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Singapore's Declining Productivity Growth
An Exploratory Paper

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SINGAPORE'S DECLINING PRODUCTIVITY GROWTH

AN EXPLORATORY PAPER

INTRODUCTION

Labour productivity has been on a down trend since 2004. It has declined further in the second quarter of 2008 (-7.5 per cent), after two consecutive quarters of contraction in the previous periods (refer to Exhibit 1 in attachment). This decline is seen across all industries except for wholesale and retail trade (0.5 per cent). The contraction is steepest in manufacturing (-13.0 per cent), followed by hotels and restaurants (-8.5%), business services (-6.4 per cent), financial services (-4.5 per cent), construction (-3.4 per cent), transport and storage (-1.2 per cent), community, social and personal services (-1.1 per cent) and information and communications (-0.1 per cent).

In contrast to productivity growth, real earnings rose in 2006 and 2007. With the global economic slowdown, however, it has since shrunk to -4.0 per cent in the second quarter of 2008 (refer to Exhibit 2).

Overall unit labour cost (ULC) has been on the rise since 2006. Despite the slowdown and dip in productivity as well as real earnings, labour costs have not receded. Overall ULC increased from 9.6 per cent to 11 per cent from the first to the second quarter of 2008 (refer to Exhibit 3 in attachment). Manufacturing ULC rose even more aggressively from a -0.7 per cent to 17.9 per cent during the same period. This pumped up unit business cost (UBC) in manufacturing by 10.7 per cent.

Declining productivity, coupled with increasing costs, does not augment well for the Singapore economy. Yet this is not an uncommon problem among developed countries. What triggers such labour productivity performance? This paper explores some possible causes behind Singapore's declining productivity growth. Causes highlighted below are based on a review of the literature and feedback obtained while interacting with professionals in the business community.

POSSIBLE CAUSES FOR DECLINING LABOUR PRODUCTIVITY[1]

1 Over Hiring During Boom Time

[1] Refer to Exhibit 5.

Rapid economic growth in the last few years has pushed many firms to hire more workers. Besides hiring more in anticipation of new projects and businesses, many of these are also done in anticipation of staff attrition and competitive poaching in a tight labour market.

Manpower Minister Gan Kim Yong believes that such boom time over hiring is unavoidable. He points out that a similar pattern was seen during the economic boom prior to the Asian financial crisis. 234,900 jobs are created in 2007.[2] This is twice the average seen since 2003. The ministry believes that such over hiring has contributed to the slide in Singapore's labour productivity in 2007.

2 Shifts Towards Greater Knowledge and Skill Work

The split between goods and services producing industries in terms of gross domestic product has been averaging between one-third and two-thirds over the last 20 years for Singapore (refer to Exhibit 4). Despite this stability, the nature of both industries has been transforming drastically.

Globalization and the rapid advent of new technology have vastly increased the degree of knowledge and skills needed. This is true not just of the services industry, but also manufacturing. The latter occurs when manufacturing moves up the value chain into high tech manufacturing, manufacturing services and skill intensive activities like research and development. According to a McKinsey report[3], "jobs that involve participating in interactions rather than extracting raw materials or making finished goods account for more than 80 per cent of all employment in the United States…..jobs involving complex type of interactions – those requiring employees to analyze information, grapple with ambiguity, and solve problems – make up the fastest-growing segment…..Indeed, most developed nations are experiencing this trend."

2.1 Difference in Knowledge vs Manual Worker Productivity

Despite this transformation, the current mechanics of measuring and improving productivity continues to follow Frederick Taylor's "Scientific Management" (1856 – 1916) approach. Taylor's approach is designed for manual workers in manufacturing, where productivity is measured by the quantity of output per worker. According to Peter Drucker (1991)[4] knowledge worker productivity cannot be measured and improved on in the same way as a manual worker. The requirements needed to improve the productivity of a knowledge worker

[2] "Dip in productivity but rate still respectable" by Goh Chin Lian, Straits Times, 26 August 2008.
[3] "The Next Revolution in Interactions", by Bradford C. Johnson, James M. Manyika and Lareina A. Yee, The McKinsey Quarterly, November 2005, p1-3.
[4] "Knowledge-Worker Productivity: The Biggest Challenge", by Peter F.Drucker, California Management Review, Winter 1991, Volume 41,No. 2, p. 79-94.

