K-ECONOMY:
DOES PENANG HAVE THE NEEDED INFRASTRUCTURE?

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In This Issue

K-Economy—Does Penang Have The Needed Infrastructure?	**1**
The Ninth Malaysia Plan 2006-2010: What it has to do	**15**
Forum: Understanding the Goods and Services Tax (GST): Methods of Preferential Treatment	**19**
International Headlines	**26**

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The ability of Penang to achieve k-economy status is critical in allowing the state to reposition itself in terms of the value chain as an innovative and creative economy capable of higher end manufacturing and service related activities. The readiness of state to embracing this new concept is thus a critical issue. In terms of manufacturing capabilities, Penang is caught in between the developing and the developed countries. Thus, Penang needs to undergo a radical shift from a p-economy to a k-economy to move up to the next level of value-added activities.

Under the K-economy Masterplan, a k-economy should have a highly educated labour force where workers contribute to ideas, skills and knowledge by using the latest technology. Exactly how effective are the state's measures and actions taken to date to realise this shift? One way to measure the level of transformation taking place is to look at the infrastructure needed to support a viable k-economy versus the existing infrastructure available within the state.

The infrastructure necessary to facilitate a k-economy are identified as:

- the level of research and development (R&D) activities and funding.
- institutes of higher learning (IHLs) which are capable of producing skilled, educated and creative knowledge workers,
- the degree of infostructure development, access and penetration such as the availability of communications infrastructure, ICT penetration rates, development of local content and security of infostructure networks; and
- access to funding (by way of bank lending or more commonly venture capital) which allows the conversion of innovative ideas into economic assets.

Research & Development Activities in Penang

Research & Development (R&D) has been identified as one of the crucial knowledge-based activities that will create new economic value and strengthen the technology capability of the nation. The information and knowledge acquisition, generation, distribution and utilization in R&D activities are a vital source of innovation and value creation towards a k-economy.

In an effort to strengthen technological & R&D commercialization capabilities, the Federal Government allocated a total of RM161 million to the Ministry of International Trade and Industry (MITI), channeled through Malaysian Technology Development Corporation Sdn Bhd (MITD), for the establishment of the Commercialization of R&D Fund (CRDF) and Technology Acquisition Fund (TAF) under the Seventh Malaysia Plan (1996-2000). During this period, the government approved and disbursed a total of RM124 million to 126 companies. Additional funds have been allocated for these schemes under the Eighth Malaysia Plan (2001-2005) and as of March 2003, a total of 40 companies have been provided grants amounting to RM41 million under these schemes.[1]

Based on the 2000 National Survey of Research & Development by Malaysian Science & Technology Information Center (MASTIC), Malaysia's gross expenditure on R&D was only 5 percent of GDP for 2000 as compared to 2.65 percent for the United States (1999), 2.80 percent for Japan (1999) and 2.38 percent for Germany (1999).

In terms of R&D personnel, Malaysia has 15.6 researchers per 10,000 labour force, compared to Japan at 136 (1999), Singapore at 83.5 (1999), United States at 74 (1999) and South Korea at 60 (1998).

The Malaysian Science and Technology Indicators Report shows that despite the economic downturn, overall R&D expenditure has increased from 1998 – 2000 (Table 1). The private sector contributed a major portion of R&D spending over the years, followed by government research institutes (GRIs) and IHLs.

Table 1: Total R&D Expenditure (RM Million) by Sectors, 1992-2000

	1992	***1994***	***1996***	***1998***	***2000***
Private Sector	246.3	292.6	400.1	746.1	967.9
Government Research Institutes (GRIs)	253.7	164.9	108.6	247.3	417.5
Institutes of Higher Learning (IHLs)	50.7	150.9	40.4	133.6	286.1
Non-Profit Organisation (NPOs)	0	2.8	0	0	0
TOTAL	**550.7**	**611.2**	**549.1**	**1127.0**	**1671.5**

Source: Malaysian Science and Technology Indicators Report

In terms of R&D spending by type of research, applied research ranked first followed by basic research and experimental work (Table 2).

