Business services and the knowledge economy in Malaysia

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Abstract

Purpose – This paper aims to argue that the World Bank-sanctioned strategy of investing in knowledge economy infrastructure will not make a developing country competitive in the highest value activities such as research, design and innovation.

Design/methodology/approach – The paper examines Malaysia’s efforts to increase its national income and change its position from a “middle-income” country to one with a standard of living equivalent to a developed country by 2020. Specifically, it analyses Malaysia’s strategy of constructing a multimedia super corridor, a multibillion-dollar state-led project to attract knowledge-intensive operations to Malaysia.

Findings – Despite the creation of a world-class infrastructure, the Malaysian government has not been successful in realising its original aim of creating a cutting-edge multimedia research and development hub. Instead a thriving business support services sector has developed. Therefore, it is by no means a guaranteed way to close the gap between rich and poor nations.

Research limitations/implications – Official data relating to the activities of firms not only are limited but also have been made problematic by changes in categorisation over the relevant years. Analysis that is more conclusive requires the publication of official data with greater detail about firm activities and a standardised reporting format over time.

Originality/value – This is one of the first academic studies discussing the rise of the business services industry in Malaysia and its relationship with the MSC infrastructure development project.

Keywords Knowledge economy, Services, Outsourcing, Call centres, Malaysia

Paper type Research paper

Like many people around the world, we are at a fork in the road. The path we choose will alter our future – perhaps irrevocably. Even as we sit back and question its usefulness, the k-economy is posing its own challenges for us. Can we master it or will those who master it race ahead of us, leaving us breathless as the Industrial Age had done in the past. Will we again lose out because we are late in grasping the opportunity to start with the others?

(Mahatir Mohamed in Chuan and Abdulai, 2002, p. 12)

Introduction

Regions around the world have increasingly become pitted in a fierce competition to lure and retain high-quality firms to provide stable employment with moderate to high wages to underpin broader community and nation-building objectives. While it may once have been the case that manufacturing firms were the principal prizes, more recently service sector firms have become the focus of attention. Some of the support for this new emphasis on the importance of the service sector is drawn from theories of the “knowledge economy” in development from the 1960s onwards. These theories emphasise the enhanced status of knowledge in economic growth. As it is argued that knowledge-intensive activities bring the greatest returns, the World Bank has encouraged countries to expand the role of knowledge in their economies in order to achieve higher productivity and growth. This obviously involves a substantial reallocation of funds into what would be deemed as knowledge-oriented projects, such as the information and communication technology (ICT) sector, which has increasingly come to symbolise the knowledge economy.
However, does a substantial re-allocation of funds automatically lead to the development of a knowledge economy? Developing countries, in their respective efforts to build knowledge economies, face serious challenges due to comparative weakness in their reservoirs of knowledge (World Bank, 2007). This article examines the strategy of a middle-income country to develop a knowledge-based economy through heavy investment in infrastructural projects. It provides a case study of Malaysia’s efforts to establish itself as a global hub of cutting edge multimedia research and development in the initiative known as the multimedia super corridor (MSC)[1]. The MSC is a key driver of Vision 2020 that aims to achieve a standard of living and a level of development equivalent to that of a developed country by the year 2020.

**Knowledge economies and economic growth**

Since the 1960s, governments around the world have been encouraged to develop the “knowledge sector” of their economies. Report after report extols the potential of the knowledge economy for generating growth. A consultant’s report for Nigeria, for example, argues that “the generation and exploitation of knowledge has come to play the predominant part in the creation of wealth.” (Ariyo, 1999). From Canada, we hear “knowledge is now clearly recognised as the engine of economic growth” (Beaudin and Breau, 2001, p. 28). World Bank recommendations for India include the following: “India should continue to leverage its strengths to become a leader in knowledge creation and use. To get the greatest benefits from the knowledge revolution, the country needs to press on with the economic reform agenda that it put into motion more than a decade ago and continue to implement the various policy and institutional changes needed to accelerate growth” (Dahlman and Utz, 2005). Throughout the developed and developing world, countries are being encouraged to pursue similar strategies and embrace a knowledge economy concept in order to stimulate economic growth.

The emphasis on developing knowledge economies is driven by the belief that knowledge has replaced machinery, land and labour as the principal resource in economic growth and production (Bell, 1973; Richta, 1977; Machlup, 1962; Beniger, 1986; Parker, 1973; Porat, 1977; Drucker, 1993). This implies that developing countries that are deficient in the traditional inputs of production, typically capital, would still be able to achieve sustainable economic growth if they developed knowledge economy oriented activities. A good example of this is India’s rise in software development.