"is almost the exact opposite of what is needed to increase the productivity of the manual worker"[5].

In Drucker's (1991) opinion, 6 factors determine knowledge worker productivity:

1. **Unclear definition of task.** Manual tasks are very clearly defined, while knowledge work tends to be more open-ended and its scope is often left to the individual worker.

2. **Autonomy to self-manage**. Given the nature of knowledge work, productivity can only be optimized if the worker is given the autonomy to manage his own work.

3. **Continuous innovation.** The nature of knowledge work demands that the worker innovate continuously to be effective. This is unlike manual work where strict adherence to stipulated standards or procedure is more important than innovation.

4. **Continuous learning and teaching.** Knowledge work requires continuous learning on the part of the knowledge worker to ensure that his skill and knowledge remain current and relevant, as new technology and new challenges evolve rapidly. To ensure that his knowledge is internalized and adds to the company's overall productivity, it is also his responsibility to teach continuously. A manual worker only has to learn his task once and hone his skill via repetition.

5. **Aim to maximize quality first, not quantity**. Productivity of knowledge work aims first to attain maximum quality. To maximize quantity is secondary. In manufacturing, though quality is important too, the aim is to maximize quantity within a minimum quality standard. In knowledge work, quality is not a minimum; it is the "essence of the output"[6].

6. **Consider the worker as an asset, not a cost.** A manual worker is seen as a cost by his employer. As such, the aim is to amortize this cost over a larger base of output. Basically, manual workers are "costs that need to be controlled and reduce".[7] In contrast, a knowledge worker is "an asset which needs to be made to grow".[6]

2.2 Impact on Organizational Structure

[5] "Knowledge-Worker Productivity: The Biggest Challenge", by Peter F.Drucker, California Management Review, Winter 1991, Volume 41,No. 2, p. 84.

[6] "Knowledge-Worker Productivity: The Biggest Challenge", by Peter F.Drucker, California Management Review, Winter 1991, Volume 41,No. 2, p. 84.

[7] "Knowledge-Worker Productivity: The Biggest Challenge", by Peter F.Drucker, California Management Review, Winter 1991, Volume 41,No. 2, p. 87.

Many organizations, especially manufacturing corporations, are structured in a hierarchical manner where a few top managers/knowledge workers coordinate the work of a large number of employees/manual workers. In a knowledge economy where there are more problem solvers than there are doers, such structures are no longer effective.

Given the dynamic and ambiguous nature of knowledge work, a hierarchical structure where there is close superior-subordinate supervision is often sub-optimum. The knowledge worker needs to have the independence to manage his work and the space to be creative. To raise the productivity of their knowledge workers, some companies like British Petroleum[8] finds that enabling their workers to collaborate more effectively across geographical boundaries and having a flat structure where cross functional business teams work together, promotes innovations and creative solutions. Companies have to evaluate the structure of their organization and the nature of their business to ensure that the structure does not stifle, but allows knowledge workers to thrive.

2.3 Impact on Management and Human Resource Programs

Knowledge workers are a new breed. Companies cannot hope to hire, develop and manage them the way they did manual workers.

Knowledge workers are assets that companies have invested time and money to recruit and train. The tacit knowledge acquired by these workers through training, on the job exposure and interactions with industry players, belongs to the individual and not the company, unlike a manual worker. Further, their specialization means that knowledge workers cannot be easily replaced. Yet, many companies are unwilling to recognize that their knowledge workers are assets that need to be motivated to contribute positively and to choose to work for their company in preference to all other opportunities. As such, programs like work-life initiatives used by some companies as a tool to motivate and retain knowledge workers are often viewed by the majority as a luxury that does not pay out.

