%) of 731 respondents expressed interested in getting one-stop assistance on green purchasing and receiving information on environmentally preferable products;

(vii) 683 (93.7%) of 729 respondents stated that they would definitely consider practicing green purchasing if there was a comprehensive database of environmentally preferable products;

(viii) 702 (96.7%) of 726 respondents expressed the opinion that the Government should lead green purchasing;

(ix) 699 (95.6%) of 731 respondents suggested that the Government should take a stronger role in promoting green purchasing in Hong Kong through such means as: enhanced promotion and awareness raising of 'green' products, provision of product-specific tax exemptions and/or subsidies as incentives.

Discussion

The response rate is high in this study that indicates citizens in Hong Kong do aware of the importance of environmental protection. Seventy-five percent of respondents were willing to pay more for green products. However, a significant number (59%) of respondents found it difficult to find their desired green products, which implies a vast business opportunity. Almost 90% of respondents express their need for information on environmental preferable products, which indicates a customer friendly database or labeling system is in great need. Not unexpectedly, almost all respondents believed that the government must take a stronger role to promote green purchasing.

Research limitations

This survey is a preliminary survey only; the result is not stratified into the demographic characteristics of the street-intercept sample. The stratified data, which is beyond the scope of this study, would be most valuable in marketing of green products.

Questionnaire of Green Purchasing Survey for (2006)

	Question 問題	Response 回應
1.	Does your organization/do you purchase any environmental preferable products? If so, what are these items? 請問貴機構/閣下有否採購環保產品？ 如有，什麼產品？	Yes 有 Items 產品種類 _____ _____ No 沒有
2.	Does your organization/do you include environmental considerations during purchasing? If so, what are these considerations? (Examples: recycled contents, durability, reduced packaging materials, toxicity etc.) 請問貴機構/閣下進行採購時有否加入環保考慮因素？ 如有，什麼環保考慮因素？（如：再造成份、耐久性、簡約包裝、毒性等）	Yes 有 Considerations 考慮的環保因素 _____ _____ No 沒有
3.	Does your organization/do you consider cost is a prime factor in green purchasing? 請問貴機構/閣下是否認為產品價錢是執行環保採購的重要因素之一?	Yes 會 No 不會
4.	Does your organization/do you willing to pay more for green products? 請問貴機構/閣下是否願意付出較高的價錢購買環保產品?	Yes 會 No 不會
5.	Does your organization/do you find it difficult to source environmentally preferable products? If so, what are the difficulties? 請問貴機構/閣下在採購環保產品時會否遇到困難？ 如有，是什麼困難？	Yes 有 Difficulties 困難 _____ _____ No 沒有
6.	Will your organization/you be interested in receiving one-stop assistance on green purchasing and information on environmental preferable product? 請問貴機構/閣下有沒有興趣收到有關環保採購的協助及環保產品的資訊？	Yes 有興趣 No 沒有興趣
7.	Will your organization/you consider practicing green purchasing if there is a comprehensive database of environmental preferable products? 如有一個比較完善資料庫，你認為會有利於貴機構//閣下進行環保採購嗎？	Yes 會 No 不會
8.	Does your organization/you consider the Government should take a stronger role on promoting green purchasing in Hong Kong? If yes, in what way? (Examples: offering tax concession) 請問貴機構/閣下認為政府應否更主動地推動香港的環保採購？ 如認為應該，政府又應該如何推動？（如：提供稅惠）	Yes 應該 Ways of promotion 推動方法 _____ _____ No 不應該

9.	Does your organization/do you think the Government should lead green purchasing? 政府需否率先執行環保採購？	Yes 應該 No 不應該
10.	(For Environmental Preferable Product Retailer/Supplier/Wholesaler/Manufacturer Only) What assistance does your organization consider useful in promoting environmental preferable products in Hong Kong? (只適合環保產品零售/供應/批發/製造商) 貴機構認為哪些行動可推廣環保產品？	Can select more than one item: 可選擇多項： Green products database for public access 供公眾瀏覽的環保產品資料庫 Opportunities to contact environmentally responsible organizations 提供機會接觸有環保採購的公司 Government to commit purchasing a certain percentage of environmentally preferable type 政府承諾購買環保產品 Others 其他 _____ _____

Are you representing an organization or an individual? 請問閣下的身份是代表私營機構或個人？	Individual 個人 ☐<20 years old 二十歲以下 ☐20 – 60 year old 二十至六十歲 ☐≥ 60 years old 六十歲以上 Organization 機構 ☐External trade 對外貿易 ☐Industrial production 工業生產 ☐Commerce 商業 ☐ Information Technology 資訊科技 ☐ Property & construction 物業及建築 ☐ Transport, communication & tourism 運輸、通訊、旅遊 ☐Education 教育 ☐Health 健康 ☐Social Welfare 社會福利
(For Organization Only) What is the number of staff employed under your organization? (只適私營機構) 請問貴機構擁有多少員工？	< 50 staff 五十位員工以下 50 – 100 staff members 五十至一百位員工 ≥ 100 staff 一百位員工以上

Appendix C: 2009 Green Purchasing Questionnaire

Company Name: _____

_____

Address: _____

_____

_____

Sector: · Accountancy · Architectural, surveying and planning
· Agriculture and fisheries
· Commercial · Education · Engineering
· Finance · Financial services
· Health services · Import and export · Industrial
· Informational technology · Insurance · Labour
· Legal · Medical · Real estate and construction
· Social welfare · Sports, performing arts, culture and publication · Textiles and garment
· Tourism · Transport · Wholesale and retail
· Other: _____

Number of Employees: _____ Website Address: _____

_____

Name of Respondent:_____ Job Title: _____

Tel: _____ Fax: _____ Email:

_____

If selected, are you willing to participate in a follow-up interview? · Yes · No

---

Does your company have a Green Purchasing (GP) policy, procedures and/or activities in place?

· Yes **(Complete this question and go to Q3)** · No **(Go to Q2)**

→ Policy: · Stand-alone · Component of a broader policy · Drafted

→ Procedures: · In practice · Documented · Under review

→ Activities: · On-going · Recently Implemented · Planned

Under which of the following circumstance(s), your company will consider practicing GP?

・ Government requirement
・ Tendering requirements of clients
・ Top management's commitment
・ Others_____

Which of the following has lead / could lead to your company practicing GP?

・ efforts / initiatives taken by other progressive Hong Kong companies (within or outside your sector)
・ efforts / initiatives taken by affiliated companies/divisions within your corporate organization
・ efforts / initiatives taken / expected to be taken by direct competitor(s)
・ international trends and efforts in general

Which of the following role(s) should the Government play in promoting, guiding and encouraging GP in the private sector (select as many as you wish):

・ "Lead by example"
・ Identification of 'green' commodities
・ Provision of training courses
・ Information dissemination
・ Recognition of achievements
・ Others _____

Which of the following(s) would you consider to be **major** deterrents to GP implementation?

・ Increases in expenditure without significant improvement in environmental performance
・ Difficulty in integrating GP policy into the company's existing policy
・ Insufficient in-house knowledge for identification of 'green' products / services
・ Inadequate market supply of 'green' products / services for comparison and selection
・ Inadequate guidance and / or training on GP implementation
・ Insufficient internal corporate incentive (in terms of financial allocation and formal and sustained commitment from top management)
・ Difficult socio-economic conditions at a local, regional, national or international level