A slightly different argument for developing knowledge economies is the upgrading that will occur as knowledge work penetrates through the whole economy. Krishan Kumar describes the process as follows:

Knowledge, according to information society theorists, is progressively supposed to affect work in two ways. One is the upgrading of the knowledge content of existing work, in the sense that the new technology adds rather than subtracts from the skill of workers. The other is the creation and expansion of new work in the knowledge sector, such that information workers come to predominate in the economy. Moreover, it is assumed that it is the more skilled, more knowledgeable information workers who will come to constitute the core of the information economy (Kumar, 1995, p. 23).

Additionally, more skilled and knowledgeable workers will have primary place in the “new” economy. At the same time, there is a de-emphasis on the needs of those who are less skilled (Stehr and Ericson, 1992, p. 127), despite the fact that in most economies around the world, the low skilled and those with a basic education actually predominate.
While there has been much agreement that significant transformations are underway, there are fundamental disagreements as to what extent these transformations produce outcomes consistent with the goals of bettering human societies or improving the situation for regions struggling with unemployment and under-employment. Governments in many different jurisdictions grapple with key questions about how far to involve themselves in the support and development of “knowledge society” or “information society” initiatives. There have been doubts raised over the capacity of economies to generate sufficient number of jobs with meaningful work and are sceptical about industry complaints about “skill shortages”, viewing them as attempts to pressure public sector institutions to foot the bill for expensive long-term training (Cockburn, 1987). Another related criticism against knowledge economy projects is that the jobs they create do not justify the long and expensive training of potential workers (Livingstone, 1997). Furthermore, questions pertaining to the definition of obtaining a desirable “knowledge economy” mix of firms are fundamental.

While there seems to be almost universal recommendations that governments pursue strategies to develop “knowledge economy” sectors to further their own economic and social development, it is also clear that some countries have far more advantages than others in doing so. As an influential World Bank report makes clear, there is a “danger of a growing “knowledge divide” between advanced countries, which are generating most of this knowledge, and developing countries, many of which are failing to tap the vast and growing stock of knowledge because of their limited awareness, poor economic incentive regimes, and weak institutions” (World Bank, 2007, p. 1). However, what the report does not point out is that advanced countries often do not share their knowledge with developing countries due to economic and strategic reasons. Even if they do want to share technology, knowledge gaps between the two groups of countries make this difficult to do. When we move to innovative technologies these problems become amplified as such work requires cultural and linguistic similarities amongst the workers (Feldman, 2002, pp. 49-51). Also crucial are the basic resources for innovation such as well-stocked libraries and a pool of labour sufficiently imaginative, able and keen to use such resources to generate new ideas, services and products. Furthermore, there must be enough existing business and social infrastructure to translate these ideas into growing developments, as well as the social and political stability to allow people to focus on activities other than survival and security.

Research method
Malaysia’s super corridor development has been chosen as a case study for several reasons. First, governments in few developing countries have the ability to finance and complete an infrastructure project on the scale of this development. The cost of this project is equal to the yearly gross domestic product (GDP) of countries such as Lebanon, Costa Rica or Kenya and is about 26 per cent of the Malaysian yearly domestic product (World Bank, 2006).

The Malaysian state has a 40-year-long record of accomplishment of exceptional economic development initiatives. The World Bank cites it as an illustration of the “rapid progress” that can be made using strategies to create a “knowledge-based economy”[2]. Thus, a case study of Malaysia provides an example of the problems facing a developing state that has already made serious and successful efforts to develop its potential.

Malaysia has also recently become the third most attractive country for shared services[3] and outsourcing, behind the giant economies of China and India (Kearney,
Despite the considerable public discussion on the rise of China and India as outsourcing destinations, much less attention has been paid to the position of smaller countries in the reconfiguration of the global division of labour. Furthermore, it raises the question of how this recent entrance into outsourcing relates to a development that provides relevant infrastructure, but was never designed to make Malaysia an outsourcing services centre.

The first stage of the methodology involved a comprehensive review of existing material – academic articles and books, speeches, newspapers, websites and trade journals – pertaining to the development of the MSC and the knowledge sector initiative in Malaysia more generally. The second stage involved an analysis of the nature of the business activities, drawing upon the lists of firms and descriptions of activities published on the official MSC website.