Konrad and Mangel (2000)[9] found that work-life programs like on-site daycare for children, flexible work arrangements, parental leave and extended maternity leave, have a significant impact on the productivity of professionals.[10] Although these programs are a cost item, Konrad and Mangel found that they can generate net productivity gains for companies, given the scarcity and high cost of recruiting professionals. Further, the high value-add they bring to their companies also helps justify the programs' costs. Konrad and Mangel also found

[8] "Unleashing the Power of Learning: An interview with Bristish Petroleum's John Browne" by Steven E. Prokesch, Harvard Business Review, September-October 1997, p.147-168.

[9] "The impact of work-life programs on firm productivity", by Alison M. Konrad and Robert Mangel, Strategic Management Journal, Vol. 21, No. 12, December 2000.

[10] Konrad & Mangel define professionals as an organized body of experts who apply some form of specialized, theory-based knowledge to a set of complex problems. This is the same as a knowledge worker.

that professionals often start their family during the peak of their productivity. As such, work-life programs help professionals manage work-family conflict to reduce productivity loss due to distraction and absenteeism. The research also found that such programs allow autonomy-hungry professionals to be independent. Companies need to be willing to consider new or different human resource programs to motivate their knowledge workers.

However, even if a company is willing to offer such programs, managers are often ill prepared to accept them. Managers fail to realize that knowledge workers need to be intrinsically motivated, not just extrinsically motivated. Extrinsically motivated employees satisfy their needs indirectly, especially through monetary compensation[11]. Intrinsically motivated employees value the work for its own sake and is often self sustaining (Calder and Staw)[12]. For such individuals, the ideal incentive system is to participate in work that is satisfactory and fulfilling. According to Osterloh and Frey (2000), intrinsic motivation is needed for tasks that require creativity, and the generation and transfer of tacit knowledge - like the work of a knowledge worker. Extrinsically motivated employees tend to produce stereotyped repetition of what already works – like the work of a manual worker.

So how can managers enhance the intrinsic motivation of knowledge workers? According to Deci, Koestner and Ryan (1999)[13] monetary rewards that are perceived to be controlling reduces intrinsic motivation. While personal relationships (Frey and Bohnet)[14], joint goal setting (Raia)[15], and empowerment (Wellins)[16] enhance intrinsic motivation.

These practices are not the norm among most managers. Companies have to equip their managers with these skills before they can expect any meaningful increase in knowledge worker productivity.

2.4 Impact on Technological Investment

According to Edelman (1981)[17], the "traditional approach has been to address white collar productivity problem almost entirely through "cost displacement" systems; that is, systems explicitly designed and operated to mechanize manually performed and routine clerical tasks, and thereby to replace expensive labour with less expensive machines". However, while

[11] "Motivation, knowledge transfer and organizational forms", by Margit Osterloh and Bruno S. Frey, Organization Science, Vol. 11, No. 5, September-October 2000, p. 538-550.
[12] "The self-perception of intrinsic and extrinsic motivation", by B.J. Calder and B.M. Staw, Journal of Personality Social Psychology, Vol. 31 p. 599-605.
[13] "A meta-analytical review of experiments examining the effects of extrinsic rewards on intrinsic motivation", by E.L. Deci, R. Koestner and R.M. Ryan, Psychology Bulletin, Vol 125, 1999, p.627-668.
[14] "Institutions affect fairness: Experimental investigations", by B.S. Frey and I. Bohnet, Journal of Institutional Theoretical Economics, Vol. 151 (2), 1995, p.286-303.
[15] "Managing by objectives", by A.P.Raia, 1974. Scott & Foresman, Glenview, IL.
[16] "Empowered teams: Creating self-directed work groups that improve quality, productivity and participation" by R.S. Wellins, W.C. Byham and J.M. Wilson, 1991. Jossey-Bass, San Francisco, CA.
[17] "Managers, computer systems, and productivity", by Franz Edelman, MIS Quarterly, Vol. 5, No. 3, September 1981, p. 1.

technology can replace a bank teller, it cannot replace a marketing manager. Knowledge work cannot be replaced by machines, but it can be enhanced by the right technological applications. Future investments in technology must add value to knowledge workers' ability to achieve faster, better and higher quality results.

