Editorial

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Biographical notes: Elizabeth Fife is an Associate Director of Industry Studies at the Institute of Communication Technology Management (CTM) in the Marshall School of Business located at the University of Southern California (USC), Los Angeles, USA. She has co-authored numerous conference and journal papers, papers and book chapters examining issues in the networked digital industry: international telecommunications markets, mobile user behaviour, development and ICT adoption and innovation. Her current work focuses on the wireless industry and the media/content business. She is the chair of the Global Mobile Survey project, a loosely organised academic research consortium that collects data about mobile phone users on an annual basis. Also, she teaches technical communications, market research methodology and the evolution of telecom/entertainment/digital markets at USC and elsewhere.

This special issue was in part motivated by the need to synthesise the various separate efforts going on around the world to study mobile data service usage. Despite the pervasiveness of the mobile phone, the dynamics of mobile behaviour still remain largely hidden. Several of the papers in this special issue are based on data collected through the Global Mobile Survey (GMS) formerly the Worldwide Mobile Data Services Study, which was created in 2002 by academics in Korea, Japan and Hong Kong, the initial leading markets for mobile data services.[1] The goal of this work has been to understand the evolution of user behaviour using an annual standard survey. This project has grown to include over 12 markets around the world, including China, Egypt, Japan, Korea, Singapore, Taiwan, Australia, Germany, Finland, Greece, Hungary, Portugal, Hong Kong, India, Singapore, the USA and others through a loose organisation of universities and research centres.

The project's annual standardised survey of mobile phone users tracks preferences, use patterns and other consumer trends in mobile data services and provides international comparisons on a multi-year basis. An objective has been to provide survey data that is unbiased and in so doing, to provide a counter-weight or alternative view to hype and less substantiated trend analysis. Major drivers supporting adoption such as dimensions of utility, usage and pricing have been identified, often diverging dramatically with industry estimates of growth in data service adoption and use.

The wireless industry is moving rapidly ahead technologically and is arguably the current centre for innovation both on the consumer side as well as in health, security, tracking and other areas. Data collection on a global basis using multiple methods would not only provide the descriptive statistics needed to track usage, but also allow for deeper analysis of the factors that affect adoption across regions and within markets. Variables such as pricing plans, policy and regulation, technology trajectories and cultural factors all seem to have varying degrees of influence, but researchers struggle to attain broad conclusions based on incomplete data. The need for data also underlies other current debates and strands of research as new operating systems, platforms, advanced devices and networks for mobile and wireless systems are introduced. This special issue is intended to bring to light the practical and theoretical issues attached to understanding a 'moving target' – mobile data users.

This special issue is unique in the breadth of primary data sets that are presented – national surveys as well as data gathered from handset-based software, traffic measurements and carrier usage data. In addition to presenting several different methods for collecting user-data, various well-known analytical models including variants of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are adapted and applied (Venkatesh et al., 2003; Davis, 1989).[2]

As mobile data service revenues and data use patterns continue to surprise, questions surrounding mobile phone usage remain significant. Leading markets for smartphones such as the USA and Korea are not seeing broad adoption of mobile data services beyond web-browsing and communication-related services. For example, the dramatic growth of smartphone penetration in the USA since 2007 along with bundled data plans has increased carrier's data revenues, but nonetheless, widespread use of the mobile phone for a range of other activities including commerce and entertainment is not yet apparent. These similar patterns are measured in a variety of markets with vastly different user-profiles, internet penetration levels and socio-economic and cultural contexts suggest that to some extent, fundamentally, people have a level of similarity in preference when it comes to mobile phone usage. Where the differences exist and where a sweet spot for data service usage can be developed is explored variously in the following research papers. A core issue in all markets remains how to offer data services for a mass market that are as compelling, valued and are as well suited as the primary communication-related activity of the mobile phone.

