Incorporating Conflict-Free Minerals into Sustainable Supply Chain Management

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Abstract

Title: Incorporating Conflict-Free Minerals into Sustainable Supply Chain Management

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Issue of Study: Sustainable supply chain management is increasingly viewed not as a cost, but as a profit-building and value-adding direction. Within this policy, a dichotomy of social and environmental goals is pursued, with economic sustainability providing a foundation. Minerals originating from within the Democratic Republic of Congo, a nation with a long history of sufferance, are being exploited by violent and lawless criminals. Filtering supply chains of these conflict minerals without damaging the economies of central Africa poses complicated challenges to stakeholders, raises transparency issues and questions the ethical sourcing resolve of companies who operate in the developed world.

Purpose: The purpose is to identify drivers and barriers and what possible influence companies downstream can have on incorporating conflict minerals into their supply chains. As a secondary development, Australian industry reaction to the Dodd-Frank Act and conflict minerals was also investigated.

Method: This thesis is constructed upon literature studies and empirical research. It is exploratory and comparative as well as qualitative in method by analysing several core case studies through primary interviewing and secondary data collection. Further industry experts were interviewed in an attempt to gain greater understanding of the complexities involved in incorporating supply chain sustainability into a highly decentralised supply chain. Network position was examined to identify the degree of influence of leading companies in pushing sustainable policies over stakeholders. Chain of control concepts including transparency and codes of conduct were also examined.

Conclusions: Network centrality is a significant determinate of influence over implementing multi-tier sustainability initiatives, with low centrality being a significant restraint on incorporating conflict minerals into SSCM. Australian industry being comprised mainly of peripheral actors with low centrality has reacted slowly in comparison to industry based in the US and Europe.

Keywords: SCM, sustainability, stakeholders, transparency, network position, corporate responsibility, responsible sourcing
Acronyms and Abbreviations

CFGS – Conflict-free Gold Standard
CoCS – Chain of Custody Standard
CFS – Conflict-free smelter
CSR – Corporate social responsibility
DRC – Democratic Republic of Congo
EICC – Electronic Industry Citizenship Coalition
ETI – Ethical Trading Institute
EMAS – Eco Management Auditing Scheme
ISO – International Organisation for Standards
NGO – Non-government Organisation
OECD – Organisation for Economic Co-operation and Development
OEM – Original Equipment Manufacturer
SEC – Securities and Exchange Commission
SME – Small and Medium-sized Enterprises
SSCM – Sustainable Supply Chain Management
TBL – Triple Bottom Line
3TG – Tin, Tungsten, Tantalum and Gold
WGC – World Gold Council
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1. Introduction

Incorporating conflict-free minerals into sustainable supply chain management (SSCM) is currently being attempted by a long list of companies involved in electronic supply chains. Establishing responsible sourcing in strategic planning, in combination with tracing materials back upstream, monitoring potential supply chain infiltration ‘weak points’ and cooperating with previously unheard of supply chain tiers and partners are providing considerable challenges. This paper attempts to address the issues of downstream companies’ ability to influence stakeholders and their partners by examining their position in their own sphere of influence as well as their overall supply chain by using theory connected to SSCM and network/stakeholder governance. As well, it highlights mechanisms which must be utilised when implementing SSCM. Finally, it assesses the Australian electronics industry reaction to conflict minerals in SSCM, again using network governance as a prime motivator.

1.1 Background

Businesses increasingly operate beyond national boundaries, sourcing, manufacturing, trading and moving their resources from country to country (Gereffi 2005). They act whereby the maximum amount of energy is directed towards enhancing shareholder value (Tencati and Zsolnai 2009). A simple assertion says that wherever the least amount of capital invested can produce the most amount of economic output, then this corresponds to the right place to do business. Global market conditions such as currency fluctuations, consumer demand, tariffs (or lack of), as well as favourable legal conditions, and local government support, provide the incentive for investment in areas remote from the consumers many businesses are seeking to satisfy. Operating in such distant locations allows businesses to operate according to different standards than those operating closer to the consumer. For business too, “outsourcing and subcontracting has resulted in a general loss of control over the stages of the production and distribution processes” (Vurro et al. 2010 p609). It is not always easy for both producers and consumers to be aware of what is happening in a factory or mine on the other side of the world.

SSCM has come to be identified with incorporating fundamental business practices with an increased awareness of the need to contribute positively to social, environmental areas that the business is involved with (Svensson 2009). SSCM is now a common tool for many businesses, with annual meetings and reports detailing activities that address potential risks to the communities and environments in which operations take place. Codes of conduct have become the baseline indicator of business attitudes to its social responsibility as well as providing a guide for concerned stakeholders. SSCM also provides competitive advantages, with consumers willing to pay more for ethically cleaner products (De Pelsmacker et al. 2005; Sammer and Wüstenhagen. 2006). Focal
groups or businesses, defined as those that govern supply chains, provide direct contact with customers and have the greatest influence on designing a product or service (Seuring and Muller 2008), face increased pressure to contribute to activities outside their traditional sphere of influence.

Given the complexities of modern day global sourcing and manufacturing, business has sought to address issues through sustainability management within their supply networks. Drivers of SSCM vary, and make up a complex network of stakeholders and their views on economic, environmental and social responsibilities of business (Elkington 1998). As well, the focal firms’ ability to influence stakeholders and drive their own policy varies depending on their relationship in the network. Sustainability issues affect different supply networks in different ways but are not necessarily mutually exclusive. Socially adverse consequences through acts such as primary resource consolidation, environmental degradation, population displacement, child labour, primary resource exploitation, whilst independent phenomena, often overlap and are frequently set in similar settings, if not identical places. SSCM seeks to avert the incorporation of such practices into supply chains at the same time as pursing economically sustainable enterprises.

A new risk to SSCM has emerged due to growing international abhorrence of gross human rights violations in the Democratic Republic of Congo (DRC). In the US, this risk is being confronted by legislators and is being extended to other developed economies in the world. Such legislation poses the challenge of eradication of support for these armed groups by removing their primary funding means. The consequence of this legislation means for business that they must delve deeper into their supply networks, communicate more with previously unknown suppliers, implement codes of conduct and increase audits all in an effort to increase transparency measures if they want to adhere to the law and further consolidate their SSCM strategies.

What are now commonly termed as conflict minerals or 3TG (tin, tungsten, tantalum and gold – see appendix for a better description), are becoming a serious challenge to the integrity of companies SSCM strategies. Conflict minerals raise the issue of ethical sourcing, as the conditions under which miners in the DRC must work, the climate of violence, rape and fear that local communities live under, in combination with precious environmental destruction by unregulated artisanal mining, all join together to pose formidable questions about whether companies that ultimately derive their products from materials coming from this area are really operating under a comprehensive SSCM strategy and whether such sourcing is in-fact counter to many businesses’ conduct codes. DRC livelihoods are extremely dependent on continuing mining operations, so there exists the added complication of potentially hurting the repressed communities economically, as well as the surrounding communities in non-conflict areas.

At the present stage of addressing conflict minerals in supply chains, the most important control points are located upstream, pre-smelter. A range of both government and civil society control initiatives and traceability schemes are underway to secure the supply chain. With Dodd-Frank
legislation potentially publicly tarnishing listed businesses’ reputations, downstream firms must adopt a proactive approach to securing post-smelter supply chains, as these are most within their sphere of influence. To detail both 3T and Gold supply chain control points, we can observe figures 1 and 2.

Figure 1 Generic 3T supply chain.
(Metals flows are black arrows; mineral flows and processes are shaded grey. Note that mineral concentrates typically enters the smelter from multiple mines; and crude metal may feed a refinery from multiple suppliers. [Young and Dias 2011 p5])

Figure 1 details a generic supply network path for the 3Ts, from mine to the original equipment manufacturer (OEM). Along the way negociants (who buy the ore from the miners) are exposed to extortion, disease and regularly opportunistic buyers (comptoirs) (Eichstaedt 2011). Comptoirs operate market depots where negociants come to sell their ore loads. These depots are little more
than big sheds where local, often ad hoc workers come to sort through the ore. Comptoirs are also often controlled by local gangs and authorities who exhumed taxes on them. Here the ore is crushed and minerals extracted and made ready for export either to surrounding countries (often smuggled illegally) or to international destinations (Yager, 2011). Minerals coming to the comptoir will come from many different mines and there are currently few enforceable checks as to the origin. This is a critical stage needing transparency and accountability. Minerals from conflict mines may be mixed in with other legitimate minerals and then moved illegally out of conflict zones within the DRC and into clean supply chains in neighbouring countries.

Figure 2 Gold supply chain
(Adapted from Responsible Jewellery Council. 2011)

Within the gold supply chain, there are several points of entry for gold of unknown origins. From mine to smelter, it is possible to mix ore taken from other mines into ore supplies originating from the principal mine (WGC. 2011), similar to the 3Ts. Transport between the smelter and refinery stage represents another high risk point due to less regulation in some parts of the world (ibid). Beyond the transporters to the refinery, approximately 41% of gold entering the supply chain at this stage is recycled and thus near impossible to trace.

SSCM requires identifying what are the challenges to implementing businesses’ code of conduct to conflict minerals in the supply network and how to balance these challenges with economic ones. These challenges must be identified at all stages in the supply network, from mine, to smelter, to component manufacturer, to end consumer. SSCM requires addressing these challenges in a manner which reflects all stakeholders’ interests, whilst continuing the economic growth of the business.
2. Problem

The Democratic Republic of Congo (DRC) and its people have been victim to unimaginable atrocities. Referred to by some as the rape capital of the world (Wallström 2010), the citizenry of the DRC have suffered extraordinary brutality. Following decades of dictatorship, in 1998 war enveloped the DRC drawing in nine African countries in Africa’s biggest interstate modern war which officially ended in 2003, though the killing did not. (Titeca et al. 2011). A lacking in rule of law and the seemingly impunity for perpetrators of crimes (Eichstaedt 2011) has left millions dead, terrified and suffering at the hands of brutal militia groups which seek to profit from the nations mineral trade.

In 2010, the Obama administration signed in The Dodd-Frank Wall Street Reform and Consumer Protection Act legislation which was intended to reform the operation and regulation of US financial markets (Crook. 2010). An amended section (1502) of the act, commonly known as the Dodd-Frank Act, seeks to put pressure on companies reporting to the SEC to determine where their suppliers source their raw materials from, be that from the DRC or neighbouring countries (see figure 3) (Drimmer and Phillips. 2010). This section requires that due diligence should be taken by publicly listed businesses to provide both self and independent audits of their supply chains and ensure that armed groups are not being indirectly funded by the conflict minerals (Dodd-Frank 2010). In 2008, it is estimated that these groups made about $185 million (Gorski. 2010; Lezhnev. 2010).

Figure 3 Map of affected areas due to Dodd-Frank Act (KPMG. 2011)
This legislation, planned for 2012, has lead industry at many different levels in the supply chain, to be proactive and work towards identify their supply chain weaknesses (EICC Resolve. 2010). In the face of this legislation, various commentators have been critical of practical implementation possibilities of this legislation and whether it will be counter beneficial to the wider citizenry of DRC. The costs of transparency are expected to be high to industry, with estimates between $71.2 million and between $9-16 billion (Bayer 2011). It is also possible local mining communities will continue to suffer under militia rule, as even if international companies are able to overcome the difficult task of accountable traceability, black market supply chains may continue to feed growing demand for inexpensive resources. Tackling the problems of conflict minerals are complex, and magnified by the many different actors involved. Action is needed and these challenges present “a real-time case study of corporate social responsibility on the front line” (Hayes and Burge. 2003. p13).

The supply chain of these conflict minerals is compromised by mines that operate under illegal conditions and the seemingly easy ability to move these conflict minerals into bona fide clean supply chains. Gold is especially easy due to its high value and easy to smuggle nature. Within DRC the conflict mines are in fact limited to a comparatively small areas known as north and south Kivu, which borders Tanzania, Burundi, Rwanda and Uganda (see figure 4). Such an area has caused immense suffering however. The Dodd-Frank legislation also identifies countries surrounding DRC as pathways for the conflict minerals and thus neighbouring countries also face defacto embargoes unless supply chain security can be satisfied. Such an embargo in combination with the Dodd-Frank legislation, threatens the livelihood of those living in both conflict and non-conflict zones.

Figure 4 Conflict mineral origins – North and South Kivu
(Clottey. 2011)

To comply with Dodd-Frank, publicly listed companies in the US that purchase metals are legally required to carry out due diligence over the source of the metals and then establish some form of
chain of custody over them (Hazen, C. 2011). The Dodd-Frank Act therefore represents a significant challenge to supply chain transparency that has not been required of it before, drawing into its line-of-view many indirect suppliers. Such corporate social responsibility (CSR) is neither restricted to the US, with Australia (DFAT. 2010), the EU (EU Parliament. 2010) and Canada (HoP. 2010) all either implementing or having discussed to some degree the adoption of similar requirements. Legislation like this, while an initial driver towards incorporating conflict free minerals into SSCM, is yet to be clearly laid out in government guidelines. Delays causing ambiguity over the final guidelines proposed by the SEC, companies must now first act independently and assess the merit of how pursuing such policy fits with their SSCM programs. This means balancing economic considerations with a range of others including CSR responsibilities, corporate image and supplier management to name a few.
3. Purpose

The purpose of this thesis is exploratory in nature and seeks to contribute to network theory in combination with SSCM. Conflict minerals in supply chains has only recently begun to be addressed by governments and private businesses and subsequently there is very little academic consideration on this topic prior to this paper. The thesis has been designed to assess the drivers and subsequent challenges that conflict minerals present to downstream SSCM in light of the Dodd-Frank due diligence requirements. Therefore the research questions will be discussed as follows:

1. **What challenges do exemplar downstream electronic companies encounter when incorporating conflict-free minerals into their sustainable supply chain management practices?**
2. **What has been the Australian business industries reaction to conflict minerals?**

To accomplish the objectives set out by the author, supply chain sustainability theory will be analysed with particular attention paid to the Triple Bottom Line (TBL) and stakeholder involvement. From this analysis, we will move to focus on how the position of the firm in the supply chain affects their ability to influence SSCM. Business structures including codes of conduct, auditing will also contribute to our understanding of the issue and in answering the above questions.

