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Opportunities and Challenges for OSM Researchers - A Focus on Counterfeit Products in the Supply Chain

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1. Introduction

As the competitive landscape evolves, opportunities and challenges for Operations & Supply Management (OSM) researchers continue to emerge. One area where this is currently evident is counterfeit production. While counterfeiting has been commonly associated with currency and luxury items, with growth in outsourcing, increasingly global and complex supply chains, greater freedom of trade and labour movement, and new distribution channels, including the Internet, it is now a significant problem across a broad range of products in B2C and B2B contexts. Industries affected include pharmaceuticals, apparel, electronics, automotives, and aerospace, where there is high reliance on R&D and innovation. Using, e.g., reverse engineering, counterfeiters bypass years of investment, rapidly imitating products and profiting on the back of brand names and marketing campaigns. The Counterfeit Intelligence Bureau (CIB, 2008) estimated that counterfeiting accounts for 5-7% of all world trade, worth an estimated US\$600 billion/year.

Counterfeiting is closely related to parallel importing (i.e., price diversion or the “grey market”, see Myers & Griffith, 1999; Maskus, 2000) where goods are produced legitimately but diverted from a lower-priced into a higher-priced market without the authorisation of the local Intellectual Property (IP) rights owner. This leaves behind unfulfilled demand, often satisfied by counterfeit products. Not only do counterfeits affect jobs, revenues, brand integrity, share price, etc, they are a disincentive to innovation and linked to the funding of organized crime and terrorism. Moreover, counterfeits may not have been made to the same standards as the products being imitated; in industries such as pharmaceuticals and automotives, poor quality counterfeits can be fatal. Many examples are provided by the International Chamber of Commerce (ICC, 2008), including cases of counterfeit components being found on military aircraft and space shuttles.

The phenomenon is now of high interest to supply chain (SC) practitioners - reflected by recent articles in industry-oriented publications (e.g., Whitehead, 2003; Wald & Holleran, 2007) - but has received little attention in leading academic journals. While the influential work of Chopra & Sodhi (2004) on SC risk raised concerns over the security of IP as a result of global outsourcing, of the nine SC risks the authors present, it is arguably the one which is least well understood.

Section 2 focuses on counterfeiting in the automotive sector – an industry in which OSM researchers have a longstanding history of conducting research - before OSM-related topics that can be expanded to consider such emerging phenomena and employed to further understand, explain and reduce counterfeit activity in the SC are outlined in Section 3, providing research opportunities to be exploited. In Section 4, challenges for researchers to overcome, such as how existing research methods can be adapted to explore emerging phenomena, are discussed. Concluding remarks are provided in Section 5.

2. Counterfeiting in the Automotive Industry

In recent times, much automotive manufacturing has been transferred from the West to low cost economies, e.g., in Eastern Europe and Asia. Taylor & Taylor (2008) referred to Donnelly et al. (2002) in stating that the automotive sector is “probably the most globalised industry in the world”. To manufacture in low cost economies, e.g., China, many large automotive companies have entered into joint ventures with local firms. Western companies have provided designs, state-of-the-art technology, and training to local companies, and, in doing so, introduced new SC risks. Jiang et al. (2007) stated that “as companies consider transferring processes and technologies ... they need to consider China’s historically lax enforcement of laws protecting proprietary information and processes”.

It is perhaps no coincidence then that the most globalised industry in the world is also one of the most heavily counterfeited, both in terms of the infiltration of counterfeit automotive parts into the SC and aftermarket, and, the cloning of entire models. The following briefly explores counterfeit automotive parts before counterfeit car production is discussed.

2.1 Counterfeit Automotive Parts

A report by the Coalition Against Counterfeiting and Piracy (CACCP, 2006) estimated that counterfeit automotive parts cost Ford Motor Company US\$1 billion and the industry as a whole US\$12 billion/year. Parts known to have been counterfeited include: wheels, engine hoods, spark plugs, windscreens, shock absorbers, and brake discs. The importance of this issue is also evident in one of BMW’s marketing campaigns for “genuine BMW parts” (BMW, 2008).

A supplier, producing automotive parts for an OEM, may seek to increase their revenue by using the OEM’s machines out-of-hours, producing extra batches, perhaps from a substandard material or by reworking scrapped parts, and selling them ‘through the back door’ to other customers with the trademark and/or packaging of the OEM (Minagawa et al., 2007). Counterfeit parts also enter the aftermarket, being bought by garages and fitted to cars when replacement parts are required. Haley (2003) explained that “Volkswagen sells only a third of the replacement parts for the 1.5 million Santanas driven in China ... makers of bogus unauthorized parts claim the other two thirds”. There is also a lucrative grey market in automotive parts (Miano, 2004).