Table 2: R&D Expenditure (RM Million) by Type of Research, 1992-2000

	1992	***1994***	***1996***	***1998***	***2000***
Basic	68.8	44.2	49.2	138.8	452.0
Applied	271.7	383.5	228.5	568.6	852.1
Experimental Work	210.2	183.5	271.4	419.6	367.4
TOTAL	**550.7**	**611.2**	**549.1**	**1127.0**	**1671.5**

Source: Malaysian Science and Technology Indicators Report

[1] *Other available R&D grants include:*
- *Fundamental Grant Scheme – provided by Ministry of Education through universities*
- *Intensification of Research Priority Areas (IRPA) grant – provided by Ministry of Science, Technology & Innovation through universities*
- *Industrial Grant Scheme – provided by Ministry of Science, Technology & Innovation (MOSTI*
- *Multimedia Super Corridor R&D Grant Scheme (MGS) – provided by Multimedia Development Corporation*
- *Contract research – direct from industry to universities*

More recent comprehensive data is not available, however, according to the MSC Impact Survey 2004 by the Multimedia Development Corporation Sdn Bhd (MDC) which targeted 716 companies, the 343 responding companies indicated that they spent a total of RM428 million on R&D in 2003; or an average of RM1.25 million per company. This R&D expenditure was 66 percent higher than the amount spent in 2002; but slightly than the projected figure (RM1.33 million per company) for 2004. An average R&D expenditure of RM2.09 million per company has been forecasted for 2005.

The above data depicts an overall picture of R&D for Malaysia whereby there is an evident trend of increased R&D activities and expenditure. Nevertheless, Malaysia has a long way to go in terms of catching up with the more developed nations.

In Penang:[2]

- The top ranking MNCs have substantial R&D or Design & Development (D&D) operations within their Penang plants. Barring their respective headquarters, the level of R&D undertaken in Penang is at least on par if not better than their sister companies in other locations of operation. In some companies, Penang is the regional hub for strategic decisions pertaining to key business decisions. R&D and D&D activities undertaken in Penang range from IC design, flash memory design, automation design, software development, test instruments, semiconductor, telecommunication and information systems amongst many others.

- In most companies, more than 50 percent of their engineering pool is involved in R&D activities, with at least 90 percent being Malaysians. In some companies, especially the larger factories, the R&D headcount exceeds 500.

- The total R&D expenditure of these MNCs amount to millions of ringgit per annum. On average, the larger players reinvest approximately 5-10 percent of their revenue into R&D yearly. In some cases, R&D expenditure may be expected to double by 2006. In line with these R&D activities, significant investments were undertaken to retrain and re-skill both the existing and new engineering pool.

Why Penang?

Penang has the competitive advantage of the deep involvement of MNCs with a 30 year history. The benefits of the concentric cluster of Electrical & Electronics (E&E) MNCs found in Penang have filtered down to the local economy in terms of creating a strong engineering and ICT base. As manufacturing takes place, there is a natural need to innovate and proliferate new markets. R&D activities are thus a natural extension of core manufacturing activities.

Penang as an R&D hub makes business sense ...

Penang as an R&D hub makes business sense due to the extensive manufacturing activities generated out of the Penang operations and its closer proximity to the Asia Pacific region which is fast becoming a major market. Comparatively, Penang is also able to provide a more talented pool of resources at lower labour cost than other areas of South East Asia. Through the process of technology transfer over the years, a number of local SMEs have evolved to be formidable players in the field with the deep technical knowledge and skill levels capable of supporting the supply chain of these MNCs. Building up new relationships elsewhere will take time and incur additional costs. The positive attitude and dedication of the local workforce are additional plus points.

[2] In the absence of secondary data available for R&D activities in Penang, SERI conducted interviews with several MNCs to gauge the present operating environment, especially the extent of R&D activities and capabilities in Penang.

Issues and Challenges

Countries such as India and China are changing the equation.

Nonetheless, Penang is beginning to lose its competitive advantage. Countries such as India and China are changing the equation. With their abundance of skilled labour and market opportunities for regional expansion, many MNCs and large local companies are beginning to, if not already, setting up operations in those countries.