It was considered that other industries such as diamonds, cocoa, coffee, tea, timber and palm oil may provide a guiding lead in proceeding with this paper, and indeed theoretical contributions to these fields were analysed and considered. The context of conflict minerals proves to incorporate aspects of each and all of these industries to some degree, however the decision not to write this paper based on the experiences of responsible sourcing in these other industries was made due to the lack of current material solely focused on conflict minerals, as well due to the post-processed complexity of metals supply chains and the fact that electronic supply chains represent neither luxury or substitutable items, but components critical to the operations and life as we now know it on Earth.

There are definitely lessons to be learned and applied from other responsibly sourced industries, but this paper should be viewed as a first step in academic material aimed at understanding the responsible sourcing of conflict-free minerals and their implementation into supply chains.
4. Methodology

The following chapter will detail the choice of methodology carried out in this study. Due to the recent emergence of conflict minerals as a source of insecurity to sustainability, there has been little research undertaken on conflict minerals in an academic environment. Thus this provides an opportunity to better understand, describe and analyse conflict minerals in the supply chain and the structures of governance that can better incorporate conflict free minerals into SSCM, in the wake of the Dodd-Frank Act.

4.1 Qualitative research

Typically there are two dominant methods for carrying out research, inductive and deductive. In assisting with carrying out these research methods, either qualitative or quantitative studies can be utilised. Whilst both inductive and deductive methods can be applied to both qualitative and quantitative, generally there is an alignment which favours one type of study to a particular method. Usually quantitative research will be deductive, whereby a theory will be established, tested and finally corroborated or abandoned depending on the outcome of the research (Kovács 2005). Quantitative research frequently involves the analysis of data through focusing on numbers and weighted responses. It will often seek to focus on relationships between a dependent variable and an independent variable in an effort to test a hypothesis (Strauss and Corbin 1998).

Qualitative research tends to be more inductive and seeks to identify the ‘how’ and ‘why’ of the issue through analysing peoples’ personal experiences and understandings. Qualitative data collection methods include, but are not limited to interviews, questionnaires, observation of field work, journal keeping, case studies, researchers impressions and the observed’s reactions (Frankel et al 2005). Figure 5 shows a comparison between purely inductive and deductive research methods.
Qualitative research has been determined to be the most appropriate form of research given the ambiguity of conflict minerals to contemporary research, as the analysis of such qualitative data lends itself to the discovery of new concepts, relationships and research (Strauss and Corbin 1998). Carter and Rogers (2008) also support the notion of limited research into SSCM in general by highlighting the standalone nature that the environment, safety, and human rights issues have previously taken, and which have only recently started to be treated as interrelated relationships. Stern (1980) further supports the notion that qualitative methods can be used to explore areas about which little is known or understood in which to gain novel understanding.

This thesis will seek to be both descriptive and exploratory in design. Krishnaswami and Satyaprasad describe exploratory research as being “similar to a doctor’s initial investigation of a patient suffering from an unfamiliar malady for getting some clues for identifying it” (Krishnaswami and Satyaprasad 2010. p12). The reason for this duel approach is based on the limited academic research undertaken on conflict minerals and assessing the possibilities and challenges associated with incorporating conflict minerals into SSCM. The thesis can also be described as inductive in nature. Existing theoretical knowledge was first considered, and based on observations through empirical research, conclusions were able to be formed which extended the main theory analysed, mainly stakeholder and network position.
4.2 Literature Review

Knowledge about conflict minerals in the supply chain was limited to begin with, so a broad range of literature was first looked at. Keyword searches were conducted via the Jönköping University Library website and in particular Google Scholar. Search terms included ‘conflict minerals’, ‘DRC’, ‘supply chain’, ‘traceability’ and ‘sustainability’. Few matches were returned under ‘conflict minerals’ and so the search was broadened to include ‘diamonds’, ‘timber’, ‘coffee’ and ‘cocoa’ in connection with ‘sustainable’ and ‘csr’. Bibliography citations were sourced and provided new literature avenues.

Through consideration of the literature, it became quickly apparent that many theoretical angles could be analysed in relation to conflict minerals, meaning the method of this thesis was also iterative and that new material was constantly found which would lead onto other related topics. The literature review soon began to encompass a very broad range of disciplines, which if jointly researched would dilute the thesis and negatively affect its relevancy, and so decisions were made to limit the use of theory to only those most consequential. From the literature analysis, it was possible to identify how conflict minerals could be incorporated into SSCM. Stakeholder theory and network collaboration were considered to be critical elements of influence on SSCM. Traceability, codes of conduct and auditability were seen as tools that can be used to facilitate SSCM.

4.3 Empirical research

Background work in learning about conflict minerals was initially conducted through informal interviews and discussions with industry experts and those responsible for SSCM. It was identified that many different stakeholders are involved in the conflict mineral supply chain and more still influence corporate SSCM. Following the path from point-of-origin to point-of-consumption, four general industry areas were identified. Although a drastically simplified supply chain; raw minerals, component manufactures, OEMs and retailers were identified as stakeholders with direct control over minerals and metals in their supply chains. A case study was originally considered as a method of carrying out research, as they are useful when investigating “a contemporary phenomenon with its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin. 1994. p13).

Originally ten companies from each industry sector (raw minerals, component manufactures, OEMs and retailers) was considered a realistic number to interview and obtain data from and this formed the original pursuit. Companies that were members of the Electronic Industry Citizenship Coalition (EICC) were considered ideal candidates as they have displayed proactive attitudes to the problem of conflict minerals. It was planned to draw multiple case studies based on primary
materials and cooperation with these businesses from each industry. A simplified point of origin through to point of consumption analysis was initially considered, however the reality of an extremely low manufacturing base (electronic manufacturing not even designated a category in recent surveys of Australian manufacturing (MSA 2011) and the comparatively small market (the Australian population numbering a little over 22,755,600 million people. ABS. 2011) meant a rethink was necessary. Once companies in these industries were identified, emails were sent to each to gauge interest in the idea of both focus groups and further independent cooperation and participation in addressing SSCM and conflict minerals. Follow-up phone calls to one or multiple contacts were made. Unfortunately both positive email and phone response rates were very low. Most emails were either ignored or the author was informed via email and phone that this topic was an internal affair and they were unable to communicate their policies with members of the general public. Lamming (2004) describes this situation as a ‘black box’ whereby a company’s inner workings are not revealed to customers. Nevertheless, after persistent efforts, three initial actors were found willing to cooperate and share some in-depth business practices and policies regarding SSCM and conflict minerals.

The main form of electronic businesses operating in Australia were quickly identified as consisting of group buyers, wholesale distributors and point-of-consumption retailers. In terms of selecting point-of-consumption nodes to conduct data research with, the largest Australian-based international retailers and distributors were approached first. These are all fairly widely known and recognised in the Australian marketplace and society. They represent different supply chains that may or may not converge at the point of consumption, but still provide somewhat of a generic model of supply chains that may potentially consist of conflict minerals. As a benchmark, sustainable best-practice international retailer Tesco was analysed and used as a comparison case against Australian-based point of consumption companies.

To gather a better picture of the overall response by electronic importers in Australia, small and medium sized enterprises (SEMs) operating with international suppliers were also contacted. Research data significantly improved, but that data revealed a general across the board ignorance of the Dodd-Frank Act, the possibility of similar legislation in Australia and indeed the general topic of conflict minerals. Anonymity was offered to all participants who joined the study as there seemed to be a culture of fear or reluctance to implicate suppliers as possibly having conflict minerals in their supply chain. Anonymity seemed the only method to gain honest and reliable data about such an ethically and competitively sensitive topic.

To increase the chance of obtaining more relevant data, in total 40 businesses were surveyed based on secondary sources such as codes of conduct, sustainability reports, peer reviewed journals and public website information. Some employees of these businesses agreed to discuss SSCM and conflict minerals, however this was largely based on anonymity.
As well, interviews with industry experts, groups and some government departments were undertaken in an effort to add legitimacy to the study. Conducted in similar fashion to those with business employees, these were semi-structured, verbatim-oriented questions. Interviewing was seen as the most appropriate form of data collection due to it being the most useful and direct method (Yeung 1995). Qualitative personal interviews offer greater accuracy and validity because they allow for strategy, history and circumstances to be more thoroughly considered, unlike many quantitative technics which standardise and simplify complex realities (Schoenberger 1991; Yeung 1995). The complexity of supplier network structure in tracing conflict minerals being as vast and deep as it is, means that qualitative interviews can best provide a real understanding of the factors that affect incorporating conflict-free minerals into SSCM.

4.4 Outline

The thesis is separated into eight chapters as shown in the diagram below (figure 6). The first chapter introduces the topics at hand and provides a background on the minerals later discussed. Chapter two is a more detailed account of the problem the thesis is discussing. Chapter three states the purpose of the thesis and research questions that will be addressed. The fourth chapter details the methodology of the thesis, followed by the fifth chapter which contains the frame of reference. Empirical research is conducted in the sixth chapter. An analysis and conclusion round up the study in chapters seven and eight.

4.5 Validity and Reliability

Validity and reliability are important factors in proving the merit of a research paper. Those with high validity and reliability allow for easy replication for confirmation and verification of results.
Joppe defines reliability as “the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable” (Joppe. 2006. p1). He further explains that validity “determines whether the research truly measures that which it was intended to measure or how truthful the research results are” (ibid. p1). Table 1 details the actions which can strengthen the validity and reliability:

<table>
<thead>
<tr>
<th>Validity</th>
<th>Reliability</th>
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<tbody>
<tr>
<td>-Research triangulation and comparison with other theories</td>
<td>-Multiple listenings of recorded audio/video tapes and documented transcripts</td>
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<tr>
<td>-Multiple case studies</td>
<td>-Clearly cited sources</td>
</tr>
<tr>
<td>-Extensive field note transcriptions</td>
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<td>-Archival data</td>
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<td>-Independent checks/multiple researchers</td>
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<td>-Revisiting those studied and interviewed</td>
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Table 1 Validity and Reliability table
(Adapted from Ratcliff.2010)

In an effort to satisfy the criteria of validity, the author set out to interview and study a large number of subjects using a combination of primary and secondary sources. Whilst in the three major case studies, primary sources were found and utilised, this data was largely gathered through anonymous interviews and confidential internal documents. This unfortunately poses as a significant delimitation in the thesis paper, as it reduces the reliability of case studies, but information was difficult to gather without such consideration. In an effort to counter the lack of clearly cited individuals involved in case studies, and also to support the notion of an industry wide ‘closed policy’ on conflict minerals, the number of businesses analysed via secondary sources was increased until a clear pattern of redundancy had emerged. In addition, industry experts were also consulted in an effort to better understand and analyse the nature of incorporating conflict minerals into SSCM.

A further delimitation of the paper is that it is written with SEC guidelines still to be clearly determined. The effect of this means that many companies are hesitant on implementing conflict-free mineral auditing processes into their supply chain due to anticipated high costs associated with implementing and auditing. While OECD guidelines in combination with CFS provide the preferred voluntary means of eliminating conflict minerals in supply chains, without clear SEC regulations, uncertainty of the extent companies must go to fulfil these requirements, limits progress towards fully incorporating conflict-free minerals into SSCM.
5. Frame of Reference

The literature review was a narrative review in order to gain a better understanding of the topic. Narrative reviews are conducted when one is attempting to link together many studies on different topics in an effort to contribute to theory building (Baumeister and Leary. 1997).

The integration of this literature review with the research questions has been delayed until after some of the empirical research was carried out. This was because the study was firstly iterative and then approached from the perspective that the literature review should be conducted with an open mind, from which better understanding and conclusions could be drawn for answering the research questions and contribute to SSCM theory (ibid).

What follows is a general literature review of supply chain management (SCM) and SSCM which provide a grounding to the empirical research. Stakeholder theory and network position follow which highlight the degree of influence actors in the supply chain have on the focal firm. Finally traceability and auditing are researched as this provides a framework for understanding how conflict-free minerals can be incorporated into SSCM.

