

Box 2.1: The Information & Communications Sector - Trends, Drivers and Opportunities

This box article highlights recent growth trends in the Information and Communications (I&C) sector as well as the key growth drivers for the sector.

Growth Trends

The I&C sector is divided into three segments, viz. telecommunications, IT services and other I&C services (e.g., publishing and television and radio broadcasting). The telecommunications segment is the largest, though its share in the I&C sector fell from 62 per cent in 1998 to 43 per cent in 2008. In contrast, the share of the IT services segment out of the whole sector rose from 23 per cent to 35 per cent over the same period ([Exhibit 1](#)).

Exhibit 1: Breakdown and Key Activities in the I&C Sector¹

Segment	Examples of Activities	Nominal VA Share in 1998	Nominal VA Share in 2008
Telecommunications	<ul style="list-style-type: none"> ▪ Fixed line services ▪ Mobile cellular services ▪ Internet Service Providers (ISPs) 	62%	43%
IT Services	<ul style="list-style-type: none"> ▪ IT Consultancy and Software Development ▪ Data processing and hosting related activities ▪ Computer facility management and integration 	23%	35%
Other Services	<ul style="list-style-type: none"> ▪ Publication of books, periodicals and software ▪ Motion picture and video production ▪ Radio and television activities 	15%	22%

Source: Singapore Department of Statistics

Since 1995, the I&C sector has enjoyed robust growth that has led its share of Gross Domestic Product (GDP) to rise from 3.2 per cent in 1995 (\$3.7 billion) to 3.7 per cent in 2008 (\$9.6 billion). Broadly, growth during this period can be divided into two phases. From 1995 to 2001, the sector's real value-added (VA) grew by a double-digit compound annual growth rate (CAGR) of 15 per cent as telecommunications services such as mobile communications and fixed line services grew strongly. Following the dot-com bust in 2001 and increasing market saturation in traditional telecommunications services, the sector grew by a slower CAGR of 6.6 per cent from 2001 to 2008.

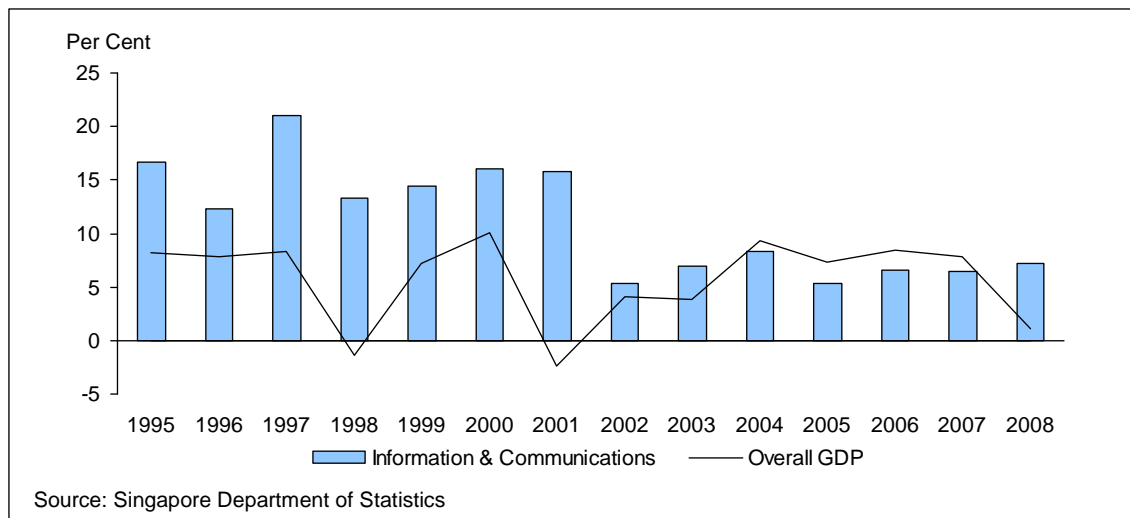
In general, the I&C sector has tended to remain relatively resilient during downturns² ([Exhibit 2](#)). During the current downturn, I&C growth slowed to 1.1 per cent in the first half of 2009 compared to the same period a year ago. However, this is much less severe compared to the overall decline in GDP of 6.5 per cent over the same period.³

¹ The I&C sector defined in this article is based on the Singapore Standard Industrial Classification. It is defined differently from the Infocomm Cluster which is covered by the Infocomm Development Authority of Singapore's Infocomm Industry Surveys. The Infocomm Cluster takes a broader industry view and includes other activities such as the wholesale of IT equipment and some business services such as IT market research and advertising services.