Amongst the key concerns for Penang-based industrialist are:

- Shortage of “appropriately skilled” engineers in the marketplace. Penang currently lacks skilled engineers in the areas of research & IC design, software development, telecommunication and photonics engineers. China and India benefit from a larger population pool and have a more industry relevant education system. As such, most of its graduates are more industry specific and take a shorter time to train than in Malaysia. The education system here produces complacent, non-risk takers who are not capable of creativity and lack basic communication skills but possess untapped intelligence. As a result, significant investments are incurred in the retraining and re-skilling process to increase the knowledge depth and breadth of these graduates. Therefore, even though Penang currently possesses a more skilled workforce than the rest of its neighbours, the capacity for expansion is limited by educational constraints. Many are concerned about the lack of government initiatives to address the issue of the mismatch of industry demands with both the private and public IHLs here.

There is mounting frustration amongst many MNCs as the majority of supporting SMEs are not capable of co-design and co-development...

- There is mounting frustration amongst many MNCs as the majority of supporting SMEs are not capable of co-design and co-development, and thus do not provide the value-added that MNCs can otherwise benefit from. Many MNCs have resorted to “forced incentivisation” whereby local suppliers are expected to partake in some form of R&D before business contracts are signed or renewed. There is also a lack of technology partners to be found in Malaysia as compared to China and India where indigenous companies are capable of providing 100 percent independent technical support. As a result, technology partners have to be sourced overseas, increasing turnaround time and costs; for example, the shipment of prototypes.

...incentives and grants are important as they are interpreted as a commitment indicator of the government .....

- The rigid procedures in applying for R&D incentives and grants and the lengthy approval period are hindering the rate of R&D activity expansion in Penang. On average, world-reknowned MNCs have had to wait a minimum of 2 years for approval (some are still waiting) during which time they have been given the run-around between various officials and departments. Some MNCs have set up operations in India, Singapore and China while waiting for these approvals. It must be understood that many of these MNCs are capable of funding their own R&D operations and do not require financial assistance from the Malaysian government. However, these incentives and grants are very important as they are interpreted as a commitment indicator of the government in promoting and attracting FDI into Penang and reflect the business orientation of the government. As a result of its underlying bureaucratic system, Malaysia suffers from slow “speed of execution” as compared to its regional competitors. In countries like Singapore, policy planning translates into visible action within a timeframe of 2 years, if not less.

- On average, the R&D cost per researcher in Malaysia stands at USD5,000 as compared to Singapore at USD10,000 and India at USD8,000. Interestingly, despite the lower R&D costs incurred, it would be the Malaysian engineer that is the least productive. This is on the basis that Malaysian R&D engineers undergo a longer period of training and lengthier processes of re-designing before the final product is marketable and the additional costs incurred by having to liaise with overseas technology providers due to the shortage of local technology providers.

There is a real possibility of these operations relocating out of Penang. Right now, these companies are here because of the tremendous amount of investments over the years. Nevertheless, Penang will only be preferred as an ideal regional operation hub if all things remain equal. With the competitive advantage eroding very quickly as a result of capacity constraints in terms of skill and cost effective productivity, urgent actions are required to restore confidence levels. Apart from the economic benefits, it is important to maintain the presence of the "Big Boys" i.e. the MNCs in Penang as they are the main facilitators of knowledge transfer, they help to grow the next generation of k-workers and R&D, as previously mentioned, is a natural extension of their immense manufacturing activities.

...competitive advantage eroding very quickly as a result of capacity constraints in terms of skill and cost-effective productivity...

Both the state and federal governments need to project a more focused and responsive approach to its commitment in developing R&D capabilities in the country. The state government should assist these MNCs by continuously applying pressure on the Federal government to enhance our competitiveness in relation to other competitor countries by monitoring the incentives provided and where possible providing better terms and conditions offered to spawn and attract further R&D operations in Penang. In turn, these MNCs then have the basis to lobby their Headquarters to move more R&D activities out here. It is also critical for the government to simplify the procedures of R&D incentives/grants application and to speed up the evaluation & approval process. Attention also needs to be given to stem the rising cost of labour as a result of lower productivity per worker.

There is also a need to nurture R&D activities within our SMEs to address the shortage of local technology partners and service providers and to strengthen the local supply chain network. While MNCs are capable of facilitating their own research agenda, SMEs are not. Most require handholding at this stage of infancy. On the other hand, marketable innovations and ideas have been generated at the University level, but the lack of industrial participation has seen many of these ideas fail to make it to the next level of commercialization. This is where the government has a "matchmaking" role to play by bringing public/private universities together with SMEs by way of collaborative efforts to successfully convert innovative ideas into economic assets.