2.2 The Counterfeit Car

Many of the best-known automotive and motorcycle manufacturers in the world have been on the receiving end of alleged cloning from Chinese firms. For example, the (alleged) clones of: General Motors’ Chevy Spark by Chery Automobile, called the “Chery QQ”; Honda motorcycles by the Chongqing Lijan Industry Group, branded with a “Hongda” logo; Daimler Chrysler’s subsidiary Smart Fortwo by CMEC, called the “City Smart Car”; and, Toyota cars, and logo, by the Zhejiang Jili Group called the Geely Merrie. Some counterfeiters purchase former factories and/or old machines of genuine producers, use the same suppliers, and employ from the same labour pool; employees arrive with expertise and IP, even if not the rights to it. Modularity is prevalent in the automotive sector (Doran, 2003) and, arguably, this aids counterfeiters as genuine products can be more easily disassembled and reverse engineered. New technologies are also used to scan a genuine part or model, develop a 3D image, produce a rapid prototype, and then mass produce it.

3. Opportunities for OSM Researchers

In the available literature, the emphasis for combating counterfeiting is not on prosecution (compensation is often exceeded by the costs of bringing cases to court) but on collaboration. Minagawa et al. (2007) provided a rare empirical study from the perspective of Chinese manufacturing companies, focusing on non-consensual acquisition of technology. The authors recommended that firms should consider collaborating with infringers of IP before resorting to legal action. Jiang et al. (2007) explained that after Honda’s designs and brand were counterfeited in China, it established joint-ventures with Chinese imitators, recovered its market share and took advantage of local low costs to export motorcycles more cheaply.

CACP (2006) described how Ford is tackling counterfeit parts in their SC by building close relationships with legitimate suppliers. Because car production is such high volume, repeat orders from Ford are more important than any gain a supplier could get from counterfeiting. In addition, collaboration with: governments, to develop/enforce laws against counterfeiting; customers, to educate them and devalue counterfeits; auction sites, to monitor counterfeit and grey market activity; and, similar firms, to share information, may also be prove effective.

Many OSM fields of research may be enriched, and new insights into existing topics uncovered, by considering emerging phenomena. There are many opportunities for researchers to use and adapt existing theory to consider counterfeiting and help managers develop effective strategies to protect innovations. As a starting point, consider the following:

- Contracts (e.g., Tsay, 1999; Giannoccaro & Pontrandolfo, 2004): A sizeable literature on contracts exists. Accountability if counterfeit parts are discovered in the SC, or if IP is stolen, should be considered.
- Operations and marketing coordination (e.g., Whang, 1995; Malhotra & Sharma, 2002): Counterfeiting and the grey market should be considered when determining local pricing strategies. For example, does the price of the product make it attractive to counterfeiters?
- RFID (e.g., Cannon et al., 2008): Debate continues over the cost effectiveness of RFID for some product types, particularly when related information systems are considered. RFID can assist in combating counterfeiting by verifying product authenticity; this should be considered in cost-benefit analysis.
- Supply chain risk and mitigation (e.g., Chopra & Sodhi, 2004; Neiger et al., 2008): Further consideration should be given to the risk of losing IP. The products at most risk of counterfeiting, and the points in the SC at most risk of being infiltrated by counterfeiters, should be determined.
- Knowledge management (e.g., Siemieniuch & Sinclair, 2004; Hult et al., 2006): How to strike a balance between close ties with SC partners and protecting knowledge of designs and production procedures from potential counterfeiters should be considered.
- Quality management (e.g., Sousa & Voss, 2002): While a mature research field, opportunities continue to emerge, e.g., the impact of counterfeit components on product quality should be explored.
- Supply chain responsiveness and agility (e.g., Fisher, 1997; Christopher, 2000): Counterfeit SCs, e.g., in car production, appear agile and responsive to new product introductions. How this is achieved, given the complexity of a car, and how this compares with the approach to fast fashion in the apparel industry - familiar to many in the OSM domain - should be explored.
- Supply chain design and integration (e.g., Handfield & Nichols, 2002; Howard et al., 2006): Counterfeiting should be considered in design and integration decisions. Some forms of counterfeiting and grey market activity may be prevented if SCs are redesigned so an OEM provides suppliers with just enough packaging and raw materials (just-in-time) and closes the loop so unsold items are returned.
- Outsourcing, global sourcing and supplier selection (e.g., Choi & Hartley, 1996; Bozarth et al., 1998; Holcomb & Hitt, 2007): The link between counterfeiting and global sourcing should be further explored. The threat of counterfeiting should be considered in outsourcing decision models and in supplier selection criteria.
- Product design, innovation and modularization (e.g., Doran, 2003; Howard & Squire, 2007): The ease with which designs can be imitated should be further considered when integrating suppliers in product development and when making products easier to (re-)manufacture. Counterfeiting should also be

considered in relation to product life cycle management as some counterfeits emerge to fulfil demand for replacement parts that a genuine manufacturer has stopped producing.