5.1 Supply Chain Management

Standard definitions of SCM include describing it as “... an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user” (Cooper et al. 1997) and “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer” (Mentzer et al. 2001 p4). However the term supply chain management somewhat understates or minimises the complexity of the actual task at hand. Chains are linear and describe a relationship that can clearly identify the life cycle stages of a product throughout the chain. Such a description of a business’ supplier structure simplifies the relationships that contribute to bringing a product, usually once a raw material, to a final product which may be utilised by the end consumer. Due to the general usage of the term supply chain management, we will continue to employ it, however given the nature of complex supplier relationship structures, we suggest that instead supply network management be thought of when referencing the term SCM. Such recognition highlights the diverse and fragmented environment in which businesses operate in. Today’s globalised environment entails information and products flowing between sophisticated webs of networks that link organisations, industries and economies (Christopher and Peck 2004). This consideration
is most appropriate when discussing the supply network from which minerals sourced from the DRC are a part of.

SCM has “become such a ‘hot topic’ that it is difficult to pick up a periodical on manufacturing, distribution, marketing, customer management, or transportation without seeing an article about SCM or SCM-related topics” (Mentzer et al. 2001 p2). This is largely due to the fact that many industries and their related products and services which service the world, now operate in a transboundary environments. Competition between companies now extends to competition between supply chains, as the ability to respond quickly to market demands often requires intermediaries to exhibit efficient and flexible practices. Competition has led supplier management to move from adversarial to long-term strategic partnerships (Daugherty 2011; Whipple and Frankel 2000). Material control and flow, complicated by trans-national movement must be organised from within the supply chain in as fluid way as possible to offset factors which cannot be controlled. Those with highly coordinated supply chains may benefit in terms of bringing goods faster to market, without defaults and more to customer satisfaction and desire. Such outcomes are therefore highly dependent on supplier-buyer relationships and communication.

Gereffi (1998) differentiates between supply chains as being producer and buyer-driven. Producer-driven supply chains are generally capital and technology intensive where usually transnational manufacturers coordinate production networks from a central position (ibid). The automobile, aircraft and heavy machinery industries are typical examples of producer-driven supply chains. Buyer-driven supply chains are labour intensive, consumer goods industries where decentralised networks are managed by retailers, marketers and branded manufacturers (ibid). As such, many conflict mineral products fall into both chains, though through their primary use in electronics, they fit more in the latter supply chain.

In traditional SCM, relationships between partners are seen as being adversarial in nature, with short-term contracts leading to conflicting interests as opposite sides look to maximise individual profit. Its characteristics advocate minimizing dependence on suppliers and maximising bargaining power. (Dyer. 1996; Martin. 2011) Such relationships see price, quality and delivery as the key to SCM efficiency, but do not encompass all the other factors that need to be considered in long-term partnerships (Spekman 1988; Martin 2011). Beyond these basic factors, other requirements have pressed forth that are less traditional in nature. Factors such as transparency, reputation, after-sales, technology, geography, corporate social responsibility and ethical sourcing now play a leading role in engaging with global suppliers (Spekman. 1998) These factors and others, when in alignment with stakeholder’s interests, present a valuable basis for a successful supply chain.

5.2 Sustainable Supply Chain Management

case for socially responsible supply chains, with the number one driver for companies being perceived as a ‘thought-leader’ for green/sustainable practices (ibid). Consumers too are increasing their demands for corporate responsibility through more green, transparent and ethically responsible supply chains (Smith 1990; Valor 2005). Such demand have “resulted in both negative publicity and earnings impact for firms such as Nike for its overseas production facilities, Conoco and its oil production in Burma and Texaco, Denny’s and Coca-Cola for their discrimination litigation” (Carter and Jennings. 2002. p145). Disney, Levi Strauss, Benetton and Adidas have are amongst other high profile companies to receive unwanted attention for inhumane working condition and the pollution of their local working environments (Seuring and Müller. 2008) More recently Apple has seen significant public backlash over the working conditions of one of its major component manufactures, Foxconn, with a spate of worker suicides in 2010 due to factory and working conditions (Barboza and Tabuchi. 2010). Corporate social responsibility (CSR) has now become a strategic objective which is often employed under the auspices of sustainable supply chain management.

One of the most widely cited definitions of sustainability is that of the Brundtland Commission which states, “development that meets the needs of the present without compromising the ability of future generations to meet their needs” (WCED. 1987.p8) Within this definition lie other issues including understanding the environmental impact of economic activity in both the developed and developing world, basic human rights are attained, ensuring worldwide food security and the conservation of non-renewable resources (Erlich and Erlich. 1991; Whiteman and Cooper. 2000; Lal et al. 2002; Savitz and Weber. 2006; Carter and Rogers. 2008).

These days the word “sustainability” has become something of a catch phrase, often being interchanged with the word “environment”, both by managers and researchers (Carter and Easton. 2011). Sustainability has often been considered from a purely ecological perspective, without consideration of the broad social aspects of sustainability. However Carter and Rogers (2008) do make note of engineering literature, surprisingly broad in definition and explicitly incorporating equal weighing for economic stability, ecological compatibility and social equilibrium (Gónicz et al. 2007). That said, sustainability in supply chain management still lacks long term research and thus the term sustainability is often focused on the environmental dimension, frequently neglecting the social element (Seuring and Müller. 2008).

The question has arisen however, to what degree does a business pursue sustainable practices in what is usually not their core responsibility. As well, does this type of social responsibility and investment undermine the purpose of what the business is actually intended to do, that is, to make money. Milton Friedman (1962) sparked debate when he argued that “few trends could so thoroughly undermine the very foundations of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible” (Carroll 1979 p497). This type of argument was quickly countered by Joseph McGuire (1963) where he posited that whilst economic concerns are the firm’s primary responsibility, social
responsibility goes beyond merely economic and legal obligations into responsibilities to society itself.

These social responsibilities in turn can lead to more business creation and economic longevity for those employing them, though measuring and analysing such strategy can be difficult to measure. That said, the competitive advantage that comes with developing closer and longer lasting relationships with stakeholders, reduced risk management, improved employee morale and customer goodwill can provide a significant incentive for following or establishing a sustainable supply chain (Carter and Jennings. 2002). Conversely, firms that are less socially responsible may derive some form of advantage due to the lower expenses from not implementing sustainable supply chain measures (Ullman 1985; Walley and Whitehead 1994; Carter and Jennings. 2002).

In an effort to narrow down the debate of what constitutes corporate social responsibility, Carroll (1979, 1991) introduced four hierarchically related duties:

**Economic Responsibilities** – to transact business and provide needed products and services in a market economy;

**Legal Responsibilities** – to obey laws which represent a form of codified ethics;

**Ethical Responsibilities** – to transact business in a manner expect and viewed by society as being fair and reasonable, even though not legally required; and

**Voluntary/Discretionary** – to conduct activities which are more “guided by business’s discretion” than actual responsibility or expectation. Figure 7 exhibits the hierarchical nature of these four levels of corporate social responsibility.
Whilst Carroll laid out the principles of CSR and his interpretation of business role towards them, we have seen a reorientation in general thought. Carroll’s CSR model of standalone supply chain management activities has been placed “within the context of discretionary activities and thus social responsibilities” (Carter and Easton 2011). What were once hierarchical and separate responsibilities, are now viewed as highly interconnected and equally crucial in facilitating the path towards overall corporate sustainability and what is increasingly referred to as the triple bottom line (TBL) – economic, social and environmental convergence (Elkington 1998).

Elkington’s (1998) TBL has been designed to “identify those activities which improve economic performance and dictate the avoidance of social and environmental activities which fall outside of this intersection” (Carter and Easton 2011). Carter and Rogers (2008) identify four supporting facilitators of SSCM (Carter and Easton 2011 p49). See figure 8.

-Strategy, which holistically and purposefully identifies individual SSCM initiatives which align with and support the organization’s overall sustainability strategy;

-Risk management including contingency planning for both the upstream and the downstream supply chain;
An organizational culture which is deeply ingrained and encompasses organizational citizenship, and which includes high ethical standards and expectations (a building block for SSCM) along with a respect for society (both within and outside of the organisation) and the natural environment; and

- Transparency in terms of proactively engaging and communicating with key stakeholders and having traceability and visibility into upstream and downstream supply chain operations.

Through the pursuit of balanced sustainability, firms capable of combining all three of the dimensions of the TBL will be able to deduct competitive advantage and will outperform other firms only able to maximize economic performance or the social/environmental dimensions who neglect consideration for economic performance (Carter and Rogers. 2008). Florida (1996) similarly supports the view, highlighting that firms practicing innovative and cost-effective enterprises, are also dominant leaders too in sustainability. Further, the pursuit of equally bounded goals will enhance reputation, which makes firms more attractive to a variety of stakeholders, necessary for sustainable economic performance. The concept of sustainability and “the key interfaces that sustainability has with supply chain management, strongly suggests that sustainability is instead a license to do business in the twenty-first century” (Carter and Easton. 2011). With these factors in mind, we will adopt Seuring and Müller (2008) definition of SSCM as
“The management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements” (Seuring and Müller. 2008. p1700).

Stakeholder influence is a key factor in SSCM. Stakeholder pressures requiring the satisfaction of the dimensions of economic, environmental and social performance management are being incorporated into collaborated decision making behaviour. “The potential benefits of combining the integration of social and environmental concerns into the supply chain (Carter. 2000; Carter and Jennings. 2002; Vurro. 2010) with governance models based on collaboration have started to become evident, as a form of social control pressuring participants into seeking multilateral benefits at the network level instead of unilateral benefits at the firm level” (Gereffi et al. 2005; Jiang. 2009; Vurro. 2010 p608). This represents a recognition among stakeholders of their combined pressure power and for business this means more opportunity to try and direct their stakeholder’s interests. Ultimately SSCM seeks to ensure all members of the network “not only stay in business, but that they do so in a manner that allows them to thrive, reinvest, innovate and grow” (Pagell and Wu. 2009), which in turn can strengthen their commitment to social and environment dimensions.

5.3 Stakeholder Influence over the Supply Chain Network

As companies diversify their supply lines, global fragmentation of industry and manufacturing has removed traditional boundaries of control as an increased number of stakeholders are influencing decision making from both internal and external perspectives. Stakeholders have become a constant source of pressure in all organizational life and cannot be discounted in any organizational system (Rowley 1997). Stakeholder theory is based on a traditional input-output model of managerial capitalism where different groups including customers, governments, NGO’s, management, buyers, sellers, communities and competitors all have a stake in how the business is run (Johansson and Sterner 2011). Freeman (1984) notably integrated the stakeholder concept into strategic management theory by defining stakeholders (figure 9), as “an individual or group of interested actors who can affect change or is affected by the achievement of an organisation’s objectives” (Freeman 1984 p25). Such a definition “still provides the core boundaries of what is at stake” (Rowley 1997 p889). Identification of who has more power and influence (Carroll 1993) or who is a risk-bearer by having some form of capital at stake (Clarkson 1995) are further proponents for affecting an organisation’s objectives and seem valid stakeholders. Defining who a firm’s stakeholders are and what type of influence they exert is an important step in dealing with the stakeholder issue.
Wide ranges of interests can be reflected by the diversity of stakeholders. These multiple and interdependent interactions occur simultaneously in the stakeholder environment and this must be considered when organisations are responding to stakeholder pressures (Rowley 1997). Given this diversity, and the relative weight carried by stakeholders, it is rare that all interests can be satisfied at any one time. “Business must therefore recognise that successful management strategies are those that integrate the interests of all stakeholders, rather than maximise the position of one group within limitations provided by the others” (Freeman 2001). Stakeholder engagement can enable a company to reach consensus among stakeholders which reinforces the business “license to operate” (Kern et al. 2007), strengthen and consolidate sustainable relationships, that is, social capital (Maak, 2007), lower transaction costs (Rigling Gallagher and Gallagher 2007), generate competitive advantage through reputation and trust based linkages (Freeman et al. 2007) and design and implement more socially cohesive, environmental conscious, value-added results (Brugmann and Prahalad. 2007; Post et al. 2002;Tencati and Zsolnai. 2008).

Inspired by Freeman’s earlier research on stakeholder theory, Rowley (1997) explains that companies do not respond to stakeholders individually or dyadically, but rather they respond to all the multiple influences and pressures of the stakeholders as a set. Rowley goes on to define the position of the business in the supply network as being the determinant in how a business will respond to specific pressures. The focal business may not necessarily be at the centre of the chain and this along with the network density of the network will determine its response.
Density characterises the whole network and is a measure of the number of relative ties that link together actors within the network (Rowley. 1997). Rowley explains that as the number of ties between businesses grows (density), communication between these stakeholders will improve. This can be connected with Jones et al. (1997) view on network governance being composed of autonomous firms that can influence similar competitors with their own self-interests so as to combine to act as a single entity to push their agenda. This is partly due to what Rowley (1997) further describes as mimicry within a high density network, whereby in an effort to appear as legitimate stakeholders, replication of each other’s business practices will occur. Such mimicry and high levels of communication encourages these businesses to take aligned positions as stakeholders and to form coalitions (ibid). Coalitions are able to better apply pressure to the focal business. Conversely, networks that are low in density will have less communication and thus form less of an influential stakeholder.

Centrality of the focal firm is synonymous with control of information flow and subsequently power distribution. Rowley (1997) explains centrality “is each supply chain actor’s position relative to others in the network, with greater centrality corresponding to a more prominent intermediary position within the network (Vurro. 2010 p612). Thus centrality can be reflective of the degree of power and influence the focal firm has on the network. Those with greater centrality have increased communication with others in the network. Therefore they can determine what information goes where. “Accordingly, for a central actor interested in implementing sustainability, it becomes easier to both resist adaption requests from others and to impose its own interpretation of sustainability and how it must translate it into practice” (Vurro. 2010 p612). Thus, “the stakeholder network is a source of power for both stakeholders and the focal firm” (Rowley. 1997 p900).