3 Inadequate Attention to System Designs

Drucker (1999) believes that in order for the knowledge worker to be productive, his work needs to be assimilated into the system design in a coherent way. For instance, the American Caterpillar Company, being the largest producer of expensive earth-moving machines, has always seen their role as being a manufacturer. However, when the company tries to clarify and define the task(s) that are really keeping their consumer satisfied, they realize that consumers treasure them not as a maker and seller of these machines, but their ability to service these machines quickly and efficiently when it breaks down. Reason being, the disruption of work when a machine breaks down is often much more expensive than the cost of the machines itself.

This realization causes the Caterpillar Company to redesign their entire operations and management systems. The system is redesigned to guarantee continuing operations and immediate repairs or replacements, instead of just building earth-moving machines.

4 Lagging Effect of Technological Investments

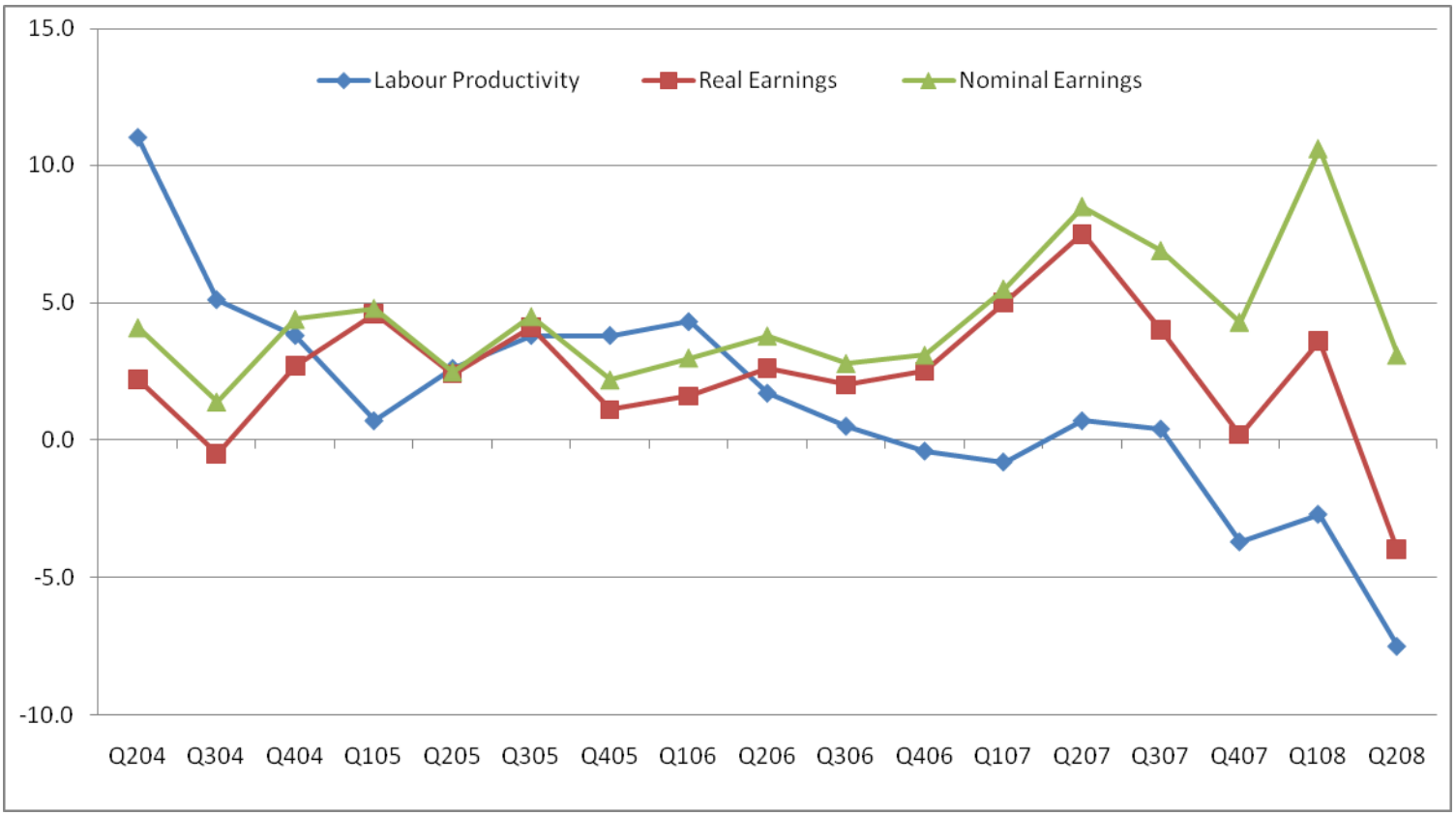
Although it is generally accepted that technological advancement improves worker productivity, this improvement may not be immediate. Workers need time to learn and adopt the new technology. This means that despite increased investments, output may remain the same or even decline during this gestation period. As technological advancement and changes becomes more frequent, their lagging effect on productivity also becomes more pronounced.