- Event studies (e.g., Hendricks & Singhal, 2003): Authors have explored, e.g., the impact of SC disruptions and plant closures on share price; studies of the impact of counterfeit court cases on share price could also be conducted.
- Culture (e.g., Buonnano et al., 2005; Ireland & Webb, 2007): Cultural issues at an organizational, SC or national level impact OSM topics such as ERP adoption. Cultural issues are also relevant to counterfeiting, e.g., counterfeiting appears more acceptable in some cultures than others, and should be explored.

In addition, in many areas, there is an increasing shift in focus from the value added by products to the whole value creation package within product-service systems. This can be particularly significant where products are imitated, as genuine producers can compete with counterfeiters by investing in the services that surround a product. But, where services increasingly become the differential, it is these that counterfeiters may seek to imitate. This raises questions, including: what constitutes service counterfeiting? Are services easier to counterfeit and harder to protect than products? While services have received much attention in recent years, there is much scope for further research. Moreover, given the discussion of car repairs, there is a need for researchers and practitioners to take greater interest in the aftermarket.

4. Challenges for OSM Researchers

To explore emerging phenomena, certain challenges must be overcome. The following outlines two of these in the context of counterfeit production:

- *Challenge 1: Determining how existing models are affected by emerging phenomena.*

More and more of the activities critical to the 'typical firm' lie beyond its 'boundaries' and some argue that we are now in an era of SCs competing against SCs, making it increasingly important to consider the SC as the unit of analysis rather than, for example, the firm, for some phenomena. As the competitive landscape continues to change, this must be re-examined. For example, it is striking from the above discussion how much the SCs for counterfeit and genuine products can overlap. Counterfeiters and genuine manufacturers may target the same customers, have shared sources of supply, use the same logistics and distribution systems, and even produce their products in the same plant. If counterfeiting is as widespread as suggested, then limiting studies and the unit of analysis to genuine manufacturers may be inadequate. It could be argued that there is a need to look at the wider collection of legitimate and illegitimate members of the total supply network as activities, such as counterfeiting, may affect existing OSM models or explain unexpected results obtained in SC studies.

- *Challenge 2: Determining how research methods can be adapted to explore emerging phenomena.*

In order for OSM researchers to address a problem, there is first a need to explore and understand it. But which research methods are best suited to exploring this phenomenon most effectively? And, which methods are executable in practice? Arguably, field research, such as an exploratory case study, would be most appropriate for understanding this emerging phenomenon and can be an important step toward theory building (Voss et al., 2002; Eisenhardt & Graebner, 2007). It would be interesting to explore not only genuine manufacturers, and how they combat counterfeiting, but also counterfeiters, how they operate, how counterfeit SCs form, and how/where legitimate and counterfeit elements overlap. The former is complicated because some genuine manufacturers are reluctant to openly discuss counterfeiting, in case it affects consumer confidence and brand perception. With the latter, counterfeiters would be even more

reluctant, even if they could be identified. It is perhaps telling that in the case studies of Minagawa et al. (2007), the authors referred to interviewees as “informants”. Moreover, the CACP (2006) report stated that “undercover work is ... vital because black or grey market suppliers and their customers ... tend to be a tightly knit community that can be tough to penetrate ... Infiltration is a tough job that requires knowledgeable investigators who can talk the talk” (CACP, 2006). This has implications for the role of the researcher and the skills they would require.

5. Concluding Remarks

Using counterfeit products as an example, this paper encourages OSM researchers to explore emerging and interesting areas otherwise neglected in the literature. In doing so, existing theoretical concepts and research methods may be adapted. Exploring neglected and emerging areas may shed new light on existing problems or rationalise previously unexpected results, improving our understanding of the behaviour of SCs and their performance. If this cannot be described as looking at operations and SCs through a different lens then perhaps it can at least be described as viewing them in widescreen.

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