**Multimedia super corridor**
The MSC has been created with a USD 20 billion investment in physical infrastructure in and around the capital city, Kuala Lumpur. The first cluster consists of the Putrajaya, the new seat of government administration consisting of government buildings and services. The second cluster consists of the Cyberjaya, a state-of-the art information technology (IT) industrial park. The MSC also includes a Multimedia University, research centres, environmental friendly “green” zones, residential areas and civic amenities such as hospitals and schools to serve MSC employees, and a business start-up incubator. It draws on a web of infrastructural support based on a 2.5-10GB per second capacity fibre-optic backbone and 5-GB direct link to surrounding Southeast Asian countries, Japan, the USA and Europe (Ramasamy et al., 2002, p. 8).

“**Build it and they will come?”**
In Malaysia, the motivation behind the huge investment in commercial infrastructure was the hope that there were multinational firms that were sufficiently footloose to consider moving to Malaysia to avail themselves of the infrastructure and the tax benefits made available to them. The first consultant’s report advising the government to set up the MSC suggested “multimedia industry” as a distinctive niche that Malaysia could develop.

The original vision was for a creative multimedia hub, but “creative multimedia” firms only account for 9 per cent of the total firms, as of October 2006, (see Table I). The number of employees classified as “creative employees” is a mere 588, compared to 15,798 “technical workers” and 4,778 “shared services” workers. This suggests that although the initial vision of the niche that Malaysia could fill on the international market emphasised an artistic and creative emphasis supported by ICT skills, the

<table>
<thead>
<tr>
<th>Cluster, operational as of 16 October 2006, MSC progress updates</th>
<th>No. of firms</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative multimedia</td>
<td>114</td>
<td>9</td>
</tr>
<tr>
<td>Shared services and outsourcing</td>
<td>87</td>
<td>7</td>
</tr>
<tr>
<td>Software development</td>
<td>656</td>
<td>52</td>
</tr>
<tr>
<td>Support services</td>
<td>164</td>
<td>13</td>
</tr>
<tr>
<td>Internet-based business</td>
<td>126</td>
<td>10</td>
</tr>
<tr>
<td>Hardware design</td>
<td>120</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>1,267</td>
<td>100</td>
</tr>
</tbody>
</table>

Table I.

MSC status companies by technology
direction has been towards firms using ICT enabled services. The “artistic and
creative” element is tiny by comparison, though it is this area that is argued to generate
the greatest economic spin-offs.

The question then becomes, what kinds of operations have populated the MSC and
are these useful additions to the development of a knowledge economy in Malaysia,
and if so, what kind of knowledge economy? The answer to these questions requires a
careful examination of the available government data describing operations. This
analysis is confounded by shifting categorisations, but a general pattern emerges
clearly below.

As of October 2006, the largest category of firms is listed as “software development”,
of which there are 656 operational firms. Presumably, these firms employ the bulk of
the 15,798 “technical” employees of the 2005 survey. Examining the summary of the
activities of the firms in the software development category, a large proportion
develops software to support business applications. Furthermore, within this category
there are quite a few firms focusing on “voice applications” (VoIP dialling devices,
speech-enabled applications, support for back office applications). A number of the
firms list explicitly technical or operational support centres (call centres) as part of
their activities.

The second and third largest categories of firms are support services (164
operations) and shared service operations (87 operations). Interestingly, in stark
contrast to the 2006 listing, in 2005 the MSC survey of firms shows a much higher
proportion (359 firms out of 808) in the “shared services and outsourcing” category
(MSC impact survey 2005. The 2006 categories use a different classification system, so
either many of these firms disappeared in the intervening year, or alternatively their
activities have been re-classified and now appear in categories such as “software
development”.

Reviewing the list of MSC firms and their activities suggests a strong emphasis on
business support services and call centre related operations.

This emphasis has certainly been noted by industry analysts who started
identifying Malaysia as having good potential for growth from about 2004 onwards.
Aroop Zutshi, President of the consultancy firm, Frost and Sullivan, reported:

“Malaysia has and will continue to be a prime location for offshore outsourcing in this region.
Its increasing prominence as a shared services and outsourcing hotbed has been largely due
to its engaging government policies and efforts in offering a world-class environment” (MSC
highlights).