² The standard deviation of growth rates for the I&C sector over the period of 2002 to 2008 was 1.1 per cent while that of GDP was 3.0 per cent.

³ Full year growth for the I&C sector in 2008 was 7.2 per cent.

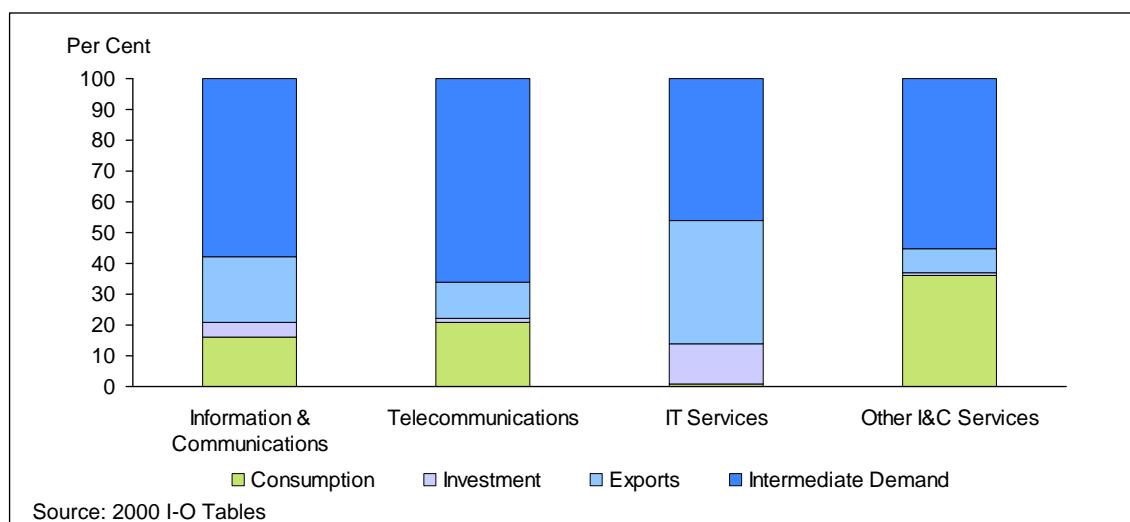
Exhibit 2: Information & Communications Sector Real VA Growth versus Overall Real GDP Growth



Key Drivers of the I&C Sector

The I&C sector is heavily dependent on intermediate demand from other sectors of the economy, in line with information and communication technology's (ICT's) role as a key infrastructural enabler for firms. Based on the 2000 Input-Output (IO) Tables, intermediate demand accounts for about 60 per cent of the sector's overall VA, with the rest of its VA accounted for by final demand (i.e., private consumption, investment and exports⁴) (Exhibit 3). Among the various I&C segments, telecommunications had the highest level of dependence on intermediate demand, while IT services was the least reliant. Other I&C services (which include cinema and broadcasting services) relied the most on domestic private consumption, while the IT services segment was the most export-oriented.

Exhibit 3: VA Drivers for the Information & Communications Sector



⁴ In the I-O Tables, government does not consume goods and services directly but indirectly through the sector 'producers of government services'.

We next explore the key factors driving the steady growth of the I&C sector, namely (a) healthy demand in the telecommunications segment; (b) strong demand from sectors which use I&C output as intermediate goods, such as wholesale & retail trade and government services; and (c) growth of I&C exports.

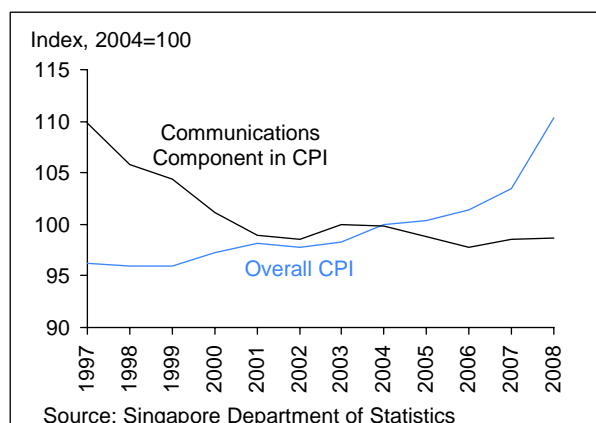
Healthy demand in the telecommunications segment...

Following the liberalisation of the telecommunications market in 1997, increased competition as well as the gradual maturing of mobile technology have resulted in a fall in the relative cost of telecommunications (Exhibit 4a). Since 1997, although the overall Consumer Price Index (CPI) rose by 15 per cent, the communications component of CPI fell by 10 per cent.