CONCLUSION

Although short term factors impact Singapore's labour productivity, its continuous decline since 2004 suggests that more deep rooted causes may be present. Some of these possible causes are discussed in this paper; however, to address the issue, further research and dialogue with the business community is needed.

ATTACHMENT

Exhibit 1
Changes in Average Monthly Earnings and Labour Productivity
(Over Corresponding Period of Previous Year)



	Q204	Q304	Q404	Q105	Q205	Q305	Q405	Q106	Q206	Q306	Q406	Q107	Q207	Q307	Q407	Q108	Q208
Labour Productivity	11.0	5.1	3.8	0.7	2.6	3.8	3.8	4.3	1.7	0.5	-0.4	-0.8	0.7	0.4	-3.7	-2.7	-7.5
Real Earnings *	2.2	-0.5	2.7	4.6	2.4	4.1	1.1	1.6	2.6	2.0	2.5	5.0	7.5	4.0	0.2	3.6	-4.0
Nominal Earnings	4.1	1.4	4.4	4.8	2.5	4.5	2.2	3.0	3.8	2.8	3.1	5.5	8.5	6.9	4.3	10.6	3.1

Sources: Department of Statistics, Ministry of Trade and Industry

- Deflated by CPI

Exhibit 2

Labour Productivity and Real Earnings Growth (Over Corresponding Period of Previous Year)

Per Cent

Industry	Q1 08		Q2 08	
	Labour Productivity	Real Earnings*	Labour Productivity	Real Earnings*
Total	-2.7	3.6	-7.5	-4.0
(Excluding Construction)	-2.2	3.6	-6.9	-4.1
Manufacturing	2.7	-2.2	-13.0	-2.3
Construction	-0.4	3.7	-3.4	-0.5
Wholesale & Retail Trade	0.3	0.2	0.5	-1.0
Transport & Storage	0.4	-1.9	-1.2	-2.6
Hotels & Restaurants	-7.7	1.3	-8.5	-5.1
Information & Communications	-1.9	0.2	-0.1	-1.5
Financial Services	-1.7	2.1	-4.5	-2.1
Business Services	-5.3	2.4	-6.4	-0.9