Similarly, a recent global service location index ranks it third out of a study of 40
countries in terms of desirability as an offshore location. The report describes it as
beginning to carve out a niche for itself in terms of higher value-added work within the
shared services sector in the areas of finance, logistics and energy (Kearney, 2005).

Officially, there seems to have been some initial defensiveness about admitting the
existence of the shared services, such as call centres and technical helpdesks.
Surprisingly, however, while service sector outsourcing in business services has
received a lot of attention in other areas of the world in relation to economic
development initiatives (Buchanan, 2000; Richardson and Belt, 2001; Larner, 2001), this
has been virtually absent from the hundreds of pages of government reports and
political speeches in Malaysia concerning the MSC. It is only recently, on the advice of
industry leaders that Malaysia must focus on her competitive advantages and not try
to focus on higher value added activities in which more advanced economies have an
edge, that discussion of business sector and outsourcing began to appear in relation to
the MSC initiative.

As of 2006, the MSC super corridor website, for example, began to incorporate
images of people wearing telephony headsets. More significantly, the official website
advertises its “multilingual workforce which uniquely positions Malaysia as the most
versatile global call centre SSO hub” (authors’ emphasis). This seems to suggest that
the old vision of a high-end artistic and creative multimedia hub able to compete with
developed countries is being replaced by the reality of a lower level industry focused
much more heavily on business support activities and call centres.

So, what happened to the original vision of a “multimedia” hub? We would argue that
two factors have been important in re-orienting the direction. The first factor is an
international trend of enormous proportions. All over the globe, organisations have been
separating non-core operations such as customer service and human resource operations
from the core activities of organisations. These are then centralised and outsourced to
others, allowing the parent firm to focus on core activities. The new global
communications structure in turn allows these outsourced activities to be offshored. This
sector was relatively young in 1991 when the MSC was being planned, and so it is not at
all surprising that it did not play a significant part in the early conceptualisation. Now it
is much more important, and the infrastructure designed for “multimedia” operations is
certainly an excellent infrastructure to support business services operations as well.

The second factor is that the Malaysian economy is still transitional in terms of its
ability to generate new advances. Table II shows that despite spending a much larger
share of national income on education and similar expenditure on infrastructure as
compared to advanced economies, Malaysia is no match to developed countries in
“knowledge creation” where the “services etc. value added” and “total scientific and
technical journal articles” are the measures used as proxies for knowledge generation.
They are substantially below the figures for the other countries. Firms may then be
impressed with the “multilingual” capacities in the available labour supply in terms of
the ability to provide service in 18 different languages, but are less convinced of the
supply of highly educated labour to support the highest end operations in the
knowledge economy.

**Business services and call centres as organisations in the knowledge
economy**
The business services industry certainly has a presence in the MSC, a presence largely
over-looked, under-theorised and under-documented. Business services and call centres
were not part of the original vision for the super corridor, partly because they were not
as significant an industry in 1991 as they have now become. There are many concerned

<table>
<thead>
<tr>
<th>Countries</th>
<th>ICT expenditure (% of GDP)</th>
<th>Expenditure per tertiary student (% of GDP/capita)</th>
<th>Scientific and technical journal articles (total/year)</th>
<th>Services, etc. value added (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>7.5</td>
<td>20</td>
<td>60,067</td>
<td>68.15</td>
</tr>
<tr>
<td>Malaysia</td>
<td>7</td>
<td>94</td>
<td>520</td>
<td>41.74</td>
</tr>
<tr>
<td>UK</td>
<td>7.5</td>
<td>28</td>
<td>48,288</td>
<td>72.8</td>
</tr>
<tr>
<td>USA</td>
<td>8.5</td>
<td>27</td>
<td>211,233</td>
<td>76.5</td>
</tr>
</tbody>
</table>

**Table II.**
Indicators of knowledge economy status

**Source:** World Bank, 2006
that these types of operations only provide limited career development opportunities (Breathnach, 2000; Larner, 2001; Richardson and Belt, 2001). Given their rise in Malaysia, it is important to consider in what ways they are part of the knowledge economy in order to decide whether their presence is helpful in terms of the direction that the government intended to set. We will now argue that these types of organisations are technologically and socially important institutions in a knowledge economy.

