We have entered the digital economy, in which consumers are increasingly connected to the vast digital resources and services on the Internet, to businesses and government agencies, and to each other. The ubiquitous Internet and related technologies have made it possible for pervasive connectivity at affordable prices via multiple channels and a growing range of devices. This is happening not only in developed countries but also in many developing countries. Rapid improvements in mobile search and location based services are also making it easier for consumers to combine online queries with offline decisions in real time.

The rapidly increasing connectivity is fundamentally transforming the way that consumers think and behave, and how they relate to organisations from the private, public and voluntary sectors. The business implications are very profound. Making sense of the connected consumers is fundamentally important to the future business landscape across different sectors and to the long-term survival of many organisations.

New Business Opportunities: Strategic and Organisational Innovations

Over the past 30 years, information systems have been deployed to fundamentally transform business processes and management responsibilities in organisations across different sectors. A wide range of strategic and organisational innovations have been developed to capitalise on the new capabilities afforded by new technologies (Li, 2007a). Identifying and conceptualising such innovations is a central theme underpinning all my research projects.

As consumers become increasingly connected via multiple digital channels, platforms and devices at unprecedented rate, businesses are under increasing pressure to re-evaluate the way they make decisions, manage processes and relationships, and understand and connect with their customers. Some of the new business opportunities are very lucrative but the challenges are also enormous.

For example, the profiles of web users are evolving rapidly. The age distribution of social networking websites in the USA revealed that 60% of all users are under the age of 45, but the proportion of ‘older’ users is also significant and is increasing steadily (Figure 1). Such evolving patterns can inform the use of social media as marketing and distribution channels by organisations targeting different segments of the market.

The rapid growth of connected consumers enables many organisations to co-develop, market and support products and services through online consumer communities. The stories of open-source software developers and Wikipedia are well known, but as the number of web communities grows, new business models are increasingly deployed in other sectors to take advantage of the increased consumer connectivity. In various customer support communities, for example, more experienced customers can give support and advice to those who need help; and the users can share experience and useful tips with one another. If deployed properly, this
not only significantly reduces customer support costs, but also improves customer satisfaction and experience.

As consumers become connected, businesses are increasingly able to gather and analyse detailed data from proprietary, public, and purchased sources, and from online communities at affordable prices. Such analysis can then be used to support business experiments, test new products, business models, and innovations in customer experience and guide decision making, sometimes in real time. The pioneers were leading e-Businesses such as Amazon and e-Bay, but companies from a range of other sectors – from supermarkets and airlines to credit card and media companies - are increasingly exploiting such new capabilities to inform decision making on pricing, promotion, consumer sentiment and the effectiveness of marketing campaigns. However, deploying such new capabilities require not only new data analytic tools, but also significant changes in decision making processes and organisational culture, as well as new technologies and new skill sets that are not readily available.

Furthermore, the increased connectivity for consumers is a double edged sword, because bad news travels very fast. The full business implications of the connected consumers are still poorly understood today, which is clearly illustrated by some recent events, such as the activities around Wikileaks and the perception of consumers about the actions of some businesses (e.g. Amazon, PayPal, Mastercard and Visa), privacy concerns about Facebook and Google, the dispute between Google and the Chinese government, and security concerns with some online banks. To understand the business implications, it is essential to systematically explore the broader social implications and challenges involved (Li, 2007b).

The increasing consumer connectivity also opens up many other opportunities for strategic and organisational innovations. The ultimate challenge for business research is to systematically identify, conceptualise and articulate such innovations and help business leaders understand, adapt and implement such innovations to take advantage of the pervasive connectivity. Making sense of the connected consumers is essential to the long term development of all organisations.

**Major Business Challenges from the Connected Consumers**

The increasingly connected consumers pose significant challenges for businesses and other organisations. Many of the social, political and legal challenges, from privacy, security, identity management and ethical issues, to digital divide and inadequate telecom infrastructure are well publicised (Li, 2007b). In contrast, some of the technological challenges have been overlooked or underestimated. Over the last two decades, it is widely assumed that technological challenges can be resolved over time, by further technological advances and new investments. However, in practice, some technological challenges significantly restrict our ability to introduce new strategic and organisational innovations based on the notion of pervasive connectivity. There is no easy solution to some of the problems under the current economic climate, especially when most organisations are under significant financial constraints and the tenure of CEOs and CIOs has been significantly shortened in recent years.

Today, a growing amount of information about consumers is captured, stored and analysed. Most organisations can gain cheap, extensive access to vast digital resources from proprietary, public and purchased sources, and from the growing number of online communities. However, our ability to systematically extract business intelligence out of the data mountain
remains surprisingly inadequate, despite recent advances in data mining techniques and the rapidly falling costs of powerful analytical tools. The situation is about to get much worse with the increasing connectivity of not only people via personal computers and other electronic devices, but also cheap RFID tags and other electronic devices embedded in different objects that are able to capture and transmit data on a massive scale.

