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Smartphones tune into the Supply Chain

Dr. John L. Hopkins
Victoria University
PO Box 14428
Melbourne, Victoria 8001
AUSTRALIA
john.hopkins@vu.edu.au
Tel: + 61 (0)3 9919 1069

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Abstract: This paper explores the impact that Smartphones have on the way modern supply chains operate, examining how the mobility they offer can completely alter the way users communicate, do business, interact, plan and most importantly *think*.

A preliminary survey was conducted amongst Australian business users of Smartphones, which aimed to identify the type of user they were, what role and industry they were from, and what impact Smartphones had on their working behaviour. Results from this study gave rise to the theory that Smartphone functionality can be split into four distinct categories – *Get*, *Give*, *Store* and *Share*.

In order to test this theory further a programme of industry interviews were organised that ventured beyond the opinions of merely the user, by incorporating the opinions of the Australian network carriers, technology providers, and application developers to validate the survey findings.

Keywords: *Supply Chain Management, Smartphone, Mobility, Convergence*

1. INTRODUCTION

1.1 Background

Smartphones are a combination of the Personal Digital Assistant (PDA) and the mobile phone, regarded as either a mobile phone with PC-like functionality or, more increasingly, a pocket computer that can also be used to make phone calls (Holger 2003) . Unlike traditional mobile phones Smartphones are data-centric and capable of running third-party software applications (Cheng et al. 2007), the convenience of this

“all-in-one" device making them very attractive to a wide range of users, which resulted in global sales of these devices surpassing 36.4 million units in the first quarter of 2009 (Gartner 2009).

Typical functionality of Smartphones includes; mobile Internet access, eMail, calendar/diary, world clock, video and audio communication, full keyboard interface, software execution capability, access to downloadable programs and content, voice and image/video capture, SMS, MMS, data storage, Global Positioning System (GPS), Wireless (WiFi) and Bluetooth connectivity, mapping and the capability of synchronising with other devices (e.g. laptops & desktops). Their compact size, and ‘always on’ functionality, makes them more practical than a laptop in many environments (BenMoussa 2005), presenting users with a greater level of access to information and people, anywhere at anytime. This can give rise to enhanced decision making capabilities, rapid response times, and creates user-centric environments (Basole 2004).

In its short life the Smartphone has rapidly evolved from simply an upscale version of a mobile phone into a miniature computer, a technology platform in its own right, with its own growing market of downloadable customised software applications. The versatility of these devices, leading them to be dubbed the ‘Swiss army knife of the digital age’ (Munro 2009), is largely contributable to a design that facilitates third party software developers being able to produce and deploy their own applications directly on the phones (Aanensen et al. 2009). These applications, or *Apps*, are basically executable programs that can be installed and run on the devices to extend their factory fitted functionality. To give an indication of the size of this new market

there are some $200 million worth of applications sold in Apple's iPhone store alone every month, from a range of over 100,000 on offer, adding up to about $2.4 billion a year (AdMob 2009).

How information is received, used and shared is the key to unlocking new value added business applications. Smartphones have the capacity to increase the amount of information we can consume and distribute, and the times/places where we can do it, adding a valuable level of *mobility* to the way we work. This need for on-the-go communication is therefore motivating application developers and service providers to target Smartphones as a universal end point for data access and networked computing (Zheng & Ni 2006).

In business environments a visionary approach to technology, the possibilities that new technologies such as mobile commerce (m-commerce) can bring, and the application of that technology dominates the understanding of business benefits (Snowden et al. 2006). These handheld devices can impact across the entire supply chain; from Supplier Relationship Management (SRM), Procurement, Operations Management, and Logistics, to Customer Relationship Management (CRM), Sales & Distribution, and Reverse Logistics. Smartphones, widely available and low in cost, can completely alter the way individuals and organisations communicate, do business, interact, plan and most importantly *think*.

The objective of this research is to explore the impact that Smartphones have had on the way supply chains currently operate; to recognise instances where added value has

been realised, and to hopefully identify gaps in the supply chain where new value may be created.

Australia, with 2.1 million Smartphones sold in 2009 and sales expected to grow at 30% year on year until 2013 (Gartner, 2009), also has the fastest mobile Internet growth worldwide (Barton 2009), making it a an emerging market in this field and a particularly interesting region upon which to focus the study.