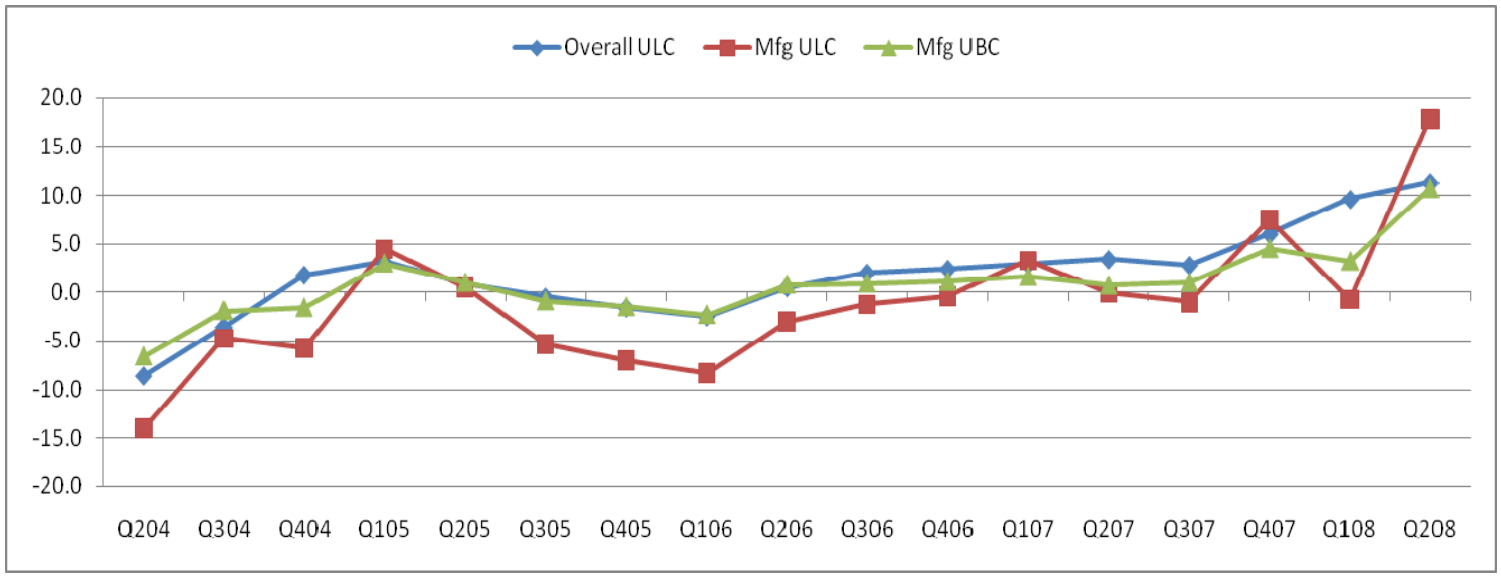
Community, Social & Personal Services	-0.3	13.6	-1.1	-14.7

Sources: Department of Statistics, Ministry of Trade and Industry; Central Provident Fund Board

* Deflated by CPI

Exhibit 3

Change in Cost Indices
(Over Corresponding Period of Previous Year)



	Q204	Q304	Q404	Q105	Q205	Q305	Q405	Q106	Q206	Q306	Q406	Q107	Q207	Q307	Q407	Q108	Q208
Overall ULC	-8.6	-3.6	1.8	3.1	0.8	-0.5	-1.6	-2.5	0.5	2.0	2.4	2.9	3.4	2.8	6.0	9.6	11.3
Mfg ULC	-14.0	-4.7	-5.7	4.5	0.5	-5.3	-7.0	-8.3	-3.0	-1.2	-0.4	3.3	0.0	-1.0	7.5	-0.7	17.9
Mfg UBC	-6.6	-1.9	-1.6	3.0	1.0	-0.9	-1.5	-2.3	0.8	0.9	1.1	1.6	0.7	1.0	4.5	3.2	10.7

Source: Department of Statistics, Ministry of Trade & Industry

Exhibit 4

Gross Domestic Product by Industry
(As a fraction of total GDP)