Vurro et al. (2010) build upon Rowley’s concept of predictive indicators of governance based on position within the supply network and his research that suggests that multiple stakeholders are key influencers of business behaviour as opposed to dyadic relationships. The emergence of collaborative practices and integration between stakeholders (Lee. 2005), recognising that the supply chain is not linear (Bovel and Martha. 2000) and the efficiency and flexibility that come from interacting and collaborating with multiple stakeholders (Wathne and Heide. 2004) is supportive of such a network perspective.
The degree of centrality of the focal firm within the network, together with the density of the network and their respective influence over power distribution (centrality) and interconnectedness (density) play a focal role in determining stakeholder influence over SSCM (Vurro et al. 2010). Such a description of the network produce four forms of governance as shown above in figure 10 (ibid).

A transactional sustainable supply chain governance (SSCG) model is reach when both density and centrality are low. This means the focal organisations will lack influence within the network and connections between nodes are low (Vurro et al. 2010). Such a situation can result in members that have committed SSCM programs, being ignored or going unnoticed (ibid). As well, due to isolation some businesses may pursue opportunistic or deceitful behaviours and as a consequence short-term, arm’s length relationships will prevail (ibid). Such a model “would potentially turn into a generalized worsening of aggregate social and environmental conditions” (ibid p613).

A dictatorial style of SSCG takes place when density is low, meaning disconnect between stakeholders, but the centrality of focal firm is relatively high. The high centrality means that the focal firm is able to “resist pressures from others to conform to sustainability expectations or impose self-centred practices, norms, or behaviours that reflect its own interpretation of what sustainability should mean” (Jacobs. 1974; Neville and Menguc. 2006; Vurro et al. 2010 p614). The focal business can thus guide their own agenda and standards, both upstream and downstream (Vurro et al. 2010). Dictatorial models are vulnerable to disconnected nodes, which may be mobilized by NGO’s or consumer watchdogs and thus must have the power and resources to maintain upstream and downstream control (ibid).

Acquiescent models of SSCG are characterized by well-interconnected nodes, facilitated by high levels of information flow coming from high network density (Vurro et al. 2010). This type of model encourages peripheral businesses to comply with network norms, often under the direction of more powerful businesses at the upstream end of the network (ibid). Adequate resources for peripheral actors are necessary for implementing sustainability, else actors without resources will
conceal irresponsible practices and will be eventually forced out of the network (Jiang. 2009; van Tulder et al. 2009; Vurro et al. 2010). Therefore influence over suppliers is weakened due to a lack of centrality within the overall network.

A participative model of SSCG benefits from information gatekeeping associated with the centrality of the business, while at the same time being both influenced and influencing its high density network of partners (Vurro et al. 2010). Such a governance structure facilitates collaboration, joint initiatives and more open and rewarding communication (ibid). Long-term, TBL pursuant policies will be handled by what Rowley (1997) defines as compromisers, who will engage in multi-stakeholder collaborations such as 3rd party certifications, environmental management schemes, knowledge sharing and competence enhancing compliance in order to achieve sustainability in the network (Vurro et al. 2010). Flexibility and understanding of various stakeholders’ interests are key to applying this type of governance.

5.4 Traceability

Traceability is given a broad definition by ISO 9000:2000 standard which states that traceability is: The ability to trace the history, application or location of that which is under consideration (ISO 8402:1994). Traceability can further be defined as the “ability to identify and verify the components and chronology of events at all stages of a process chain” (Skilton and Robinson. 2009 p40). Folinas et al. (2006) divide traceability into logistical traceability and qualitative traceability, with the former following the physical movement of the commodity and the latter being associated with preserving information, for example “about whether an aircraft part comes from a particular ingot that received a particular heat treatment” (Skilton and Robinson. 2009 p41).

Traceability is crucial to being able to identify, influence and control a component and its make-up in the supply network. Obligations to a wide variety of stakeholders necessitate traceability which provides evidence that regulations or requirements are being adhered to. Security issues, in respect to either health and safety or sensitivities to information spread, also demand traceability. It has the potential to also foster better quality management through communication, as well as building trust. Traceability becomes increasingly difficult however, as the network deepens and focal firms must trace through multiple supplier tiers. This is especially the case when suppliers have patented technology or other confidential information which if disclosed, may run counter to their business interests. Global sourcing too, so common these days, complicates traceability as the actors involved vary widely, both in terms of distance (and thus handling) and in terms of culture, economy, administrative and geographic factors (Roth. 2007).

Traceability strategies can mitigate against problems such as high recall costs, tarnished brand names and generally increase the security of a product (Thakur et al. 2010). In obtaining traceability, resilient and accurate data capture points are necessary in the supply chain. Figure 11
details a simplified traceability process capturing internal and external data collection points. Information flow accompanies material flow as it progresses in the supply chain.

“Identification and data capture technologies used will vary depending on the production process, product properties, technology maturity in the company” (Senneset et al. 2007 p808). Traceability schemes can be as simple as bag and tag systems (see appendix 10.6) or may be facilitated by advancing technologies, such as EDI systems and increasingly internet based software solutions such as XML technology. Advance technological traceability carries forth electronic information flows related to the component, sometimes in conjunction with RFID and/or barcodes. The benefits of new technologies allow for more information to be carried easier. Beyond the use of electronic, computer based information systems, bilateral exchange of selected sensitive information requires managed transparency within the relationship (Lamming. 2004), however there are notable short failings with manual recording techniques being described as labour intensive and error prone (Senneset et al. 2007). Thus choosing the right partner and ensuring inter-organisational linkages are mutually developed is a critical success factor.

Traceability systems when utilised from a social and environmental perspective aim to identify all methods and materials used in the supply network in order to provide for equitable and fair treatment of suppliers and appropriate consideration of the environment (Pagell and Wu. 2009). “Rising concerns on environmental damage, depleted resources, exploitation of child labor, endangered species, and global warming” (Syahruddin. 2010 p10) have made consumers more aware of the supply chain process that delivers their end product. Traceability has therefore become recognised as a key requirement towards reaching sustainability (ibid. 2010).
5.5 Codes of Conduct

Codes of ethics or conduct increasingly incorporate a number of dimensions of corporate strategy (van Tulder et al. 2008; Singh. 2006). They are institutionalised forms of conduct that can be applied both internally and externally to companies. They are a reaction to or a preventative measure to ensure that legal, social and environmental standards are put in place around the business when the law is lacking. Buyer enforced codes “stipulate, among other operations issues, that working conditions are safe and hygienic, child labor is not used, working hours are not excessive, and workers are paid living wages” (Jiang. 2009 p77). Codes of conduct figure “prominently as an indicator of socially responsible business” (Kolk et al.1999. p149). Codes of conduct also may exist beyond the organisation, created by industry groups, NGOs and other regulatory bodies. They are particularly employed when businesses span beyond international boundaries.

Some researchers suggest that codes of conduct are self-regulatory, baseline models from which other CSR activities can evolve from (Warren and Lloyd. 2009; Rivoli and Waddock. 2011). They have also been increasingly used to place standards on suppliers as outsourcing has become both an economic incentive and sometimes a public relations catastrophe.

Since as early as the beginning of the 1990’s, research suggested that between 75% to 93% of companies had codes of conduct (McCabe et al. 1996), with recent studies stating over 92% of the world’s 250 largest corporations now have comprehensive codes of conduct (Rivoli and Waddock. 2011). McCabe et al. (1996) note that the usefulness of a code is dependent on its implementation strength (the degree by which the organisation communicates its application with staff) and embeddedness (the depth that the code is integrated into the corporate culture). Both implementation and embeddedness must be strongly enforced for it to be effective.

Such enforcement can come from auditing. Auditing “is both an assurance and consulting activity concerned with evaluating and improving the effectiveness of risk management, control and governance processes” (Munro and Stewart. 2011. p464). It’s advantages include code of conduct adherence as well as fewer defects and after-sales returns, reduce cycle times, less waste, improved delivery times for buyers and adherence to company codes of conduct (Wong 2007). It also offers the opportunity for internal reviews and objective criticism from 3rd parties. External auditing helps to “control the conflict of interests among firm managers, shareholders and bondholders” (Chow. 2011. P287).

As van Tulder et al. (2008) observe, stakeholder pressure may give incentive for businesses to formulate codes of conduct, but may lack the will to implement them as long as the code holds criticisers at bay. To take the implementation of codes more seriously rather than simply window dressing, monitoring and the inclusion of international standards set by agencies such as the ISO 9000 (quality management), ISO 14000 (environmental management) and Social Accountability
standard 8000 provide legitimacy to codes of conduct (Kolk et al. 1999). With such prescriptions set, their effects can form positive flows for suppliers and clients alike.

5.6 Literature Review Summary

This literature review aims to provide a comprehensive background of theory which has influence over incorporating conflict minerals in SSCM. Using the theory from the literature review we can compare and measure individual business policy positions to SSCM and their potential for influence, which in turn provides information that can assist stakeholders in forming potential engagement strategies. From predominant importance, network position and its corresponding influence on SSCM can be identified. To further Vurro et al.’s SSCG theory, we can narrow down and isolate the industry network position relative to the overall supply chain position. Transparency, CSR and conflict minerals policies again will reflect Vurro et al. SSCG theory. The below table will act as a template for this examination.

<table>
<thead>
<tr>
<th>Principle</th>
<th>Key Characteristics</th>
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<tr>
<td>Network Position in collaboration</td>
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<tr>
<td>-Overall supply chain</td>
<td></td>
</tr>
<tr>
<td>-Retail/OEM/Component Manu. industry</td>
<td></td>
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<tr>
<td>SSCM network governance</td>
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<tr>
<td>Transparency policy</td>
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<tr>
<td>Corporate Responsibility Endeavours</td>
<td></td>
</tr>
<tr>
<td>Conflict mineral policy</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Example template for capturing CSR data
Author’s own. 2011
6. Empirical Research

The empirical research is taken with the understanding that when looking at electronic supply chains and the metals that go into them, there result in two separate networks developing. This is in the process of the physical changing of properties from mineral to metal. The first network moves mineral ore from the mine to smelters and refineries (see figure 12). The smelter point is a bottleneck in the supply chain and is paradoxly a factor in both blurring and contributing to transparency. It blurs as when the minerals are processed, their chemical characteristics altering them, making them virtually untraceable (BSR. 2010.) This point does however have the potential to act as a data collection point and provide transparency through securing of the supply chain up till this point and beyond. Conflict-free smelters (CFS) offer a significant amount of assurance to downstream buyers that the metals purchased will be originating from conflict-free mines. What must be assumed however, even with the CFS in place, due to the commoditization of metals, in combination with their trans-boundary movement, far from parent companies, consumers and reliable audits, there exists the possibility of opportunistic acts and the potential for vulnerabilities in supply chain vendors being exposed (Wong. 2007). Therefore while downstream companies can feel confident that they are receiving conflict-free metals, this second supply chain – smelter to end user – also merits appropriate attention. Constraints exist on pre-smelter traceability and efforts to address these problems are being widely addressed (see appendix for more details). To isolate the core focus of downstream SSCM response, we will assume the best case scenario that the following companies are sourcing their metals from conflict-free smelters (or similar schemes yet to be developed) that provide reasonable assurance of being conflict mineral free. We must however assume that these conflict-free smelter downstream supply chains are not 100% reliable and adequate checks and balances must be incorporated to achieve SSCM.

Figure 12 Proposed solution for end to end supply chain transparency (KPMG.2011)
The empirical data derived is as follows:
-Comparative background information about each company is presented
-The companies SSCM policy is analysed
-Network governance and position of targeted companies are evaluated
6.1 Retailers

The Leading Edge Group (TLEG), Target, Harvey Norman were chosen, as these are 3 genuinely well-known and established Australian retail department stores/distributor who are the sellers of electronic goods either at, or close to the point-of-consumption. They hold dominant market positions and provide examples of industry best practices in their retail and sustainability strategies (Sinha. 2011). They engage a large variety of stakeholders and thus seemed suitable candidates to evaluate in terms of how they approach incorporating conflict-free minerals into SSCM. All three companies were contacted via email and phone, with email proving to be the least responsive communication means. When contacted by phone, both Target and Harvey Norman switch board operators, store personnel and managers were unwilling to participate in any primary research data collection. Two different people participated in interviews within TLEG, who were able to provide a better understanding of their procurement strategy. Their contribution was significant, but still lacking in depth and scope. Nevertheless, given the lack of response and understanding of the conflict minerals issue, coupled with their limited network position associated with smaller competitors, it seemed logical to focus on market leaders, as it was believed their governance structures would project more power as well as be susceptible to increased influence by other stakeholders. It was preconceived that these retailers fit within acquiescent/participative type power network, as density is high due to their market diversity and dominance. Their centrality in relation to their major suppliers however requires consideration. Secondary sources were thus utilised to determine two of the three retailer’s current SSCM, their network position and other determinants of incorporating conflict-free minerals into their SSCM programs. As stated before, Tesco would be used a best practice comparative example. Data collected about Tesco was also unfortunately secondary, as attempts to communicate with them were also stonewalled.