The growth of 'app stores' has produced a flowering of new content and applications. Combined with strides in general usability, devices and network investments, a wider breadth of data services is now possible. Identifying the demand factors that will drive mass adoption is critical and thus the need for objective and accurate data about consumer usage is desperately needed. Survey data, handset-based usage logs and other methods provide useful statistics. However, as noted by the authors, data gathering needs to be carried out in a comprehensive and continuing fashion so that information can be reliably tracked through time.

Armey, Vladàr and Pereira in Are phones fun? Usage and barriers to adoption for wireless data services among the younger generation of Asians' make use of the GMS project cross-national user surveys to help explain the central question of what makes specific wireless data services more or less valuable to people. They explore demographic and cultural variables affecting mobile user behaviour and find several unexpected patterns among Asian markets – for example, they find that a user's age does not necessarily guide predictions of usage. While younger users seem to generally

display greater interest in more entertaining features like gaming and a wider range of data services than older users, price sensitivity and the variance in prices and plans across Asian markets appear to be crucial in ultimately determining what people will use. Across national markets, a user's age affects willingness to pay, but generally all samples with the exception of the USA show a point below which demand is inelastic. Furthermore, in their discussion of innovation models, they note that the concept of 'usefulness' as defined in the commonly used innovation models requires greater refinement to allow meaningful analysis. For example, intense online gamers may have integrated this activity into their lives, and the ability to continue play on a mobile phone offers a utility that matters to this specific group of users, but less so to the business-user. This observation is important because they find that the generic concept of usefulness does appear to be a predictor of wireless data service adoption – narrowing the definition of this concept would enhance modelling abilities. This paper's suggestion that conceptions of 'usefulness' vary across and within countries indicates an area that could be more fully explored.

Next, Pousttchi and Goeke examine Germany, Europe's largest mobile market, where data revenues make up nearly 25% of ARPU (average revenue per subscriber) in 'Determinants of customer acceptance for mobile data services: an empirical analysis with formative constructs'. They find that the bulk of revenues are derived from messaging and access. Advanced data services constitute only a small share of these revenues. To help explain the influences on adoption, they develop a model based on the principal well-established models along with new elements and test their model using their primary survey data set of users collected as part of the GMS project. They find that as is the case with many other technological services and tools, perceived usefulness has a positive effect on the intention to use mobile data services. Echoing the finding of Armey et al., they see varied conceptions of usefulness. Usefulness in their analysis translates into support for personal relationships and daily life activities. Remarkably, saving time or money is not part of the perception of usefulness – as the view that data services are expensive is apparent in survey responses. Another finding of note is the perception that 'enjoyability' is a component of usefulness in the mobile context. The authors note that not only is perceived enjoyment a factor that enhances acceptance of a service, but in fact a service that is not fun to use is simply not perceived as useful. Given that there are often various ways that a specific task can be carried out, users are motivated towards the mobile option if the element of enjoyability is present – this is an intrinsic element of the mobile medium. Furthermore, services that do not produce the perception of enjoyment, such as mobile banking, should be of less interest to the user. Whether this factor plays a role in other markets such as emerging economies, given that there are often fewer substitutes, could be an instructive extension of this study.

Given Korea's early mobile market development, understanding the factors that have driven mass usage in this country and the replicability to other markets is of continuing interest. Kim, Fife, Jun, Soh and Lee's paper 'A study of the loyalty building process in Mobile Data Service usage in Korea' examines customer perceptions towards mobile services in Korea. Despite the famed deep attachment of Korean mobile users to their devices and the integration of mobility into daily life, currently service providers are seeing slight declines in wireless data revenues. Using primary data from a customer survey, Kim et al. are interested in the emotional and functional attachment to the mobile phone and how this translates into loyalty towards wireless carriers. They find that despite the initial rapid adoption of mobile phones and mobile services, Koreans in fact

seem to have a low level of attachment to their service providers and are generally not satisfied in terms of the services that they are receiving. They note a striking difference in overall satisfaction between users who subscribe to 'premium services' and those who have standard offerings, finding that those who pay the most for services also tend to be the most pleased with their carrier and current service package.