	1965	1970	1975	1980	1985	1990	1991	1992	1993	1994	1995
Goods Producing Industries	26.7%	31.3%	34.5%	37.5%	34.2%	33.0%	34.0%	33.8%	33.6%	33.0%	33.2%
Manufacturing	14.4	18.6	22.3	27.3	20.9	25.7	26.2	25.2	25.3	24.5	25.0
Construction	6.2	6.9	7.9	6.3	10.2	5.0	5.8	6.6	6.3	6.5	6.4
Utilities	2.8	3.0	2.2	2.4	2.2	2.0	1.8	1.8	1.8	1.7	1.7
Others Goods Industries[1]	3.2	2.7	2.2	1.5	0.9	0.3	0.3	0.2	0.2	0.2	0.2
Services Producing Industries	70.2	65.8	62.6	60.2	61.8	62.9	62.1	62.1	62.3	62.6	62.1
Wholesale & Retail Trade	23.7	24.5	21.6	17.2	12.8	13.8	13.7	12.9	13.5	13.4	13.5
Transport & Storage	10.4	9.5	9.4	11.5	10.9	10.9	11.1	10.3	10.0	9.9	9.8
Hotels & Restaurants	3.7	3.5	3.5	3.8	3.3	3.5	3.2	3.2	2.9	2.7	2.7
Information & Communications	2.1	1.9	2.0	2.5	2.4	2.7	2.8	3.0	3.1	3.0	3.2
Financial Services	4.4	4.9	6.9	8.2	11.0	10.4	9.8	10.9	12.0	11.8	10.9
Business Services	9.4	9.3	8.8	8.7	10.9	11.9	11.8	12.0	11.3	12.0	12.8
Other Services Industries	16.4	12.3	10.5	8.2	10.5	9.7	9.7	9.8	9.4	9.7	9.4
Ownership of Dwellings	3.1	2.9	2.8	2.3	3.9	4.1	3.9	4.1	4.1	4.4	4.6

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Goods Producing Industries	33.0%	32.6%	33.0%	31.7%	33.7%	31.0%	31.0%	30.8%	32.8%	32.3%	33.1%
Manufacturing	23.7	22.6	22.5	22.6	26.1	22.9	24.1	24.3	26.9	26.8	27.7
Construction	7.3	7.9	8.3	7.1	5.7	5.6	4.7	4.4	3.8	3.8	3.6
Utilities	1.8	1.9	2.0	1.9	1.8	2.3	2.1	2.1	1.9	1.7	1.7
Others Goods Industries[1]	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Services Producing Industries	62.3	62.6	61.8	63.6	62.0	64.4	64.6	64.9	63.5	64.1	63.5
Wholesale & Retail Trade	13.3	12.7	11.7	13.1	13.0	12.8	13.7	14.1	14.6	15.0	15.2
Transport & Storage	9.2	8.9	9.0	9.6	9.6	9.0	8.6	9.4	10.0	10.2	9.6
Hotels & Restaurants	2.6	2.5	2.2	2.3	2.2	2.2	2.1	1.8	1.9	1.9	1.9
Information & Communications	3.1	3.2	3.3	3.7	3.6	4.4	4.2	4.3	3.9	3.9	3.8
Financial Services	10.8	12.2	12.7	12.1	10.9	12.1	11.8	11.3	11.1	11.3	11.2
Business Services	13.6	13.5	13.0	12.9	12.6	12.7	12.5	12.2	11.0	11.3	11.5
Other Services Industries	9.6	9.6	9.9	9.9	10.0	11.3	11.7	11.8	11.0	10.5	10.2
Ownership of Dwellings	4.8	4.9	5.2	4.7	4.3	4.6	4.4	4.3	3.8	3.6	3.4

[1]Comprise agriculture, fishing and quarrying.

Note: The industries are classified according to SSIC 2005.

Source: Singapore Department of Statistics

Exhibit 5

Possible Causes of Singapore's Declining Labour Productivity