2. METHODOLOGY

The larger research project has been designed to take the form of a three-stage investigation:

Stage 1:

Conduct a user survey to identify current user behaviour and recognise characteristics of the Smartphone services that bring value for business users.

Stage 2:

A programme of face-to-face interviews with key industry figures; from the Australian network carriers, technology providers, and application developers, to validate the initial survey results, build up a more detailed picture of the market from a number of different perspectives, and test any emerging theories.

Stage 3:

Apply the results from Stage1 and Stage2 into a supply chain environment. To do this a secondary programme of interviews, with key Australian supply chain figures, will

examine the ways in which supply chains currently communicate and hopefully identify potential future areas of value that can be created through the utilisation of Smartphone technology.

To date, Stage 1 of the study has been completed, and some early results from Stage 2 have also been collected. The initial survey was conducted, amongst known Smartphone business users, to gather basic early behavioural information into how these devices are being utilised. A set of questions aimed to identify the type of user they were, what role and industry they were in, and in what ways Smartphones impacted on their working lives.

Questions included:

- *Company Name:*
- *Position:*
- *Sector:*
- *Smartphone Brand/Model:*
- *Was your handset issued by your employer or is it self-purchased?*
- *One a scale of 1-5 what impact would you say your Smartphone has had on your professional role?*
- *Which features of your Smartphone have had the biggest impact on your role?*
- *What Apps have you added to your device to increase its functionality and assist with work related tasks?*
- *In what ways would you say your working behaviour has been affected by the added mobility a Smartphone brings?*
- *What functionality does your device currently not have that you see as being valuable to you in your role in the future (either built in functionality or new App etc.)?*

Questionnaires were e-mailed to known Smartphone users throughout Australia with subsequent hard copies being distributed at trade and networking events. A Smartphone-friendly online version of the survey was also developed via Surveymonkey.com, a link to which was sent out to 550 additional users, thanks to a collaboration forged with MobileMonday Melbourne; the local chapter of a global community of mobile industry visionaries, developers and influentials, fostering cooperation and cross-border business development through virtual and live networking events that share ideas, best practices and trends from global markets (MobileMonday 2010).

Fig.1: Smartphone-friendly version of Stage 1 Questionnaire

3. RESULTS

3.1 Stage 1 Survey Results

Results from this initial survey revealed a number of facts. The Smartphone service recognised as bringing the most value to business users was that of mobile access to eMail. 87% of the respondents highlighted the ability to send and receive eMails, regardless of time and location, and to therefore be able to respond to requests or new information more rapidly, as having significant value in their working lives (Fig.2). The facility of accessing, editing/updating, and synchronising their Smartphone calendar/diary with other devices was seen as bringing the value to 39% of users, with mobile Internet capability (30%), and GPS/Mapping (22%) also figuring prominently. Social Networking also seems to be rapidly becoming a significant part of business peoples' lives, being mentioned in this part of the study by 17% of respondents.