Next, Stephanie, Tan, Morales-Arroyo and Sharma compare usage and attitudes towards mobile data services in two markets: Singapore and Los Angeles (LA) California in 'The pervasiveness of Mobile Data Services: Do usage and attitudinal divides exist in Asia and North America?' Using GMS data, they examine user behaviour in terms of geographic influences and identify both differences and similarities. Respondents in LA have higher levels of usage across all categories of services (info, entertainment, info and purchasing) and are more willing to pay than Singaporean users who are more sensitive to price and value. In line with the other papers in this issue, they find that users in both markets are positively influenced by services that have utilitarian value. Second, prior experience with mobile data services in both markets is associated with higher use and higher willingness to try new services (which is more significant in the LA group than among Singaporeans). Interestingly, promotional deals and lowering prices is a more effective motivator for experienced users than for the inexperienced. Additionally, facilitating conditions like better network quality and coverage are also more motivating to the experienced user. These findings point to the need to understand the mass market since their motivations and interest are not necessarily represented by the early adopters – regardless of geographic market.

On the basis of survey data, Khasawneh, Regan and Gillard examine a population that has not been extensively studied in 'Diffusion of Innovation: analysis of internet cellular phone adoption by users in Jordan'. Focusing on a middle-class cohort in Jordan, they also use a modified diffusion of innovation model to interpret results. In line with the other studies in this issue, they find that adopters are interested in usefulness and note the influence of prior experience with technology as a motivating factor driving adoption. Specific to the Jordanian context, they note that the issue of trust could be more important to users than in other markets, given high government involvement in media and communications in Jordan and other Arab countries. They cite other specific macro-level issues that are noteworthy in the Jordanian market: a lack of coordination between the public and private sector, high connection rates, insufficient infrastructure and legislation surrounding electronic applications. This presentation of primary data about mobile internet users in Jordan based on demographic characteristics, attitudes towards and experience with technology and personality traits further extends descriptive knowledge about the evolution of mobile data services from a little studied market.

While the other studies in this issue focus on measuring mobile data service behaviour through surveys and data collection methods, Gupta, Xu and Zhang focus on a specific type of application – Location-Based Services (LBSs). In their paper, 'Balancing privacy concerns in the adoption of Location-Based Services: an empirical analysis', they examine this highly suitable use of the mobile device that provides users with reachability and accessibility that might not otherwise be available, for instance in emergency/safety situations as well as billing, navigation, traffic info and other services. They find that privacy concerns have in fact emerged as a legitimate force of discouragement for technology adoption. Also in regard to people's intention to use a particular service, they find that concerns are based on cost/benefit analysis. Their study seeks to create a model for the adoption of pull-based and push-based LBSs that takes

into consideration the effects of such concerns as privacy. Traditional models such as the TAM have only focused on positive constructs, and neglect the effects of unintended consequences. Their model also considers personal innovativeness as an additional antecedent to traditional technology adoption models. Results from their study show that performance expectancy, effort expectancy and personal innovativeness have a positive effect on LBS usage intention. The value of this study is its foundational work to model LBS adoption, balancing positive antecedents with negative unintended consequences. Given the growth of social networking activities, where the value of privacy of information seems largely subsidiary to sharing and communicating, the work of Gupta et al. appears to have great applicability to other mobile as well as internet-based user activities.

The lack of solid data about mobile data service usage is noted by Smura, Kivi and Töyli in their paper 'Mobile data services in Finland: usage of networks, devices, applications and content', which demonstrates how accurate measurements of mobile data service usage can be obtained. To examine mobile data consumption in Finland, they triangulate usage with multiple sources of data:

- mobile operator usage data

- mobile network IP traffic measurements

- mobile handset monitoring.