6.1.1 Leading Edge Group (Primary research case analysis)

Background

TLEG is a large buying group for over 1500 Australian retailers in electronics, music, security, telecommunications, computers and jewellery (Ibisworld. 2010). Originally a buying group for electronics, TLEG started as an electronic buying group specializing in home theatre electronics, but has expanded to provide a range of products to independent retailers (Leading Edge. 2011). They are probably still best known for their electronic supplies. By their own description they, “leverage the strength of the combined value of many small businesses, uniting the buyer and marketing power of individuals” (ibid).
Current Approach to Sustainability

TLEG is engaged in some type of community building, donating money to the Queensland floods relief of 2011, supporting the Indigenous Literacy Project, the Starlight Children’s Foundation amongst others. While promoting some engagement, financial figures are difficult to ascertain due to the fact that TLEG is a private company and does not publicly disclose all their CSR accounts. This shouldn’t detract from the fact that TLEG is not only self-stated as one of Australia’s largest retailing entities ((Leading Edge. 2011), but their business success is reflected in their rapid expansion into over 15 different industries.

TLEG provide no other public CSR reports and make no mention of conflict minerals. When contacted about their sustainability programs with suppliers, they stated that they have no public code of conduct policy, but are engaged in some responsible sourcing through their Value Business Commitment program. Further details are reserved for suppliers. They emphasised that they have limited influence over supplier practices as they are a buying group and retailer, but had cut ties with some companies engaged in dubious practices. Again, details could not be extrapolated.

6.2 OEM

6.2.1 Hewlett Packard (Primary research case analysis)

Background

Hewlett Packard (HP) was founded in 1939, selling its first product which was an audio oscillator to Walt Disney Studios (HP History.2011). Since then HP has become one of the largest technology companies in the world, operating in more than 170 countries, manufacturing and selling a variety of computers devices, printers, service and technology infrastructure, as well as various financial services (HP Profile. 2011). HP is ranked 11 in the Fortune 500 list and recorded US$126 billion in net revenue in 2010 (ibid). HP’s Asia Pacific operations are based in Singapore, where decisions related to supplier selection, management and sustainability are made. Operations in Australia consist of regular forecasts being sent to Singapore who then act on behalf of HP Australia.

Current Approach to Sustainability

HP has a very public and in-depth approach to sustainability issues. With true global reach, HP at a corporate level clearly recognises the benefits of implementing the TBL strategy. Such decisions filter down to HP operations worldwide. HP credits itself with being the first electronics company to publish a social and environmental responsibility supplier code of conduct (HP Global Citizenship. 2011) and extends this code to both production and non-production suppliers. Furthermore, HP has a comprehensive supplier selection process based on the Electronic Industry Code of Conduct which the focal company (in this case HP), 1st tier suppliers and their partners
beyond are expected to adhere to. International social and environmental standards such as ISO 14001, 2600, SA 8000, Eco Management Auditing Scheme (EMAS) have been used as a basis for this Code.

HP extensively involves stakeholders and belongs to at least 27 sustainability-focused working groups (ibid). HP supply chain management emphasises TBL strategy too, with both collaborative and third party audits verifying conformance with HP’s strict implementation of their Code of Conduct. Their auditing processes encourage corrective measures and capability building, however 2\textsuperscript{nd} tier auditing remains fairly low with only 25 performed by 1\textsuperscript{st} tier suppliers using HP’s validated audit process (ibid).

With regards to conflict minerals, HP has also been very internationally proactive. Both as a member of the EICC and GeSI, HP credits itself with being instrumental in establishing the Extractives Workshop in 2007 and taking part in reviewing auditing results of the CFS programs in an attempt to gain a better understanding of the process for industry (ibid). HP has even gone as far as to identify precise amounts of 3TG used in its notebooks. HP “estimate that the average HP 2 kg notebook contains approximately 0.6g of tantalum, 10g of tin, 0.00009g tungsten, and 0.3g of gold” (ibid). NGO Enough Project also recognises HP as being the ranked leader in progress towards responsible sourcing on conflict minerals (Enough Project. 2010).

Surprisingly however, despite HP’s internationally-renown SSCM involvement, individuals contacted at Australian HP operations were both unaware of what conflict minerals were and therefore could provide no Australian proactive perspective on implementing conflict-free minerals into Australian electronic supply chains. As stated above, their operations consist mainly of providing forecasts to Singapore who in turn conduct ‘responsible sourcing’. All SSCM are made at a corporate level, with this information filtering down to Australian-based operations.

**6.3 Component Manufacturer/OEM/Retailer**

**Siemens 6.3.1 (Primary research case analysis)**

**Background**

Siemens is a global engineering conglomerate with invested interests in industry, healthcare and energy. It operates many tiers of the supply chain, and can be divided into different roles depending on sector, operating as a researcher and developer, component manufacturer, OEM and retailer. With revenues exceeding $75 billion in 2010, Siemens operates in 11 different industry groups (Siemens Annual Report. 2010).
Current Approach to Sustainability

Siemens are a dominant and progressive company in sustainability and related enterprises. Siemens aim “to generate revenue with green products and solutions of at least €40 billion by the end of fiscal 2014” (Siemens Sustainability Report. 2010. p5). Siemens employ a comprehensive TBL strategy by pursuing economic interests which incorporate CSR related activities. They are in the privileged position of utilising environmental and social activities to drive forth their profits, as much of their premise for business is focused on renewable energies and healthcare. Siemens is a part of several industry collectives, advancing the interests of SSCM practices and engaging a range of stakeholders (ibid). Siemens operates on a variety of ISO standards related to environmental and social management and requires significant auditing guidelines to enforce strict standards from its suppliers (ibid) Their current approach to conflict minerals is not publicly detailed however as a publicly listed company in the US, Dodd-Frank will apply to them. On top of their other sustainable initiatives, they are working in parallel with EICC businesses and are proactively communicating with suppliers in an effort to determine the existence of conflict minerals in their upstream supply chains, prior to the implementation of the CFS program.

6.4 Secondary research comparison

6.4.1 Tesco

Background

Tesco was founded in 1919 by Jack Cohen in East London (Tesco PLC. 2011). It has expanded to become one of the world’s largest retailers with operation in 14 countries, over 5300 stores, employees numbering close to half a million and serves millions of customers every week (ibid). Tesco sells a massive range of products, from fresh food and electronics, to clothing and furniture. Tesco characterises their sustainability program as “Community is our term for what others call corporate responsibility or sustainability. For us, this means acting responsibly in the communities in which we operate, and fulfilling our commitments, or Community Promises” (ibid).

Current Approach to Sustainability

Tesco describe an extensive sustainability policy which covers cooperative efforts with a variety of NGOs and industry groups focused on improving sustainability as well as many charities and other community endeavours. In addition, water reduction usage and animal welfare are part of their SSCM policy, which also includes transparent and traceable ethical sourcing of sustainable seafood, soy, palm oil and timber supplies (Tesco PLC. 2011; Marchante. 2011). All these programs describe some form of auditing and supplier collaborative measures. Tesco is the recipient of multiple recognised awards and achievements including FTSE4 Good, the top retailer in the Carbon Disclosure Project, Platinum status in the Business in the Community Corporate Responsibility
Index amongst many more (ibid). Last year Tesco introduced a new electronic hub for itself and at least 200 of their suppliers to communicate with one another and share experiences within supply chain CO2 reduction (Briggs. 2011). Plans are to bring more suppliers into this hub, build more information, cover more issues and increase collaboration (ibid). Tesco can be described as an exemplar in TBL performance.

While it cannot be definitely stated that Tesco stock electronic goods that contain conflict minerals, as this information is not available to the general public, there exists the possibility that electronic products within Tesco stores do contain conflict minerals. As Tesco is publicly listed in the US, according to the Dodd-Frank Act, it will be required to conduct due diligence of its supply chain in determining that it is conflict mineral free. As stated earlier, due diligence guidelines from the SEC are still being formulated, however in line with other sustainability practices and incorporating conflict-free minerals into Tesco’s TBL, it seems likely that Tesco will seek to address the issue.

6.4.2 Harvey Norman

Background

Established in 1982, Harvey Norman Holdings Limited now has 195 franchise stores operating in Australia with a combined sales revenue of over A$5 billion (Harvey Norman Annual Report. 2011). Harvey Norman is well-known for their wide range of electronic and electrical appliance retailer stores, as well as also stocking an extensive furniture and bedding selection as well. Bloomberg describes Harvey Norman as Australia’s largest furniture and electrical retailer (Raja, S. 2010).

Current Approach to Sustainability

Being as large an electronic store as they are, selling thousands of products and using large amounts of electricity in their showrooms, the global environmental footprint of Harvey Norman is believed to be significant (Lauren. 2010). Harvey Norman has recently come under heavy criticism of its sustainability policy regarding its furniture lines. NGO Markets for Change conducted a year long chain of custody investigation and implicated Harvey Norman (as well as other major retailers) as selling furniture sourced from Australian native forests (Markets for Change. 2011). Harvey Norman defended the claim by stating that all native timber sourced is harvested in accordance with Australian Forestry Standards, which is legislated by state and federal governments (Harvey Norman. 2011). Nevertheless, any other sustainable programs by Harvey Norman are found to be nearly non-existent. Their website indicates no sustainable or ethical procurement policy or similar expectations from suppliers, nor do they publish an annual sustainability report. No references to Harvey Norman’s policies towards conflict minerals could be found.
6.4.3 Target Australia

Background

Wesfarmers is one of Australia’s largest public companies with a 2010 sales revenue of over A$54 billion (Wesfarmers Full Year Result. 2011). Wesfarmers have a diversified portfolio including some of Australia’s best known retailers, as well as having stakes in insurance services, chemical, energy, fertilisers, industrial, safety and raw material (coal, gas and timber) sectors (ibid. 2011). One of Wesfarmers largest retailing subsidiaries is Target Australia. It is perhaps one of the best known discount retailer department stores in Australia (Pappu and Quester.2006). There are over 290 stores Australia wide, and in 09/10 declared over A$3.8 billion in sales revenue (Wesfarmers Sustainability Report 2010). Target Australia has no affiliation with Target Corporation US (Target Australia. 2011).

Current Approach to Sustainability

Both Wesfarmers and Target have fairly extensive sustainability programs in place. In the case of retailer Target, a prominent, comprehensive and transparent ethical sourcing code is on display. This code “aims to ensure products sold in Target are produced in safe working conditions and that the basic human rights of workers respected” (Ethical Sourcing Code. 2011). Target Australia makes it clear in its Ethical Sourcing Code that it will only do business with vendors who ensure that their suppliers and subcontractors comply with Target’s Code. Here we see some form of multi-tier transparency and chain of control through Targets Code. Target also sets out a very clear and concise auditing policy to monitor risks to human rights and vendor social responsibilities. Target’s environmental commitment completes the TBL philosophy to some degree as they engage and educate consumers with social initiatives to reduce personal carbon footprints, as well publicly advertising energy and water saving initiatives underway at Target stores.

As a major distributor of electronic devices including computers, mobile phones and other electrical home appliances, Target has a clear stake in being aware of and incorporating conflict-free minerals into their supply chain. At the time of this investigation, Target lacks any reference to conflict minerals and their adaption to SSCM. Target were unwilling to publicly discuss this issue.

6.4 Summary

In the data collected from the businesses above, and in combination with the other companies also contacted (Appendix 10.10), redundancy quickly occurred among Australian retailers, distributors and buying groups, all stating similar views. They all emphasised an inability to affect supplier patterns due to their small market share. To coin an often used Australian phrase, ‘the buck was regularly passed’ which means that responsibility is passed onto another. During interviews, retailers stressed their lack of control over their suppliers and in particular something
as abstract as conflict minerals within the supply chain, many tiers removed from them. Such SSCM measures seemingly so common in large international retailers, were hardly considered for domestic counterparts or were ‘simply out of their hands’. A second redundancy also emerged among Australian businesses, that of a lacking in CSR programs other than following industry standards. Social and environmental pursuits, when compared to the larger international retailers were negligent. TBL strategy, while incorporated into some of the larger companies reviewed, was not considered by most SMEs. Finally, the majority of retailers exhibited a push-away reaction, with hostile and suspicious reactions to the concept of due diligence measures regarding conflict minerals. Some associated the idea of similar legislation in Australia with other social industry standards which they considered to be over-governance and costly to their business. Environmentally sustainable activities such as recycling and reusing packaging and suppliers were however seen as consumer driven as well as economically viable.

7. Analysis

7.1 Retailers (Primary research case analysis)

7.1.1 The Leading Edge Group
TLEG is representative of several similar buying groups in Australia. They have a long list of suppliers whom they collaborate with, however this collaboration is conducted at an arm’s-length with very little strategic elements to it. The majority of collaboration is limited to basic dispatch ordering and whilst TLEG have discontinued business with unsustainable suppliers, their position is that they have limited influence over distant manufacturers. They do represent and source for a large collection of independent retailers, from a diverse range of suppliers, so this puts them in a highly density network, and on the periphery in terms of centrality. TLEG’s approach to sustainability is limited, and due to their network position seems that they are positioned to follow, rather than lead when it comes to conflict minerals in supply chains.