Earlier, a description of the knowledge economy was presented in which it was suggested knowledge allows a firm to manipulate and exploit other resources efficiently. Business services firms – particularly call centres – collect and disseminate information. They act as the first, or front-line, intermediaries between clients and firms. They collect immense quantities of information about the popularity of products, the problems with products, and the experiences of clients. Information is recorded in customised databases that can be accessed instantly. Agents are trained as to how to record and retrieve such information efficiently. Furthermore, this information is collected systematically. Many operations collect and record information both via the database and via voice records around-the-clock and seven days of week. Therefore, they make available both quantitative information and qualitative data sources. The advantage of these data is that it is directly relevant to a firm's own operations[7] and consist of actual interactions with customers. The information is superior, therefore, to information gained from interviews with customers, or focus groups about the companies’ products, where it may be difficult to get the customer to be sufficiently motivated to give honest feedback. In short, these are certainly information-rich organisations.

However, the essence of a knowledge economy, as opposed to an information economy, is that it is not enough to collect and disseminate information. Rather, a knowledge economy depends upon the analysis of information by competent, critical, creative and empowered analysts. Knowledge becomes a key part of strategic operations.

With respect to the question of what kinds of knowledge capital is required for employees, clearly different kinds of business service firms make different types of demands for knowledge on their employees. Agents who respond to inquiries for information about directory assistance, for example, typically retrieve and supply small amounts of information. Call handling times are typically under 1 min. Little discretion is used and most information resides in the database, rather than the agent. Software support, on the other hand, requires much more complex problem solving. Calls may take 45 min or longer. An agent needs to be able to understand the user’s problem as described. The client describing the problem may be difficult to understand or direct attention to the wrong problem. The agent able to take a longer more complex call is more of a knowledge worker than an information processor.

The business services sector substantially outperforms more traditional manners of service delivery. This makes it crucial for customer retention and expansion in highly competitive markets. Therefore, this industry helps both domestic and foreign firms become more productive by improving service delivery through an intense re-organisation and systematisation of services. Business support services firms have revolutionised “non-core” operations such as human resources and customer service by elevating the status of such activities from non-core to core operations. A new industry has been created in the process. This increases overall efficiency for two reasons. The first reason is that economies of scale and specialisation have been generated as the new industry implies that it is a core operation for these new firms. They therefore spend resources to improve their service quality and reduce costs. The second reason is
that resources are then allocated for research and improving management practices specific to the new industry.

While there is much to be positive about the growth of business services industry in terms of improving service quality, operational efficiency and providing greater access by customers to firm services, this process is not without difficulties. Raising quality in these new types of operations remains a key industry concern around the globe; some operations struggle with the new organisational form to such an extent that it is arguable that efficiency is improved.

Furthermore, if the goal is to enhance knowledge skills in the workforce, lower end operations can be highly routine – after initial training periods, further skill enhancement may be limited rather than there being a substantial ongoing development of skills, unless personnel begin to move through the supervision managerial or technical ranks.

Conclusions
Initially, we presented the argument that the Malaysian case illustrates the difficulties facing a developing country trying to “catch up” to developed country standards of living even after investing in infrastructure that underpins a knowledge economy. The Malaysian case study was chosen because it is a particularly good test case due to its previous success in boosting economic growth through state-directed projects. Indeed, official reports on the project extol its successes and its place in Malaysia’s effort to build a secure future for itself consistent with “Malaysian” values (Bunnell, 2004).

From Mahatir Mohamed’s speeches, it is clear that the government intended to make the MSC a hub of cutting-edge research, services and software solutions (Ariff and Goh, 2000). Yet, the development of infrastructure to support such an economy, has had various effects, one of which is Malaysia’s entry into the international market as a desirable location for activities that are not “core” activities of larger multinational organisations, but those that can be re-located to developed countries. Our analysis of the composition of the firms in the MSC suggests the rise of a business services industry which while it certainly uses multiple media for communication with customers, does not add the same value as research, development and design.