Some supermarkets, for example, have been able to benefit enormously from their point of sale (POS) and customer loyalty card data. However, rapid reduction in the price for RFID tags may lead to their widespread adoption in their supply chains, which will generate massive amount of new data. Such datasets create the possibility of total transparency for the entire supply chain when the movement of every tomato can be tracked all the way to the point of sale - and possibly through the consumption chains as well when smart home technologies become widely available. However, our ability to analyse and make sense of such data will remain a significant bottleneck for some time to come. In the medium to long terms, however, such pervasive connectivity may lead to significant innovations in processes, products and in business models. In the Newcastle Digital Economy Hub, one of our current projects is investigating the potential of activity recognition in the smart kitchen (and the connected homes in general) to interface with supermarkets and health and social care services for disabled or old people.

For many large banks and insurance companies, the technological infrastructure consists of several generations of technologies, from the early day mainframe systems to the latest distributed systems based on SOA and smart devices. Some business processes embedded in legacy systems are no longer fully understood today, and those processes were originally designed to capture and store static data, not for supporting real-time analysis and decision making. The error rate in the data outputs from some of the legacy systems could be as high as 15%, which historically were rectified by additional spreadsheet based data and local tacit knowledge when interpreting the data for decision making. When the systems are fully integrated, however, the errors are amplified in each stage of data analysis and aggregation. By the time it reaches the decision makers, the business intelligence is often seriously distorted. Solutions based on massive data warehouses and AI based tools can improve the accessibility and consistency of the data to some extent, but could not eliminate the errors. Some experts from the financial industries argued that the only real solution is to develop greenfield new systems to replace the multiple generations of legacy systems. However, in reality, such an option would cost too much, take too long, and is too complicated to develop and implement. In fact, even if an organisation chooses to do so, the time it takes to develop and implement the new system means that it will re-create the same problems. Further problems also occur when combining data from internal and external sources. This is why a new retail bank set up by a major supermarket chain in the UK has chosen to buy the entire system from an established bank with all the embedded problems, rather than developing and implementing a new infrastructure, which some experts regarded as a lost opportunity but it is also the low risk option. Such technological challenges will continue to limit the ability of large organisations to understand and effectively connect with their consumers.

To tackle the data mess, many large organisations have over the last 20 years implemented a new layer of technology in their information system, often known as Business Intelligence (BI). However, in most cases, the accuracy and comprehensiveness of the output derived from BI analysis remain difficult to ascertain. The lack of transparency in legacy systems and processes and in different sources of data often result in a level of ambiguity in the outputs, which subsequently impacts the rigour and effectiveness of decision making based on such
results, and which inevitably requires localised, tacit knowledge to interpret. How to extract robust business intelligence from the growing data mountains remain one of the most difficult challenges. The added challenge is that as the ability of organisations to understand consumers increases, consumers themselves are also gaining unprecedented access to information about businesses, their products and services, often through mobile, real time, location-based search and via interactions with other consumers. The dynamism between organisations and the connected consumers will significantly shape the balance of power and the long term development of many organisations.

Digital Transformation of People’s Lives: From Digital Economy to the Digital Society

The internet and related technologies have not only transformed the private sectors and how consumers interact with them. Increasingly these technologies are deployed to transform public services and voluntary sectors, and to tackle significant societal challenges, from ageing and social inclusion to improving the well being of old and disabled people. Most such social initiatives are highly desirable, but their impacts will be limited if they are not financially affordable or sustainable. This calls for the development of suitable business models to ensure financial sustainability and maximum impacts, which depends critically on comprehensive understanding of the rapidly evolving behaviours of the connected consumers and citizens. One of the main objectives of our £12.6 million multidisciplinary Digital Economy Hub funded by the Research Councils UK is to systematically investigate Social Inclusion through the Digital Economy (SiDE). In addition, I have just been awarded £2 million by the Technology Strategy Board (TSB) and ESRC to investigate sustainable business models for assisted living technologies and services in the ageing society.

Social exclusion is a significant societal challenge. It is traditionally linked to low income population from deprived areas, but the situation has become much more complicated when, for example, many old and disabled people from relatively well off backgrounds feel isolated and socially excluded. New digital technologies offer new channels for them to connect with government agencies and services providers, and with families, friends and the wider community in cost effective manners. The challenge is to design products and services in ways that are acceptable and beneficial to the target consumers and citizens, and deliver them in financially sustainable fashions.