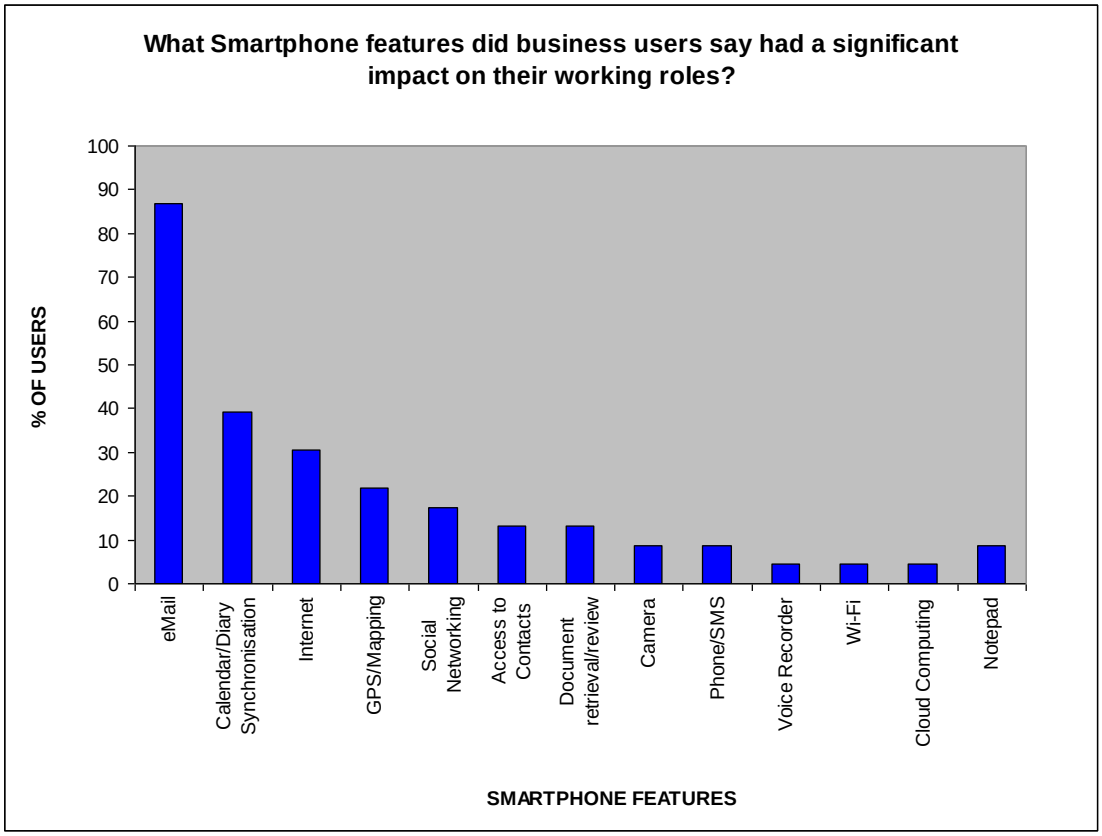

Fig. 2: Smartphone features seen as having significant impact on business users

When asked how working behaviour has been affected by the added mobility a Smartphone brings the most popular response was *greater responsiveness* (27%). In addition to this Smartphones were also seen as a tool that enables users to perform more tasks remotely (18%), and one which means they are constantly contactable (19%), regardless of working hours, facilitating greater levels of flexibility (9%).