Overall, the example of the MSC illustrates three key problems relating to the development of employment in knowledge economies in developing countries. First, while almost every region in the world wants to attract high-end operations in research and development of top multinational firms, developing countries are currently more successful in attracting the lower order activities of multinationals that are being outsourced and off-shored to reduce costs. Second, while a physical infrastructure such as that which now exists in the MSC, can be built over a period of a few years, human capital takes much longer to develop (As a basic estimate, it takes 20 years to raise one child from kindergarten to a post-graduate degree, assuming the child is sufficiently capable of reaching that level.). It probably takes much longer than 20 years to embed a significant cultural shift that embraces innovation, creativity, mastery of knowledge and technical sophistication in a broad section of a population. In a knowledge economy, however, human capital is crucial to being able to capture and retain the high-end activities of firms. Third, the term “knowledge economy” covers a wide scope of activities. The problem with much of the knowledge economy literature is that it is very general, and treats the knowledge economy as if it were undifferentiated instead of a complex hierarchical system. It overlooks the enormous advantages and long lead that developed countries have over developing countries. Furthermore, it has modernisation
assumptions that following the trajectories of already established economic powers will produce similar results for less developed countries. In this case, if a country simply increases the share of the economy given over to knowledge work, as the USA or many European countries have done, then it will become productive and competitive.

What is missing from the literature is the understanding that when developing countries embark on knowledge economy projects, they do so in a highly competitive global environment where many countries are competing with one another to secure stable employment. Furthermore, developing countries are simultaneously trying to develop basic infrastructure for roads, airports, hospitals, schools, electrical grids and water supplies alongside the additional demands for huge mega-projects to build fibre-optic cable networks and satellite grids. In addition, it is no simple task to shift a population from a low level of formal education based on rote-learning oriented to learning the three Rs of reading, writing and arithmetic to a much more demanding curriculum emphasising scientific experimentation, creativity and independent thinking from an early age. A high-level knowledge economy needs university graduates – this means extra years of education, higher state expenditure and years of foregone family income. Therefore, developing countries are facing obstacles on numerous fronts at the same time.

The Malaysian economy in the post-agricultural phase has been largely involved in lower value-added activity in the manufacturing sector. It appears as if Malaysia is set to follow a similar path in the service sector, carving out a niche for itself in lower end service sector activities that have been hived off from core activities of developed countries.

This is not to say that the IT strategy has been a failure in Malaysia. Even moderate levels of growth may give Malaysia the development it needs to achieve higher standards of living. Only by being pro-active does it stand a chance of building upon initial successes to move up the value chain, as technological advancement is a step-by-step approach. The call centre industry does employ university graduates and provides training and human capital development in a number of areas. Furthermore, the article has argued that the business services industry is an integral part of the knowledge economy, albeit at the lower end. This industry is an important vehicle for the development of the human capital of lower level knowledge workers. More significantly, this industry can help make a wide variety of Malaysian firms and industrial sectors more competitive both to improved efficiency and to improved ability to collect and exploit strategic knowledge about operations.

Notes
1. MSC: (1) 16 October, 2006 “MSC Progress Updates”, statistics include information on the number and types of companies; (2) 2005 Impact Survey; (3) listing of MSC Status Companies (January 2005) that also provides details as to technology cluster and a summary of activities. These are all available on the MSC official website www.msc.com; (4) (2006) Seven Strategies for Developing Malaysia. MSC (Survey 2005); (5) “Malaysia, a Prime SSO Hotbed: Frost and Sullivan Polls Malaysia in the Top Five for Energy, Finance and Logistics” Source: Frost and Sullivan, Posted: 1 December 2005).
2. Korea, Ireland and Chile are also cited as successful examples.
3. The term “shared services” is a new term for an old concept. Services in a large organisation are centralised so that rather than services being provided at the unit or department level, all units or departments share them. Examples include computer support, telephone services, or mail functions. Once functions have been centralised in this manner, they can also be re-located or tendered outside the organisation.
4. This ranking is based on an assessment of a country's financial structure, people skills and availability and business environment (Kearney, 2005).

5. This figure was compiled from figures provided by Phillip L. Fergusson. In 1997, he estimated the expenditures at 8 billion for the Putrajaya, 8 billion for the Cyberjaya and $3.6 billion for other related infrastructure (Fergusson, 1997, pp. 4-5).

6. “Multimedia” involves technological developments in IT that allow the conversion of video, audio, photographs and text into digital format. This results in a convergence of these different media as digital files that can be supported with new technical tools. Developments in communications technology such as high-speed broadband, wireless, and fibre-optics linkages allow such data and programs to be distributed across the globe in a short time, with minimal cost and effort.

7. The value of customer data accumulated by firms, but often not recognised or exploited fully, is repeatedly made by call centre industry analysts and senior managers (e.g. Brad Cleveland, Speech to Contact Centre Council of Singapore Symposium, 18 November 2005).

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**Further reading**


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