In most developed countries, the rapidly ageing population are putting significant new demand on health and social care provision. In the UK, the current demographic trend towards ageing suggests that health and social care in their current forms will soon become unaffordable and will bankrupt the British Government and the UK economy within two decades. This is to simply maintain, not to improve, the current level of provisions. However, new opportunities exist to use digital technologies to enable people live more independently in their own homes and communities – instead of in care homes or hospitals – for longer. Given that old people control a very significant proportion of the nation’s wealth, the ‘silver’ or ‘grey’ market also offers lucrative new opportunities to businesses and voluntary organisations to
develop new products and services for assisted living. Since ageing is a problem facing all developed countries and a growing number of developing countries (such as China), the global nature of the challenge means that new innovations in this area can potentially be adapted and exported to other countries. We need to develop a comprehensive understanding of the perceptions, acceptance and preferences of the connected consumers and citizens for various assisted living technologies and services; and for ambient assisted living environment in general. We also need to identify and explore various constraints for the widespread adoption of such new products and services, from digital divide and digital exclusion to poor broadband infrastructure in supporting advanced services, and make effective policy recommendations. My new project on assisted living is aimed to address these challenges.

The challenge for business and management research is to balance economic and social objectives, and extend and adapt theories and practices developed in the private sector for public and voluntary services. The returns on investment must be broadened to include social benefits and potential savings in health and social services elsewhere. To meet the demands from the increasingly connected consumers and citizens, a new generation of organisation and management theory for the digital economy and digital society needs to be developed.

The Need for a New Generation of Organisation and Management Theory

Since the late 1990s, e-Commerce in the form of online sales has been growing steadily and rapidly throughout the world. In some sectors, from auctions and book stores to insurance and travel, the business landscape has been radically transformed. However, online sales (e-Tailing or e-Retailing) still only represent a relatively small proportion of retailing in all countries. In the US, retail e-Commerce as a percentage of total retail sales has never exceeded 5%. For Australia it was 3-5%. Even in the UK where per capita online spending is the highest in the world (BCG, 2010), the estimated annual figure for 2010 is only about 6% (all non-store channels including mail orders and phone based sales), based on information published by ONS estimated by the BRC/KPMG. The most optimistic estimate, by IMRG, put it at around 10-15% of total retail sales in the UK. The estimate for China is 3.7% in 2010.

Even though the growth of online sales has been consistently higher than retail sales in general in most countries, and the percentage has been growing steadily year on year, it does not change the fact that online sales still only represent a very small proportion of all sales. However, if at 5%, e-Commerce has already had such profound impacts across different sectors, then what will happen when this grows further? Will it continue to grow or level off when it gets to a certain level? Does this also mean more radical changes in the business landscape are yet to come, when the figure grows to a more significant level (such as 30-50%)?

The relatively modest figure also suggests that the full impact of the Internet is not only reflected in the volume of online sales, but also, perhaps more importantly, in wider changes in consumer behaviour, and in new opportunities opened up to organisations across different sectors in redefining their strategies and business models, value chains, organisational structures and processes, work organisation, and they way these organisations connect with suppliers and their customers. In its 2010 research paper, US Online Retail Forecast, 2009 To 2014, Forrester suggested that although only 7% purchases actually happen online, the web accounted for or influenced 42% of all retail sales in 2009. The rapid development of mobile search will further influence people’s offline buying decisions when consumers are able to make mobile shopping queries while in or near stores.
Many other significant developments also call for new research from the business perspective. The rapid development of social media and various virtual worlds through MMORPGs are extending the social and economic environments for both individuals and organisations (Li, et al., 2010). The business implications are extremely profound. One the one hand, the changing nature of the economy, combined with the pervasive, ubiquitous ICTs infrastructure and services, provide organisations from all sectors significant new capabilities and enable new way of conducting business that were not conceivable only a few years ago. One the other hand, the connected consumers call for radical changes in the way organisations providing products and services and managing their interactions and relationships. These changes together render many existing organisation and management theories that have been originated in the industrial (and pre-industrial) economy ineffective, if not entirely invalid; and they call for the development of a new generation of organisation and management theories for the digital economy. At the centre of the new theories are strategic and organisational innovations that exploit the pervasive connectivity and respond to the rapidly evolving behaviours of the connected consumers.

References:


Figure 1: Age Distribution on Social Media Websites

Source: http://www.transmutationsciences.com/articles/age-distribution-social-networking-sites/?sms_ss=email&at_xt=4cf66cbfc373fa08,0
Figure 2: Retail e-Commerce as a Percent of Total Retail Sales in the US


Figure 3: Internet Retail Sales as Percent of Total Retail Sales in the UK 2009-2010

Based on ONS experimental Internet sales series, the non-seasonally adjusted average weekly value of Internet retail sales in October 2010 was £543 million, which was approximately 9.6 per cent of total retail sales (excluding automotive fuel).

Source: [http://www.statistics.gov.uk/pd/dir/rs1110.pdf](http://www.statistics.gov.uk/pd/dir/rs1110.pdf)