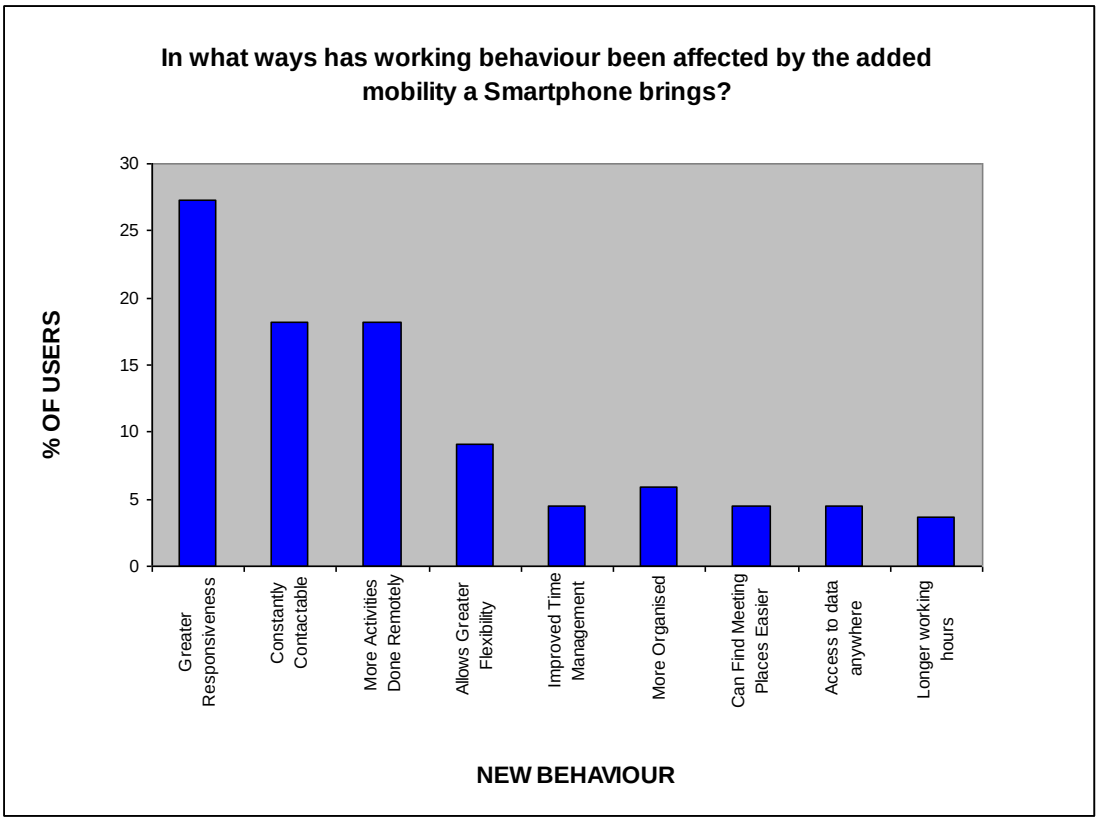

Fig. 3: Behavioural changes attributable to Smartphone mobility

The perceived overall impact of Smartphones was assessed on a Likert Scale, where 36% of respondents returned a verdict of a *Very High Impact*, 22% a *High Impact* and 32% a *Moderate Impact*. Nobody in the study thought Smartphones had no impact on the way they worked (Fig. 4).