<u>Institutes of Higher Learning (IHLs) and the Development of Human Capital</u>

A structural problem exists within the educational curriculum...

The cornerstone of achieving k-economy status is the development of human capital. However, as highlighted in the R&D section above, education as a pillar of the k-economy in Malaysia leaves much to be desired. A structural problem exists within the educational curriculum whereby school leavers today lack creativity and the desire for continuous learning.

IHLs and employers assert that the majority of school leavers and graduates also lack effective communication skills in English. This could be a consequence of the spoon feeding environment found in most schools today and the academic and examination oriented syllabus which lacks a wholesome all rounded approach to education. The effects of an education system are slow to filter through and take years to materialise. Thus the realisation of the weaknesses incumbent in the educational system will take years to rectify. To facilitate Malaysia's transformation into a k-economy, revisions to school and technical curricula is required.

The basic lack of communication skill and creativity of the people is a major barrier in allowing for regional penetration of markets and development in the business sense. Thus as part of moving up the value chain and to fulfill the gap in the quality of graduates produced and the quality of graduates needed, skills retraining at the professional level has become common practice today. In this regard, the role of IHLs is clear in facilitating the process of higher education and continuous learning.

Penang as an education hub is home to Universiti Sains Malaysia, the Penang Skills Development Center (PSDC), and 41 JPN registered private colleges of which 35 are currently active and in operation. The shift in national policy to place greater emphasis on building Malaysia's human capital, productivity and capacity for knowledge absorption and utilisation has seen many IHLs responding in various ways to facilitate the growth of the k-economy.

Thus, at the tertiary education level, many IHLs are aware of the need to:

- be more integrated with global knowledge systems and are practicing partner university or twinning programmes with established and reputable foreign universities;
- produce "industry relevant" graduates and have responded by creating links between college level education and industrial requirements. This is done by way of collaborative research with the large pool of MNCs here and by bringing in industry professionals to be guest or part-time lecturers or to share experiences with college students
- produce creative and knowledge hungry graduates who are willing to fuel the generation of new ideas and concepts
- continuously improve the quality of the institution both in terms of academic staff and student caliber as well as upgrading the standard of infrastructure

...dwindling student numbers … limits the potential of these IHLs in investing more to achieve world-class education standards

In the area of continuous improvement, many Penang based IHLs find themselves in a Catch-22 situation, whereby dwindling student numbers and diminishing profit margins do not justify significant capital investments in its human resources and infrastructure. This limits the potential of these IHLs in investing more in quality trainers in order to achieve world-class education standards. Growth of IHLs measured by way of student enrolments has shrunk in the past few years. Penang IHLs student intake have been affected by numerous factors such as the teaching of science and maths in English at the STPM level, improved Malaysian economic conditions making overseas study more affordable, course repetitions at many IHLs, decline in international student intake and the increasing number of local branch campuses of foreign universities such as Monash and Nottingham University amongst others.

As Penang realises the need to shift from traditional manufacturing skills towards higher end value-added activities to remain competitive as an investment and manufacturing hub, a natural need for human resource upgrading has emerged. To enable regional and global penetration and improved competitiveness, both MNCs and local employers began to look for a different set of criteria in fresh graduates – improved interpersonal skills with current technical and fundamental knowledge. There is also a need for retraining and reskilling opportunities for their existing pool of human resources. To entice MNCs and encourage local companies to foray into higher end value added activities such as R&D and D&D, an available pool of local talent must first be made available. This creates a natural niche market for IHLs in Penang. Some IHLs have begun to respond to industrial needs by providing soft skills and industry specific training to large manufacturing firms who traditionally engaged overseas trainers at a higher cost.

Two front runners in the area of industrial training in Penang are PSDC and Inti Industrial Training Center (IITC), a wholly-owned subsidiary of Inti International College Penang. Both institutions currently run professional training courses which reflect the specific needs of the manufacturing industry. Since its inception in 2002, IITC has reported a steady annual increase in market demand for its courses by approximately 20 percent. The ability of Penang based IHLs to provide this service to MNCs and local manufacturing companies is important in ensuring the competitiveness of the business environment in Penang. IHLs are thus helping the Penang workforce to shift from traditional skills towards higher end value chain management capabilities. This initiative by IHLs also seeks to bridge the gap in the skills mismatch so often cited by industry leaders and players.