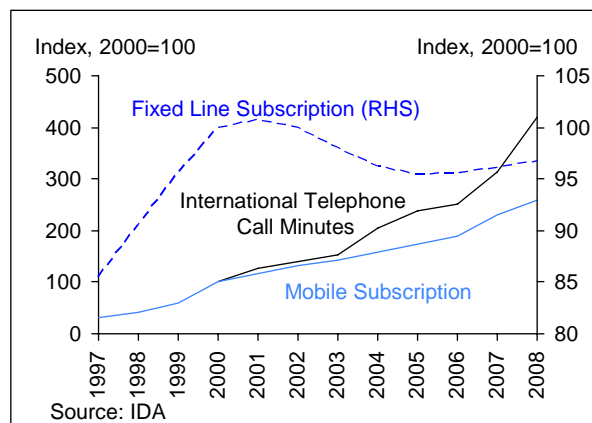
The lower relative costs of communications have in turn spurred higher consumer demand for telecommunications products. Volume indicators for the telecommunications segment have by and large increased over the past decade. In particular, mobile phone subscriptions increased at a CAGR of 22 per cent from 1997 to 2008 even as penetration rates (i.e., the ratio of mobile phone subscriptions to the total population) rose from 20 per cent to 131 per cent. Downward pressures on international phone call rates, along with a rise in Singapore's non-resident population, have also led to strong growth in the international call market, particularly in recent years.⁵ Between 2000 and 2008, international call minutes grew at a CAGR of 20 per cent. In contrast, the mature fixed line market has been in decline since 2001, possibly due to a shift in consumer preferences towards mobile communications (Exhibit 4b).

Exhibit 4: Selected Telecommunications Volume and Price Indicators

(A) Communications CPI versus Overall CPI



(B) Selected Telecommunications Volume Indicators



Strong demand from other sectors, particularly wholesale trade, financial services, and government services...

Although the I&C sector is relatively resilient to economic cycles in the short-term, it tends to grow in tandem with the economy in the medium- to long-term as ICT is a key input used by a wide range of sectors in the economy. A recent paper by Katz (2009), for instance, suggests that distribution and finance-related industries have the greatest motivation to adopt infocomm technology, as these sectors have high transactions costs and rely on network externalities.

⁵ The share of non-residents in Singapore's population remained relatively stable around 20 per cent from 2000-2005, but grew sharply from 20 per cent in 2006 to 25 per cent in 2008.

We find that such distributive services are indeed one of the largest drivers of growth in the I&C sector.⁶ Based on the 2000 IO Tables, wholesale and retail services are estimated to account for the largest share of the I&C sector's VA (13 per cent), followed by producers of government services (8 per cent). Other top sectors include computer & computer peripheral equipment (3 per cent), air transport (3 per cent) as well as other financial services (2 per cent) ([Exhibit 5](#)).

Exhibit 5: Top 5 VA Drivers (Non-I&C Sectors)

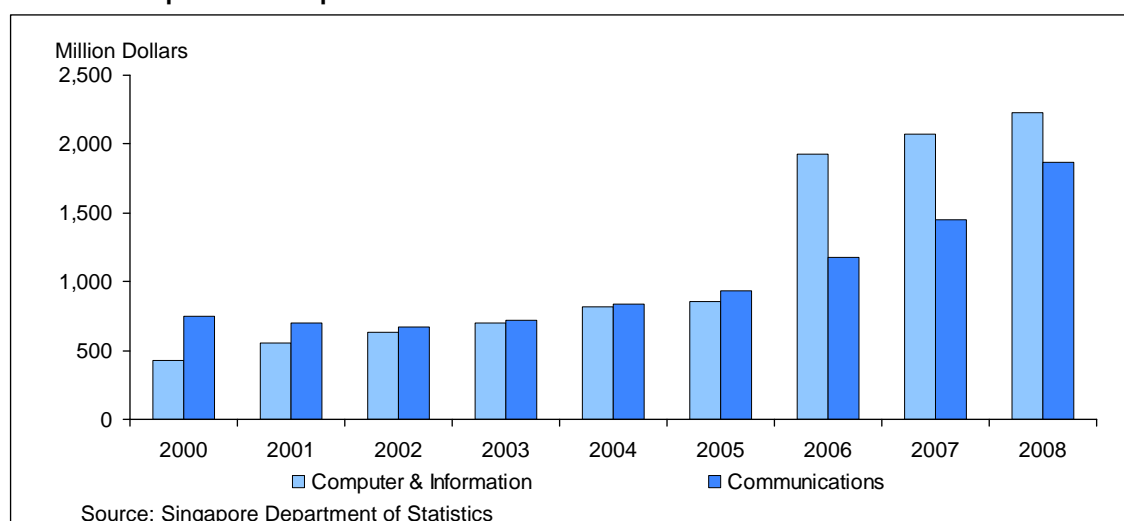
Segment	% of Total I&C VA
Wholesale & retail services	13
Producers of government services	8
Computers & computer peripheral equipment	3
Air transport	3
Other financial services	2

The rapid growth of the wholesale and retail sector in recent years, at a CAGR of 8.1 per cent from 2000 to 2008, as well as the active promotion of e-Government and other public sector IT initiatives are thus likely to have played a key role in supporting the growth of the I&C sector.⁷

Growth in I&C exports...