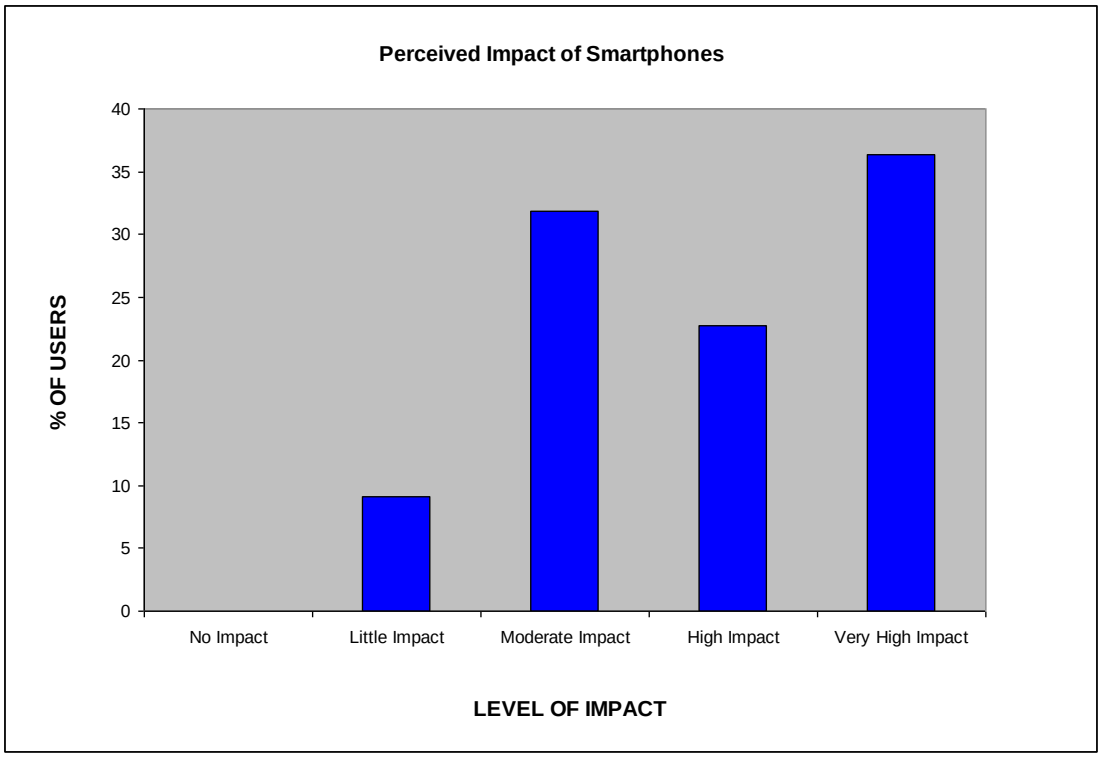

Fig. 4: Perceived Overall Impact of Smartphones

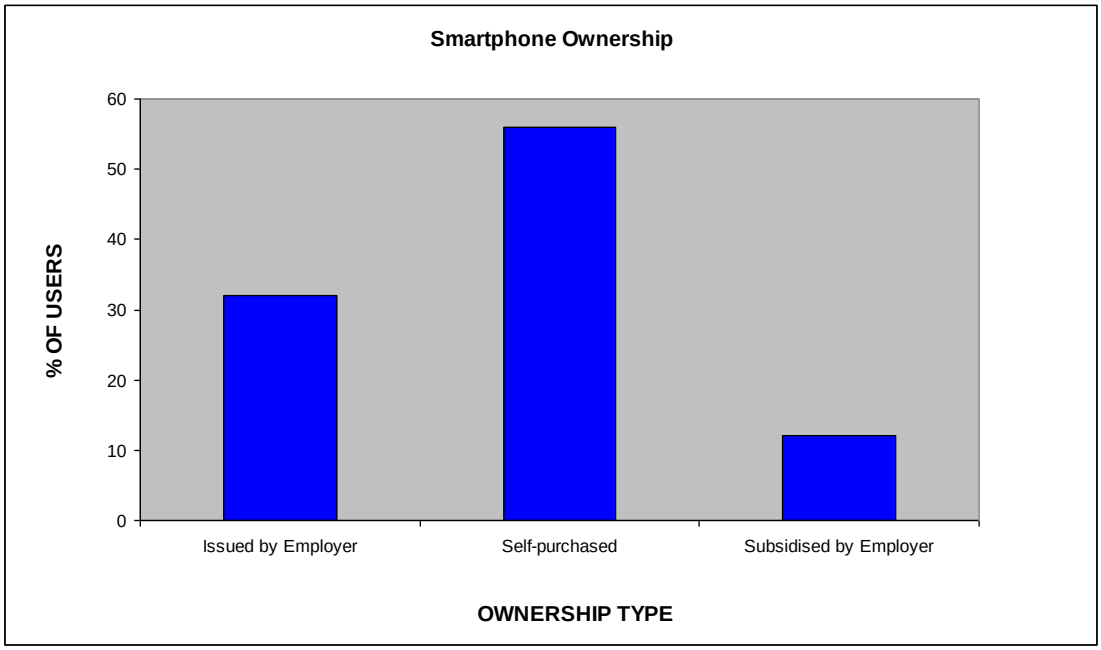

Fig. 5: Smartphones Ownership

Smartphone ownership appears to be principally in the consumer market, with individuals using their personal Smartphones to assist with tasks in the business

environment, with 56% of handsets owned by the individual. Only 32% of Smarphones in the survey were issued by the employer, although 12% were subsidised to some extent.

In terms of desired functionality, not currently built into their Smartphone or available as an App, there were no clear trends identified that suggested a single function as being in particular demand. However, the ability to multi-task (run multiple applications simultaneously), edit MS Word and Powerpoint documents, view Adobe Flashplayer material, and mobile payment facilities figured slightly more prominently.

3.2 Theory Building

On examining these results it was observed that there were a number of similarities in the Smartphones characteristics that were impacting business users' lives; through the accessing of, storing and sharing data.

Advances in information technology have led many companies to realise a world of leveraged knowledge (Lesser, Fontaine & Slusher 2000), where knowledge is regarded as information that has been authenticated and made actionable (Maglitta 1996; Vance 1997). According to the work of Alavi & Leidner (2001) the management of this knowledge involves distinct but interdependent processes of knowledge creation, storage, retrieval, transfer, and application. Using this as a reference point it was theorised that the value Smartphones bring to business users, in

terms of the availability of information, that can be categorised into 4 main areas – *Get*, *Give*, *Store* and *Share.* Where:

- *Get* services are defined as features that create value for the user through their ability to retrieve information, regardless of time or current location,
- *Give* services are those defined as instances where the ability to send information to somebody else, regardless of current location, creates value for either (or both) party,
- *Share* services arise when two or more users gain benefit from being able to share, or exchange, information concurrently,
- *Store* services create value through the storage/recording of information or knowledge for future use or distribution.