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<thead>
<tr>
<th>The Leading Edge Group</th>
<th>Key Characteristics</th>
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<td><strong>Principle</strong></td>
<td><strong>Network Position in collaboration</strong></td>
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<td>High density/ Low central position</td>
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<tr>
<td>-Overall supply chain</td>
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<td>-Retail industry</td>
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<td><strong>SSCM network governance</strong></td>
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<td><strong>Transparency policy</strong></td>
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<tr>
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<tr>
<td><strong>Conflict mineral policy</strong></td>
<td>None made public</td>
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Table 3 The Leading Edge Group evaluation
7.2 OEM/Component Manufacturers (Primary research case analysis)

7.2.1 HP
To say that HP has a SSCM strategy is an understatement, as they are clearly pursuing TBL balance in Carter and Easton’s adapted model (figure 8) on SSCM with the additional pursuit of risk management, transparency, strategy, organisation culture factors as well. HP occupies a central position within its overall very dense supply network. This is driven by its diverse and high volume purchasing portfolios.

HP has made significant efforts to highlight and address the issue of conflict minerals, more so in fact that any other electronics business. It cannot be denied that they have sought extensive international stakeholder collaboration and are pursuing programs to source responsibly. They have used their central position in the supply chain to educate, share information and incorporate conflict-free minerals sourcing practices into their supply chain. However whilst having a robust corporate SSCM program, an inherent flaw has been detected. Engagement with major NGOs, the public and other stakeholders has been limited in Australia due to a top-down strategic approach which has resulted in internal Australian stakeholders (employees) being left out of decision-making and subsequently Australian external stakeholders (NGOs, consumers) are excluded as well. Collaboration with some international NGOs, Codes of Conduct, CSR annual reports and the auditing of supply chain partners provides significant interaction with stakeholders, however what is clear is that these efforts are focused at a corporate level and filter through to Singapore and on the issue of conflict minerals, stop there. Such gate-keeping of internal corporate information surely compromises greater efforts of overall supply chain sustainability.

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<tr>
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Table 4 HP evaluation

7.2.1 Siemens
Siemens occupy a unique position amongst the companies surveyed as they hold a position in multiple roles within the supply chain. Siemens have invested interests in thousands of different...
products and components ranging from relatively simple circuit breakers to complex energy systems. They can be described as operating as a component manufacturer, an OEM and a retailer depending on the type of product in question. Such diversity in their management portfolio, combined with their massive purchasing power, sees them occupy a central position in their overall supply chain. Unquestionably situated in a densely populated network, with considerable stakeholder influence from both up and downstream, Siemens has the potential to operate a highly participatory SSCM governance style and this is what we see. Siemens, although not publicly tackling the issue of conflict minerals, is in consultations with suppliers several tiers deep. Being a component manufacturer for further downstream companies, Siemens is also having to respond to customer requests for conflict-free devices and is pursuing efforts to collaborate with all concerned stakeholders.

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Table 5 Siemens evaluation

7.3 Secondary research comparison

7.3.1 Tesco

Being a retailer at the point of consumption, Tesco is at the end of a long line of stakeholders, including customers, NGOs, industry and community groups, shareholders, suppliers and government bodies. Clear influencers of excluding conflict minerals in supply chains are NGOs such as Global Witness, the Government in the form of legislation, and consumers. Tesco operates within a dense network of stakeholders and this is reflected in their highly emphasised sustainability program. Great attention, time and investment has been directed towards sourcing, auditing, stakeholder collaboration and transparency in their supply chain. Tesco is also operating within a highly centralised position given its global operations and the amount of suppliers it cooperates with.

As it is being discovered, conflict minerals policies are yet to become an embedded issue in mainstream sustainability programs, therefore it is not really surprising that Tesco is using their leading centrality position within their supply chain network to limit NGO and government information flows. This is supported by Vurro et al (2010) as they describe such a position, enabling said actor to resist adaption demands or conversely to impose their own concept of
sustainability and its implementation. That said, Tesco has shown itself to operate in pursuit of TBL imperatives in the past, initiating joint collaborations with a range of actors in different supply chains. As well, due to its vulnerability of being within a highly dense network and susceptible to multi-stakeholder imitation and coordination, it is anticipated that Tesco will respond by developing its OEM to conflict-free smelter program.

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Table 6 Tesco evaluation

### 7.3.2 Harvey Norman

Harvey Norman occupies a significant proportion of the market. They are operating in a similar environment to Tesco, though scaled down in terms of variety. Their network is dense, and they are centrally positioned in the retail chain, but peripheral compared to upstream major manufacturers. Unlike Tesco however, they apparently approach sustainability reluctantly or with trepidation. In a position to engage collaboratively with customers, NGOs, suppliers, shareholders, Harvey Norman uses it’s centrality to limit public information to these same stakeholders. As a result, it is able to impose its notable lack of sustainable practices on its suppliers. In effect, Harvey Norman does not operate any SSCM, or could only be compared with pursuing the economic dimension when considering what we know about TBL and SSCM. Harvey Norman is vulnerable to stakeholder pressures, as the network is dense and stakeholders such as NGOs and consumers are increasingly applying pressure for sustainable practices. Gerry Harvey, Director of Harvey Norman and Ian Norman, co-founder, still hold approximately 46% of shares, with close family members and associates making up another 5% (Harvey Norman Annual Report. 2011). In terms of shareholder influence, this group holds a majority and is in a dominant position to determine future sustainability policies.


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Table 7 Harvey Norman evaluation

### 7.3.3 Target

Target have made a considerable effort to pursue TBL strategy and are seemingly well positioned in their network to affect change according to Vurro et al. (2010). Being a subsidiary of one of Australia’s goliath companies, Target is in a comparatively better position to influence suppliers than competitor Harvey Norman, due to its stronger market purchasing power. Target occupies a central position in its retail network due to its large national store presence, acting as a significant intermediary between manufacturers and public consumers. Its ethical sourcing guidelines are a reflection of its ability to influence upstream suppliers. Density mirrors Harvey Norman, but a more collaborative relationship exists with stakeholders. Based on its current ethical sourcing and transparency policies, conflict minerals will likely become incorporated into Target’s SSCM, but Target is probably not a central enough actor to influence other manufacturers upstream. It is a peripheral company in the overall supply chain, and thus subject to well-connected stakeholders around it.

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Table 8 Target evaluation
7.4 Analysis Review

The investigation of the six companies above follows a simplified supply chain, from point-of-consumption back to OEM back to component manufacturer. The results to come about are supportive of Vurro et al. (2010) SSCM governance structure. Point-of-consumption firms on the periphery of the supply chain, occupy a far less central/power influencing position than upstream businesses. They therefore demonstrate, as Vurro et al. highlight, a significant lack of influence over SSCM and are either completely dominated by upstream policy decisions as in the case of TLEG or must follow the norms of the surrounding members as in the case of Target, but lack significant influence over more central businesses in the overall supply chain. These companies too are pursuing TBL to mixed degrees, however their ability to implement full TBL pursuits are limited by their network position and thus stakeholder collaboration. Occupying a less central position, while not impossible, makes it difficult to pursue transparent and responsible sourcing.

In contrast with point-of-consumption businesses, and further supporting Vurro et al. assertion that high centrality and density equates with participatory SSCM, we have identified OEM HP and OEM/component manufacturer Siemens as occupying this position. Both businesses pursue comprehensive SSCM practices and operate transparent auditing assessments of suppliers. Both companies are faced with a range of stakeholders of which whom expect TBL pursuit.

Tesco’s operations perhaps provide somewhat of an exception to Vurro et al, as although Tesco is a point-of-consumption retailer, they are also sharing a central position in their supply chain due to their mega global operations and are thus able to be influential drivers of SSCM. This brings up a salient point, that when analysing Vurro et al.’s centrality/density model, one should consider the ‘network within the network’. Vurro et al.’s definition of network density is incorporative of overall supply chain wide actors, as is their centrality concept. This of course has merit and helps to classify the business so that we may better anticipate relationships barriers and opportunities, however it doesn’t take into account a more focused view of supply chain relationships. If we divide the greater supply chain into segments, eg. the point-of-consumption segment/OEM segment/component manufacture segment, and analyse specific actors within a segment, we may see a redistribution of power from the greater supply chain, as focal businesses within the analysed segment may occupy greater centrality within their sphere of influence. To take the examples of the other Australian retailers, in the overall supply chain they occupy peripheral positions, however when viewed within the point-of-consumption network, they are central actors compared to other stakeholders such as customers, other smaller buyers, local NGOs and local government departments. Some retailers will receive far greater pressure or coordination to implement SSCM, due to their specific characteristic traits such as size and purchasing power. Whilst in the overall supply chain, these peripheral retailers may be considered to have less influence over supply chain wide sustainability, to their local stakeholders, they can in fact be the most accessible and influential in their network. Although they are still limited by their overall supply chain position, identification of central actors within more localised networks, and
corresponding engagement with them, may provide better opportunities to encourage SSCM than stakeholders attempting to influence overall central supply chain actors.

7.5 Research question 1
What challenges do exemplar downstream electronic companies encounter when incorporating conflict-free minerals into their sustainable supply chain management practices?

Exemplar producers and sellers of electronics have a varied approach to sustainability and this partly stems from their network position. Sellers of electronic devices can be component manufacturers, OEMs or retailers and distributors. As sellers they each operate separate spheres of direct influence, upstream and downstream. It is not enough however to be only concentrating on one’s own sphere of influence, as the decisions of firms upstream can have significant effects on downstream business. Sustainability is a prime indicator of what happens upstream, will affect downstream and therefore methods for protecting and strengthening business must be multi-tier spanning.

Whilst the situation of conflict minerals in the supply chain is undoubtedly complex, there are initiatives underway. These initiatives however put great emphasis on the supply chain prior to the bottleneck point of the CFS program. Within industry there is a major emphasis on ensuring a secure supply chain from mine to smelter. This is surely necessary for an overall conflict-free supply chain and is in fact possible as the number of 3TG smelters world-wide are possible to identify. Potential barriers to sustainability post-CFS however do exist, as even with CFS in place, due to the nature of many tiny components coming from many different sources, many tiers deep, there remains the possibility of some components made from conflict minerals infiltrating the clean post-CFS supply chain.

Barriers then include a lack of SEC guidelines, the focal firm’s network position, the multi-tier spanning relationships between many different downstream actors, the integrity of internal and external auditors, stakeholder involvement, as well as the reality of the sourcing of conflict minerals by national procurers other than supply chains with parent companies not located in the US or the EU.

A lack of SEC guidelines poses an initial problem to incorporating conflict-free minerals into SSCM as many companies are unsure of the extent to which they must invest in such a project. With a reliance on CFS to provide secure conflict-free supply chains, many businesses appear to have a significant amount of trust in the project instead of taking more proactive measures to fully understand their supply chain post-smelter. Such a strategy presents a risk to supply chains, as the nature of conflict metals being as complex to trace as they are, allows for infiltration at unsecured locations. With definitive SEC guidelines, business will be more aware of the actions required by them to take to eliminate conflict minerals as these guidelines will be provide a crucial step in clearing up requirements for compliance.
Gereffi (1998. p2) states that consumer products such as electronics are highly “controlled by retailers and marketers at the distribution and retail end of the chain”. Gereffi is in effect referring to demand uncertainty in the electronic industry environment. Due to the short life cycle of electronic products, retailers are adverse to vertical integration and hierarchical forms of governance and thus operate in market or network environments. Being in a market-based relationship allows the retailer to apply more pressure to its suppliers, but the same applies in reverse and ultimately the more central the firm to overall supply chain position, the more it can influence the sustainability policy. Market governance can also not encourage sustainable practices due to intense competition to cut prices, deliver shorter lead times and even sometimes encourages deceitful practices (Jiang 2009). Retailers and distribution companies operating as separate entities from OEMs occupy a peripheral position in the supply network. Following Vurro et al. (2010) logic, the ability of retailers to influence upstream component manufacturers and OEMs is limited by their lack of centrality in the network.

From the author’s primary research conducted with TLEG, contrasted with the other three secondary evidenced case studies, we are able to determine that retailers, occupying end of the supply chain positioning, are constrained in their ability to influence overall SSCM. Exceptions exist however, as highlighted by Tesco, but this is based on Tesco’s size, global retail positioning, their diversity of purchasing power and a rigorous, clearly public pursuit of TBL. Tesco is able to press home these factors to their advantage and use their increased centrality to draw in all stakeholders in the network in pursuit of SSCM. As Tesco has not yet incorporated conflict-free minerals into their ethical sourcing policy, this does demonstrate the electronic supply chains high complexity relative to other ethically sourced products.

OEMs, in comparison to retailers, are in much more dominant positions to exercise and enable SSCM practices in both downstream retailers and upstream component manufacturers. HP being a global operator with massive purchasing power, is able to exert significant influence over their suppliers. We partly see this in their rigorous supplier assessment and evaluation requirements where suppliers must pursue responsible sourcing or face exclusion. At present HP is a world-wide leader in SSCM, not only in environmental and social issues, but extends their SSCM approach to include responsible raw minerals (3TG) and is widely recognised as an industry leader (Greenpeace 2011;Enough Project 2011).