Providing a useful framework to analyse usage, which includes all the technical components of mobile data service systems, i.e., devices, applications, networks and content, it is possible to see how different measurement points provide data about each component. Through their data collection as well as secondary sources, they present a profile of mobile data consumption in the Finnish market between 2005 and 2008 that is worth consideration when examining other markets. They find that increased capabilities in the network and devices have not directly generated mobile data usage. While mobile data traffic has increased annually, it is not comparable with the growth in penetration of data capable mobile handsets. Also, the gap between handset capabilities and actual usage is worth further exploration. Essentially, they find that most of the traffic demands that are facing mobile operators are generated by laptop users with flat-rate subscriptions. A notable difference between mobile handset internet traffic and laptop-generated traffic is the prominence of peer-to-peer traffic in the latter.

Echoing Smura et al.'s contention, Verkasalo in 'An international study of smartphone usage' also notes the need for continuous and systematic data collecting of mobile service use. The author describes the results of a data collection effort using handset-based measuring software in five markets: England, Finland, France, Germany and USA. Generating an impressive 347 man-years of smartphone usage data, the study provides comparative usage information of early-adopter behaviour between 2005 and 2006. In line with the other studies collected in this issue, Verkasalo's study reports that most application launches are based on communication between people. In the USA, voice comprises one-third of smartphone usage. Additionally, users in the USA are the most active smartphone users in terms of minutes of use, a somewhat surprising finding given the 'pre-iPhone' period of this study. Americans are also the most frequent users of web-browsing services. Furthermore, among the US users, when web-browsing services are used, they tend to be used frequently. Verkasalo suggests that US subscribers are more active users than those in some of the other markets such as Finland where services

were actually introduced sooner. This may be due to an internet spill-over effect and as well as advantageous bundled deals provided by operators. Given that Verkasalo's data reflects early-adopter behaviour, it would be worthwhile to continue this measurement effort so that changes in user profiles were captured. As smartphone penetration proceeds from the early adopter to the mass market in the USA and elsewhere, identifying use patterns through time would be extremely valuable. The method utilised in this study provides a powerful new dimension of measurement offering potential for large-scale in-depth analysis of the mobile data service market as well as potentially other areas of user behaviour that may become linked to the mobile phone.

The papers collected in this issue present a range of snapshots of the mobile user experience across different national environments including Asia, Europe, the USA and the Middle East. Defying the idea that cultural differences are apparent in use patterns, in fact a few general common points stand out from these various studies. Users in the geographic markets covered by these studies all value the mobile phone highly, but value is to a large extent defined in terms of productivity and communication. This collection of data-driven research to characterise and analyse mobile data service consumption clearly reveals the need for more comprehensive, and coordinated large-scale data collection beyond single markets to enable true comparability and analysis of the factors that drive and impede mobile data usage.

Such an effort would require cooperation with operators, statistical gathering organisations and network service providers, an ambitious goal, but one that would reap great reward in terms of targeting investment to support the growth of the mobile service eco-system. Greater coordination and synthesis of efforts would be of great value at the moment in analysing usage in some of the fastest growing and populous telecommunications regions in the world, Brazil, India and China – reliable data about usage, willingness to pay and the context of use are vital to estimate adoption curves for these emerging large-scale market segments. The approaches identified in this compilation of research: user surveys, interviews and handset measuring, combined with macrodata from network-based management approaches provide a holistic view of mobile data service use that would improve accuracy in directing investment in these markets.

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Notes

[1]The GMS, formerly called "The Worldwide Mobile Data Services Study, WMDSS", is a group of independent researchers located in multiple markets in Asia, the USA and Europe who implement a yearly standardised survey of mobile users in their respective markets. The project was initiated by Professor Jinwoo Kim at Yonsei University, and is currently administered by Dr. Elizabeth Fife at the Marshall School of Business, University of Southern California through CTM, the Institute for Communication Technology Management.

[2]See Venkatesh *et al.* (2003) and Davis (1989).