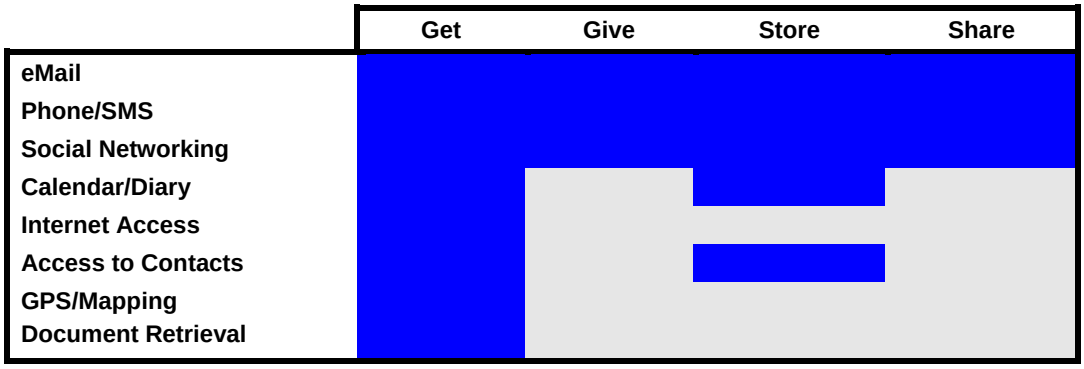

Fig. 6: Theorising how Smartphone impact can be defined by four distinct categories

The way in which the user gains value from their Smartphone was defined as being one, or a combination, of these four types (Fig. 6). For instance; the value from an eMail conversation can be one of getting information (from a sender), giving information (that you have to somebody else), or sharing with an unlimited number of recipients simultaneously. On the other hand, Internet access is primarily employed in *getting* information for personal gain – this information can, of course, be given and

shared with others (by eMail etc.) but in the first instance the initial value gained is in *getting* it.

3.3 Theory Testing

In order to test this new theory, and validate the results from the Stage 1 survey, a programme of industry interviews were organised that venture beyond the realms of merely the user, by gaining the opinions of representatives from the Australian network carriers, technology providers, and application developers. It was deemed necessary to gain opinions from each of these different perspectives in order to not only validate the early results and theory, but to also building up a broader vision of the Smartphone market.

Face-to-face interviews were seen as a particularly effective mechanism for extracting first hand expert information about the industry, as well as other useful 'off script' information and opinions that often arise during interview conversations. These interviews were planned to be initiated, and/or supplemented, by Skype, telephone, and e-mail contact. Each response would be analysed on an individual basis, against other responses, and in alignment with existing academic theory.

It was hoped that gaps in the current service range might be identified, and explored, and that recommendations could be made on possible areas in the supply chain where new value could be created through the application of Smartphone technologies.

Early results from Stage 2, based upon just a small sample of the scheduled interviewees from the Smartphone industry, indicate strong agreement for the developed theory, but with a need to include reference to the enhanced *management* decision making capabilities now also possible.

All of those interviewed were aware of the importance of eMail, Internet access, mapping and diary synchronisation to the Smartphone market, and representatives of the two carriers interviewed so far highlighted their current focus on the consumer market, as opposed to business customers, which is supported by the 56% ownership figure emerging from this study.

4. CONCLUSIONS

Smartphones, like much information technology, are essentially time saving devices. They make possible the rapid exchange, and sharing, of information. This information allows users to make quicker, more informed decisions, which in turn increases response time and flexibility; two key factors in gaining competitive advantage (Stalk Jr 1988).

Responses from the Stage 1 questionnaire survey gave rise to the theory that the value Smartphones bring to business users can be categorised into 4 main areas – Get, Give, Store and Share. In testing this theory, by gaining reaction from a series of face-to-face interviews with figures throughout the Smartphone industry, there already appears to be the need to include at least one additional category to the original theory: *Manage*. This describes that functionality which allows managers to make more efficient decisions due to the improved manner in which they receive

information and can contact employees; outside normal physical/geographical and time constraints.

This research will continue to examine the opinions of the Smartphone industry, in relation to the Stage 1 survey results and emerging theory, before later applying the results in a supply chain environment.

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