HP and Siemens have a significant number of different stakeholders who seek to influence their operations and who drive forward new sourcing decisions, as in the example of conflict minerals. Their dense network of stakeholders helps to ensure that the agendas of NGOs, activist shareholders and consumers become more integrated with corporate governance. HP and Siemens recognise that engagement with these stakeholders is beneficial in continuing its ‘license to do business’. An example is Enough Project’s significant engagement with over 20 consumer electronics leaders to begin public assessment and ranking of ‘getting to conflict-free electronics’ (Enough Project 2011). This collaboration has coexisted with US congressional efforts and the
OECD, which eventually resulted in Section 1502 of the Dodd-Frank Act. HP itself ranks as the overall leader. The position of OEMs like HP, or other major multinationals, to incorporate conflict minerals is driven also by internal decisions to pursue TBL. When it is found that TBL measures produce benefits that out way the expenses associated with such a policy, a multinational, like HP, is in a prime position to dictate marketplace implementation of a policy like sourcing conflict-free minerals.

Electronic supply chains, being as decentralised as they are, and often operating in developing nations with laws and institutions that sometimes struggle for legitimacy, are subject to increased risks of challenges to SSCM. Management level knowledge of CSR in these areas can also be very low (Jiang 2009). Taking a core tenant of SSCM, the TBL, such operations make it difficult to pursue trilateral endeavours without increased expenditure on checks and balances to management programs. Approaching SSCM must therefore be done in collaboration through codes of conduct and both internal and external auditing.

Tracing components and materials through supply chains requires precise knowledge of what components are made of and where they come from. Such understanding for downstream publicly listed businesses must come from increased collaboration with upstream suppliers. As a first step, businesses must have developed enforceable codes of conduct that are deeply embedded and implemented in both internal business sourcing practices, as well as their suppliers. Codes of conduct that are applicable for the focal firms 1st tier partners, must go beyond and be applied to all outsourcing and other direct partners. Codes of conducts provide an expectation of procedure, but lack substance unless they are backed up with real action.

Auditing and subsequent certification will be the real impetus for securing post-CFS supply chains, but are again challenges in implementing themselves. As the typical electronics OEM has dozens of upstream suppliers, the costs in first identifying and then carrying out audits are expected to have cumulative effects of many billions of dollars a year (Bayer.2011). Auditing too has risks about it, due to a growing industry of auditing manipulation and deceit in Asia (Jiang 2009; Roberts et al. 2007). Engaging with suppliers found in developing nations, who are prepared to divulge sensitive information about their components and their suppliers, surely presents one of the significant challenges to supply chain sustainability.

The incentive of incorporating conflict-free minerals into sustainable supply chain management is undoubtedly about distancing the business from negative stakeholder reaction. TBL is a starting framework towards stakeholder engagement, SSCM and the need to remove conflict minerals from supply chains.
7.6 Research question 2

What has been the Australian industry reaction to conflict minerals?

The decision to focus on Australian industry reaction to conflict minerals policies was retrospective. Initially it was presumed that Australia, being a mature democratic society with a sound record on international human rights, would have an industry reaction similar to EU/US businesses. However when the author set out to collect research data, a clear trend began to emerge. In total, 40 Australian-based international and domestic businesses were approached and whilst there were varying levels of interaction between the author and businesses, simply stated, across-the-board there was no knowledge of what conflict minerals were, let alone the Dodd-Frank Act and it’s direct effect on the parent companies of Australian-based business.

This lack of direct action in Australia, both by multi-nationals and domestic electronic businesses can be put down to several factors. Firstly, through investigation, Australian businesses involved in the electronics industry are predominantly retailers, distributors or buyers. They are the final actors in a long and complex supply network. As discussed earlier, there exist very few manufacturers in Australia and those that do, by report, have arms-length or low strategic cooperative relationships with their overseas suppliers. Their purchasing power is negligible and therefore their influence over suppliers is extremely limited. International OEMs operating in Australia, whilst being internally connected by strategic relationships with their suppliers, are removed from decision making capacity, for as stated earlier, their position in Australia is to act as a forecast planners and distributors. Sustainability decisions are left to more internally central bodies.

These examples of internally more central (or less central in the case of Australian-based OEMs) and the less central retailers and distributors of the overall electronics supply chain again support Vurro et al. and their classifying of SSCM governance. Throughout the entire electronic supply chain, Australian-based retailers and distributors are peripheral actors with low centrality and influence. The conclusive findings, that of a general lack of awareness of conflict minerals by Australian-based business, is in overall step with Vurro et al.’s assertion that actors with low centrality will receive limited communication about SSCM and therefore will have limited influence over such policies. These findings again highlight a lack of total Australian stakeholder engagement and thus pose a question to the legitimacy of implemented SSCM in this country. These results mean stakeholders must then rely on more distant and obscure sources for information and have extra barriers to influence policy directly.

A notable connection detected in Australian industry reaction came from observations regarding pursuit of the TBL. Implementation of the TBL came in mixed doses, with international OEMs and a limited number of large Australian retailers incorporating the TBL into corporate strategy. In the Australian case studies analysed, as well as further investigation into other domestic-based businesses, generally speaking, there was an overall lack of the TBL. Continuing, their regard for
conflict mineral policies, as noted, did not exist. In some cases, such as with Harvey Norman and Leading Edge, absence of such conflict mineral policies exemplifies their overall lack of pursuit of TBL. Responsible sourcing and other environmental endeavours do exist with some Australian-based businesses, but was poignantly lacking by SME. Such policies seems to be reserved for the larger market providers. This may be because of a greater expectation by the community and other stakeholders, as well as the expectations of greater influence on both suppliers and the community at large.

Also, as noted early in the empirical section, a general reluctance or what even may be described as a fear by many Australian SMEs to communicate their understanding of responsible sourcing of minerals was noted. Not wanting to generate bad publicity for their suppliers was obvious, but such a resistance to openly querying their suppliers sourcing means, may provide an additional insight and possible element of why Australian industry has been complicit in its failings to address the conflict mineral issue.

Australia does not operate a large market, and geographically speaking, is on the other side of the world. With its network position being generally point-of-consumption, industry will certainly be moved to the peripheral edge and will lack strategic input. These reasons, as well as Australia being rich in 3TG (minus Tungsten) and secure in its own mining practices and suppliers may go some way to explaining why Australian industry has been slow to recognise 3TG as a problem.
8. Conclusion

3TG and their relevance to the modern world are increasingly connected. These minerals are used in high amounts, not only in our personal computers and phones, but are also used in large scale government and military projects. The demand and price of these minerals has risen dramatically over the last ten years, and we have seen a reaction to this demand in the increased destruction of the Congo environment and its people. Since 2002 almost as many Congolese have died as had those in the Jewish Holocaust. Mineral exploitation is undoubtedly contributing to the suffering of people in eastern DRC. The wealth that the mining of 3TG should bring is not being equally distributed, and is instead fuelling violence, rape, brutality and poor and abhorrent living and working conditions. US legislation in the form of the Dodd-Frank Act is well-intentioned, but it also carries with it the unintended consequences of potentially penalising non-conflict mining communities and supply chains in the DRC and surrounding nations.

In an effort to still bring investment and prosperity to central Africa, track and trace efforts of conflict minerals and metals are being undertaken both before and after the crucial stages of smelters and refineries. As discussed, CFS are proving the pivotal junction in assuring electronic businesses that their products are conflict mineral free. Bag and tag initiatives, as well as chemical tracing and increased third party observation, offer the means to supply smelters with minerals from non-conflict areas and thus reduce financial support for brutal gangs and criminals. With world-wide 3TG smelters and refineries identified, there is positive progress towards ensuring downstream supply chains will be conflict-free.

The changing nature from mineral to metal is the critical stage, with traceability back to point-of-origin virtually impossible. This creates a vulnerability in the supply chain, as it then becomes critical that the metal has come from a CFS. Despite best efforts, the CFS has been a slow process and it is not yet assured that cooperation from every smelter is possible. Further, there exists the possibility that non-CFS smelters will pop-up and provide metals sourced from conflict mines to developing nations. These may have two effects. Firstly, it may undermine Dodd-Frank and/or similar EU legislation as local militias will still be able to ply their illegal extortion racquets and thus benefit from a continued flow of income. Secondly, metals intended for developing nations domestic markets, and which have been processed in non-auditable facilities, may in turn find their way back into component manufacturers supply chains and flow back to the West. This is why, although the CFS program may provide significant guarantee of eliminating conflict minerals in supply chains, post-CFS strategies must still be in force through focal firms in the West incorporating conflict-free minerals into their SSCM policies.

Incorporating conflict-free minerals into SSCM policies, thanks to public awareness campaigns by NGOs and now US government legislation, is becoming increasingly a part of corporate TBL and a key responsibility policy of SSCM. This is made evident by multinationals businesses like HP and
Tesco, who are proactive in stakeholder engagement and who set clear SSCM agendas and seemingly follow through with them. There has been both praise and resistance to the proposals of SEC guidelines, in what will ultimately not deliver regulatory penalties to businesses with conflict minerals in their supply chains. Instead, financial penalties will be afflicted via consumers who are seen as integral stakeholders in satisfying SSCM and the TBL demands.

The purpose of this thesis was to contribute and add to theory surrounding CSR and SSCM. Vurro et al. provides a useful theoretical model for analysing network power relationships which in turn can provide a useful tool for assisting stakeholders in knowing how to approach SSCM engagement strategies. From the companies analysed, we see a clear indication that network centrality plays a significant factor in how SSCM can be influenced, with low centrality corresponding to a low degree of influence.

The mineral price boom has been both a potential promise of opportunities for the people of central Africa, but also a curse for those operating under the supervision and control of armed groups. Significant steps are being made by business and civil society to eliminate illegal activities associated with 3TG mineral extraction, but the reality must be faced that the stability and security must be carried out by the DRC government. In the end, SSCM by businesses is a band-aid fix that stems the flow of blood, which still allows the wound to fester.

8.1 Future Research

Future research would benefit from a more in-depth empirical study through embeddedness within a focal company and participation in communications, cooperation and monitoring of of 1st and 2nd tier suppliers/buyers. Such research would provide for a far greater understanding of relative power influence one supply chain section has over another, particularly in the context of SSCM.

Transaction cost and resource-based theory could also be applied in relation to conflict minerals to contribute to the understanding of opportunism and/or neglect of incorporating conflict minerals into SSCM and the relative dependency for competitive advantage that these valuable resources creates.

Further research should also be aimed at analysing Asian based component manufacturers and their crucial role in the supply chain as well as an increased focus on the larger market reactions of the US/EU to conflict mineral policies. Australia’s small and disconnected market permeates ignorance and subsequently, limits significant input to this paper.
Finally, this paper centres on downstream component manufacturers, OEM’s and retailers. More specific studies should be carried out on each of these industries individually, but also upstream suppliers, pre-CFS, can be analysed.
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10. Appendix

10.1 3Ts
The 3Ts are a reference to derivative metals mined from within the DRC conflict areas. They are tin, tungsten and tantalum. They derive from cassiterite, wolframite and coltan (columbo-tantalite) respectively. All three metals are used in electronics, and also have varying degrees of use in industrial equipment and machinery, automotive and aerospace industries, lighting, medical equipment and construction (figure 1). The 3Ts are all mined in a similar region, in similar conditions and follow a similar supply chain (Yager. 2011).

<table>
<thead>
<tr>
<th>Metal</th>
<th>Industries Using the Metal</th>
<th>Common Applications</th>
<th>Commercial Ores*</th>
<th>% World-Supply from DRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin</td>
<td>Electronics</td>
<td>Solder for joining pipes and circuits</td>
<td>Cassiterite</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Automotive</td>
<td>Tin plating of steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial equipment</td>
<td>Alloys (bronze, brass, pewter)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tantalum</td>
<td>Electronics</td>
<td>Capacitors (in most electronics)</td>
<td>Coltan (columbite-tantalite)</td>
<td>15-20%</td>
</tr>
<tr>
<td></td>
<td>Medical equipment</td>
<td>Carbide tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial tools and equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerospace</td>
<td>Jet engine components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tungsten</td>
<td>Electronics</td>
<td>Metal wires, electrodes, electrical contacts</td>
<td>Wolframite, Scheelite, Ferberite, hübnerite</td>
<td>0.60%</td>
</tr>
<tr>
<td></td>
<td>Lighting</td>
<td>Heating, and welding applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial machinery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>Jewelry</td>
<td>Jewelry</td>
<td>Various free and combined forms</td>
<td>0.5-2%</td>
</tr>
<tr>
<td></td>
<td>Electronics</td>
<td>Electric plating and IC wiring</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerospace</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Uses of 3TG and % from DRC
(KPMG. 2011)

These minerals are mined in artisanal small-scale open pit and underground mines (ASM) that operate under the control of violent rebel groups (Freeman 2010; Eichstaedt 2011). Children are often used in these mining operations (Freeman 2010; Garrett 2007), and local men and women are regularly forced into various labour duties including acting as servants, slaves and prostitutes (Hayes and Burge 2003). Disease and illness is rife around mining areas with many people dying from HIV/AIDS, TB, malaria, cholera, dysentery amongst others (ibid). Such has been the scale of social devastation to the region that it is widely cited that well over 5 million deaths have occurred in the DRC, ranking the situation in the DRC as one of the deadliest and most dangerous in the world (Garrett 2007; Bailey 2011). The environmental effects have also been catastrophic, with
ASM leading to a range of problems including massive soil erosion, illegal poaching, pollution and deforestation (Garrett 2007; Hayes and Burge. 2003). While providing some opportunities for economic stimuli, most of the profits of mining fall into the hands of a few, with the overall effect of 3Ts exploitation having been simply devastating for the region.