Export demand has also been a growth driver in recent years, particularly in the IT services segment for which export demand plays a large direct role. Balance of payments figures suggest that I&C service exports have been growing steadily. From 2000 to 2008, exports of computer & information services grew at a CAGR of 23 per cent, while the export of communications services grew at a CAGR of 12 per cent over the same period⁸. Much of the rise in exports can be attributed to a strong growth in demand in Asia ([Exhibit 6](#)).

Exhibit 6: Exports of Computer & Information and Communications Services



⁶ These findings are also broadly consistent with other indicators of infocomms use. For instance, a high percentage of financial firms (83 per cent) have a broadband connection. (IDA, 2009)

⁷ Overall GDP growth was 4.9 per cent over the same period.

⁸ By way of comparison, the CAGR of overall services and goods exports was 12 per cent and 7.9 per cent respectively.

Opportunities and Challenges

Going forward, the I&C sector is likely to continue to see strong growth relative to other sectors given that the outlook for ICT demand in both domestic and external markets looks healthy.

Domestically, Singapore's commitment to Intelligent Nation 2015 (iN2015), the national infocomm masterplan, will ensure a strong pipeline of infrastructure and IT-related projects. Increasing ICT adoption among businesses also remains a key priority - while Singapore has consistently had high overall rankings in ICT-related competitiveness surveys, measures of business adoption have tended to lag those related to government or consumer adoption ([Exhibit 7](#)). This could be due to initial hurdles faced by firms when adopting ICT. For instance, Basu and Fernald (2007) find evidence in the US that ICT actually reduces productivity in the short-run because firms often need to devote resources to review their business models or familiarise staff with new processes that come with the adoption of new technology. In the long-run, however, firms will benefit from ICT adoption due to productivity gains.

Exhibit 7: Network Readiness Index Ranking 2008-2009

Component	Rank (2008-2009)
Network Readiness Index	4 of 134
Readiness Component	1
Individual Readiness	2
Business Readiness	10
Government Readiness	1
Usage Component	3
Individual Usage	7
Business Usage	13
Government Usage	2

Source: World Economic Forum

To encourage more businesses and consumers to fully maximize the potential of ICT, key initiatives include the development of the Next Generation National Broadband Network. This is a nation-wide ultra-high speed broadband network with access speeds of up to 1 Gbps, which is expected to enable services such as telemedicine, improved software-as-a-service offerings, etc. Other programmes to encourage greater adoption of ICT include Infocomm@SME (for SMEs) and sector-specific initiatives (such as the EdVantage Programme for schools). As more businesses embrace ICT, the I&C sector will benefit from the increased demand from businesses.

Internationally, demand for ICT in the region is also likely to remain strong, supported by infrastructure projects and strong consumer demand. The growth potential in emerging markets may also be large due to low rates of ICT adoption currently. For example, in countries such as Indonesia, Philippines and Vietnam, broadband lines are still increasing at double digit rates.⁹ Outsourced ICT services may also continue to grow strongly as businesses seek to expand their operations in Asia while keeping costs low.

Several measures have been put in place to help infocomm players tap into overseas markets. These include IDA's Overseas Development Programme, which helps smaller infocomm players team up with larger corporations to enter overseas markets, as well as IDA International, which helps to export public service infocomm capabilities. Additional infocomm projects by multinational companies in areas such as interactive digital media and data storage will also increase I&C exportable services to the region.

⁹ A report by the Broadband Forum, an industry consortium, noted that broadband lines increased by 142 per cent in Indonesia, 60 per cent in Philippines and 48 per cent in Vietnam in the first quarter of 2009 compared to the same period a year ago.

Conclusion

The I&C sector has seen stable growth over the years, largely due to a rise in consumer demand in telecommunications, the growth of sectors that tend to be large users of ICT, as well as exports growth. Going forward, the government's commitment to develop the ICT infrastructure, as well as measures to expand overseas markets for the I&C sector and increase ICT adoption in firms will continue to spur growth in the sector.

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