10.1.1 Tin
The world has seen rising tin prices with bans on lead-soldering taking place in the US and EU in 2006 and the “voluntary conversion to lead-free soldering by many Japanese OEMs” (Chen et al. p429). Tin has proven to be the desired replacement in electronic soldering thus prompting the price increase (Eichstaedt 2011). On the back of high prices, eastern DRC ASM have become increasingly attractive sources of revenue for armed groups in the region. These mines are largely illegal and remotely located (Garrett 2007). Cassiterite ore may be crushed and mixed easily with ore from conflict-free areas at any stage prior to smelting (BSR. 2010).

10.1.2 Tantalum
Tantalum which is derived from coltan, has become increasingly used in mobile phone technology and computer and video gaming devices since about 1996 (Eichstaedt 2011). Also mined in ASM, mainly with small hand tools, eastern DRC has provided approximately 15-20% of the world’s coltan (KPMG. 2011). Tantalum is double the density of steel, highly durable, ductile and has a high co-efficient of capacitance which means it is very good at storing and releasing electric charges (Hayes and Burge. 2003). “Tantalum’s unique capacitance allows the design of progressively smaller, more powerful and more reliable electronic products” (ibid p15). Coltan, like cassiterite, can also be easily blended with other ores near production sites thus increasing the challenge of traceability (BSR. 2010).

10.1.3 Tungsten
Amounts of wolframite mined (from which comes Tungsten) and exported from conflict areas within DRC are small when compared to tin and tantalum. As a result there is less pressure on industry to focus on this metal (BSR. 2010). Tungsten is used extensively in several industries, the major one being cemented carbides or hard metals (USGS. 2011). Hard metals are “wear-resistant materials used by the metalworking, mining and construction industries” (ibid). It is also used in heavy metal alloys for armaments, weights and counterweights, superalloys for turbine blades, and substitutes for lead in bullets (ibid). The mining of tungsten again follows a near identical supply network as tin and tantalum as it is often a mining by-product of Cassiterite and Coltan.

10.1.4 Gold
“Gold mined by Egyptians thousands of years ago is just as likely to become part of tomorrow’s mobile phone as gold which is produced using modern mining techniques” (WGC 2011 p8). Due to its high value, gold is possibly the most challenging mineral to address in SSCM, as it can be comparatively easy to conceal, and is recycled in all different areas of the world. Gold is also mined in similar of ASM methods to the 3Ts, but its risks of becoming mixed with ‘dirty gold’ also
lie beyond the smelters and refineries. Given these properties, gold of unknown origins can be included in gold supply chains with relative ease (see figure 2).

The World Gold Council (WGC) has reacted to stakeholder pressure for clean and conflict-free gold and in June 2011 introduced the Conflict Free Gold Standard (CFGS) and Chain of Custody Standard (CoCS). The CFGS outlines the WGC ethical stance and subsequent expectations of its members. It sets out an auditable driven framework for companies to assess their systems and analyse their impacts on those in their supply chain (ibid). The CoCS provides an infrastructure for ensuring that gold is mined according to the ‘conflict free standard’ and its supply chain remains intact to its intent through auditable chain of warranties (Ibid). Gold is used in a range of products including electronic, aerospace, medical equipment as well as jewellery.

10.2 OECD Due Diligence
The OECD due diligence guidelines (DDG) provides management recommendations for responsible supply chain management. (OECD DDG. 2011). It aims to help companies avoid being connected to with human rights abuses and the sourcing of minerals obtained from conflict or high risk areas that help fund armed militia groups (ibid). Both upstream (ASM, LSM and local mineral traders/exporters) and downstream (metal traders, product, component and OEMs) are offered voluntary guideline measures to mitigate risk to The OECD DDG are a direct response to the Dodd-Frank Act, Section 1502 and set out a framework to incorporate the following:

*Establish strong company management systems*

*Identify and assess risk in the supply chain*

*Design and implement a strategy to respond to identified risks*

*Carry out independent third-party audit of supply chain due diligence at identified points in the supply chain*

*Report on supply chain due diligence*

(OECD DDG. 2011)

DDG are suggested to be complimentary to other industry tailored solutions such as the International Great Lakes certification scheme, CFS, ITRI and the Conflict Standard and Chain of Custody Standard of the World Gold Council (WGC).

10.3 EICC
The EICC promotes an industry code of conduct for global electronics supply chains to improve working and environmental conditions (EICC. 2011). It encourages adoption of CSR best practices for businesses and its suppliers focusing on 5 key performance areas: Labor, Health and Safety,
Environment, Management Systems, Ethics (ibid). Its code is available in 16 different languages and contains over 60 global electronics companies (ibid). It provides tools and programs that assist in auditing, risk assessment and in particular has become a leading group in tackling the issue of conflict minerals being extracted from central Africa. The ECCI, along with the Global e-Sustainability Initiative (GeSI) have been drivers in establishing the Conflict-Free Smelter program (CFS) which has successfully established 5 tantalum compliant CFS since September 2010 (CFS. 2011). The CFS Aims to provide a list of 3TG CFS, by country and company, based on due diligence compliance with the Dodd-Frank Act, Section 1502. Through independent third party auditing, minerals entering CFS will provide an assurance to downstream buyers that these minerals did not originate from conflict areas within the DRC. The CFS program also provides database tools and templates to help businesses in tracing their suppliers materials.

10.4 GeSI
The GeSI is an industry group focuses on devising technology-based initiatives to sustainability issues. GeSI is involved with climate change, energy efficiency, e-Waste, public policy and supply chain management ICT initiatives. GeSI has been instrumental in the working partnership with the EICC to implement ICT-based solutions to CFS metals and minerals tracing as well as more general social and environmental supplier auditing systems. It’s standardised data management systems streamline information for network members, reducing time and costs that occur from duplication and inconsistencies between suppliers and buyers (GeSI. 2011). As well as its involvement with the CFS program, GeSI has been active in data collection through the ITRI program.

10.5 International Conference on the Great Lakes Region (ICGLR) Certification Scheme
The ICGLR comprises eleven member states surrounding the Great Lakes Region, brought together to promote sustainable peace and development (ICGLR. 2011). It has a number of projects designed to provide:

*Peace and Security*

*Democracy and Good Governance*

*Economic Development and Regional Intergration*

*Humanitarian and Social Issues*

(Ibid)

As well it has developed the ICGLR certificate scheme. The certificate is based on mine site inspection, chain of custody tracking and certification of exports. Such a certificate will be evidence that the minerals were obtained from conflict-free mines and have been exported with all duties and taxes properly paid. Certificates will be written in all relevant languages, follow a standard format and contain information that is clear about the origin of the minerals (such as
mine, exporter, importer, type, weight, purity). To complement the certificate, a public database will contain all sales and purchase information, with the ability to cross-check mineral loads to verify compliance with ICGLR and OECD guidelines (PAC. 2011). Accurate tracking and tracing will be able to show the mineral flow, into and out of African countries (ibid). Third party audits are conducive to the legitimacy of the program.

10.6 International Tin Research Institute

Regarding cassiterite (tin), the International Tin Research Institute (ITRI) has developed and implemented a conflict free bag and tag program which aims to provide a traceable system back to point of origin.

The “ITRI is a UK based industry association boasting membership which in 2010 accounted for 67% of global refined tin production” (Verbruggen et al 2011 p24). Some of their members were implicated as buyers of 3T minerals from areas controlled by armed groups (ibid). As a response, the ITRI initiated the Tin Supply Chain Initiative (iTRCi) which aimed for “a phased and constructive approach towards improved due diligence, governance and traceability” (iTSCi 2009, p. 7). iTRCi is aimed for upstream companies to be sure of receiving conflict free minerals through the bagging of the minerals at extraction and processing points (ITRC 2011). Accompanying these bags are bar-coded labels detailing information about the mine and negociant, which should be combined with additional data collection in comptoir logbooks (ibid). Information such as mining site, negociant, comptoir, transporter, date, time, weight, buyer, price, transportation route, transport method, security should be subsequently uploaded to iTRCi electronic databases (ibid). This process is also designed to be open to 3rd party auditing. The iTRCi scheme however has been strongly criticised by Global Witness for failing to address the problem of illegal taxing by warring armed groups or that the regular army was illegally benefitting from the industry (Global Witness 2010; Verbruggen et al 2011).

10.7 German Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe - BGR)

As well as bag and tag mineral traceability measures in the DRC, a chemical tracing program has been in the development by the BGR since 2007. Referred to as ‘fingerprinting’, technology has been developed which can trace coltan ore back to a close proximity from whichever mine it came. Electron microscopes identify the minerals grains of the ore, zooming in to analyse major and minor components as well as their isotopes which can be matched against conflict-free ore samples (Gorski.2010).

BGR has also been developing a certification scheme in combination with Rwandan mining companies, to test trial minimum standards based on OECD and voluntary CSR standards through third party auditing (BSR. 2011). The fingerprint method acts as an additional piece of evidence to
support conflict-free point of origin certification. Both of these schemes are hoping to be extended to cassiterite and wolframite.

10.8 Interview questions
Questions varied depending on the industry of the interviewee.

10.8.1 Incorporating conflict minerals into sustainable supply chains.
What is your role and responsibility?
How do you define sustainable supply chains (SSC) management?
Does Company X have a SSC management program? -Alternate name of program
Can you describe the internal processes that guide Company X’s SSCM strategy?
To what tier does your company inspect or audit suppliers?
Can you describe your supplier network? Size of suppliers, geographic locations, understanding of sustainability, which conflict mineral types are used?
What, if any trade-offs are made when apply SSCM?
Are ethically sourced minerals viewed as comparable to other raw materials such as timber or when apply SSCM?
Does your company have a chain of control policy/plan for conflict free minerals from supplies?
How much influence do you think your company has to affect this issue?
Do you have corrective action management plans?
At what stage is the plan developed and how many supplier tiers does this involve?
What challenges have you encountered or foresee when adopting such policy?
Positives and/or negatives of OECD DDG?
Are you involved with any cost sharing activities to implement DD?
How do you inform your stakeholders (suppliers in particular) about dealing with conflict minerals?
Which stakeholders are cooperating with you to address conflict minerals? (eg. Government, NGOs, Industry collaborations initiatives)
What support have you received from stakeholders?
Do you have a pilot program following OECD guidelines?
Is Company X’s approach based upon any other processes set up by other companies?

Do you think 3rd party certification would be constructive in dealing with conflict minerals?

Do you think a conflict free mineral supply chain is attainable?

What benefits will occur if Company X can source conflict free based components?

How can you achieve ongoing evaluation and improvement?

### 10.8.2 Incorporating conflict minerals into sustainable supply chains. (Gold)

What is your role and responsibility?

Will CFS extend to CF refineries? What is the current progress?

Is auditing CFGoldS different from 3T? Are there any other initiatives similar such as conflict free refineries?

Is there any coordination with downstream business (eg. cost sharing, limited vertical integration)? Are they using the dashboard template?

Recycled gold does not come under Dodd-Frank, but is this an area that you engaged with downstream suppliers recycling gold?

Some have suggested there is still the possibility of conflict minerals entering supply chains after CFS have been implemented. Is this applicable to gold (non-scrap/non-recycled)?

Which stakeholders can most influence incorporating conflict free minerals into supply chain management? Retailers, OEMs, component manufacturers, mineral companies?

Have DRC operations changed/will change to address Dodd-Frank?

Why do you think there’s been such poor Australian industry reaction – to your knowledge, would you say Australian industry is usually behind on issues like this?

Will Dodd-Frank put pressure on the price of gold?

Will Dodd-Frank be undermined by developing nations?

Is there a correspondence to the dirty gold campaign?

Can you suggest other people to talk with?
### 10.9 Primary/Secondary Case Studies

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<tr>
<td>Leading Edge</td>
<td>Buying Group</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
</tr>
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<td>Harvey Norman</td>
<td>Retailer</td>
<td>No</td>
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<td>Limited</td>
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**Key:**
- **A**: Company name
- **B**: Domestically-based
- **C**: CSR/Sustainability annual report
- **D**: Ethical sourcing/Traceability policy/Code of conduct for suppliers
- **E**: Public conflict minerals policy
- **F**: Australian industry reaction to conflict minerals
- **G**: Environmental sustainability programs
- **H**: Social sustainability programs
- **I**: Centrality
- **J**: Density
10.11 Industry Experts Interviewed

Thomas Kentsch - Corporate Responsibility Supply Chain Manager at Siemens Corporate Level

Mark Davis – Global Witness (Email interview)

Sasha Lezhnev – Enough Project (Email interview)

Caroline Walker - Interim Head of Sustainability at Pace PLC (Email interview)

John Hall – General Manager External Affairs at Rio Tinto Diamonds/Vice Chairman for World Jewellery Council

Richard Arthur Naylor – Director at Alliance Electronics
10.12 Usage of the 3T’s and Gold

Usage of the 3 T’s and Gold

- These metals are used widely in electronics products (including automobiles and appliances)
- Phase-out/substitution of some of these metals is not currently cost effective, or technically feasible
- The amount of these metals used in a typical electronic product are in the order of about 0.7 grams for tantalum, 10 grams for tin, 0.0001 grams for tungsten, and 0.3 grams for gold

### Usage of the 3 T’s and Gold (cont’)

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Note: These are typical or potential uses, and may not be found in all components/parts

(EICC. 2010)