Issues and Challenges

Although successful in professional development, IHLs believe the full potential of their contribution has not been achieved. Many deem that with greater collaboration from the government, academic institutions, MNCs and local corporations, they would be able to anticipate industry trends and demands and play a more proactive rather than reactive role in designing programmes and courses to facilitate the k-economy. There is potential for Penang based IHLs to become pioneers in the area of professional development as they have the advantage of ready campuses, existing infrastructure and the necessary network with industry professionals to bring the industry into the education system.

As market driven institutions, IHLs are able to provide courses which are more attuned to market needs and taught by industry practitioners. However, many feel that their capabilities are not fully understood by higher authorities and that the lengthy course approval processes interfere with their ability to innovate their courses to the needs of the dynamic market place. While roles may differ and the role of an accreditation institution is obvious in maintaining the integrity and ethical standards of private educational institutions, there is a need for both IHLs and the relevant authorities to share the same goal which is providing the necessary infrastructure to develop human capital. Thus it would help if the authorities change their policing mindset to that of a facilitating one. Facilitating in this sense purely means reduction in the levels of bureaucracy and a deeper level of understanding amongst the approval officers when going through course approval processes; facilitating does not mean pure accommodation. With sufficient moral support, IHLs would be able to produce creative, innovative and industry relevant graduates.

On the other hand, IHLs have the moral responsibility to maintain the standards of their institutions. In the pursuit of profit, IHLs should not lower the standards of education by accepting under-performers to fulfill student numbers and employing educators and lecturers who lack the necessary academic and professional qualifications.

As long as Penang proves unattractive as an educational hub, the state will never be able to attract or retain its pool of smart local talent

The issue of human resources presents a major hurdle in Penang achieving k-economy status. As long as Penang proves unattractive as an educational hub, the state will never be able to attract or retain its pool of smart local talent. What makes Penang unattractive as an educational hub is the lack of commitment from the government to promote and provide adequate business opportunities to support the private educational insititutions. For instance, IHLs have recently introduced more Science and Biotechnology related courses in line with the government focus on promoting agribusiness in Malaysia. Hence, it is incumbent on the government to follow through on this policy so that the graduates from these fields do not have to face the quandary of job scarcity. The lack of business opportunities is also a major hurdle in further expansion of these educational institutions in terms of attracting world-class educational institutions here and in attracting and keeping qualified teachers within the education system.

While it is more difficult for public institutions of higher learning to adapt and respond to market needs, it has research and development capacities which private institutions lack. On the other hand, private institutions, being market driven can develop courses pertinent to industrial needs. Bringing these institutions together will improve the calibre of the educational institutions in Penang. Thus, there is potential and synergistic value to be derived from these private institutions if there is a greater cohesion between government and private schools and private and public institutions of higher learning.

The peace and unity enjoyed by the multi-cultural nation of Malaysia has no doubt come about from the successful socio-economic policies developed and implemented by the government. This includes the educational initiatives which aim to ensure a fair chance for all to have accessibility to higher educational qualifications. However, to compete with countries like Singapore, China and Taiwan in creating k-workers for the k-economy, certain aspects of the educational initiatives are worth a re-look. Mediocrity in our educational institutions bred out of excessive political control and intervention must make way for the principle of meritocracy where excellence and not mediocrity is rewarded. The problem with Malaysia is: as more places are provided for tertiary education to fulfill the k-worker shortage, the quality of the students qualifying for this level gets compromised. The controversial process of "streaming" where students are segmented according to learning ability has helped Singapore maximize the potential of all students and minimized the number of school dropouts. Students with lower learning abilities can join technical-vocational courses which offer full-time training and apprenticeship programmes jointly conducted by companies and the vocational institutions.

Info-structure Development in Penang

Growth in a k-economy is driven and sustained by 3 essential pillars: Knowledge, Creativity and Innovation. The structure to enable the perpetual creation and augmentation of knowledge, creativity and innovation is very much associated, if not dependant, on the availability and application of information and communications technology (ICT) in our work and dealings each day. In a nutshell, a k-economy survives on its ICT capabilities. Thus the availability and penetration of info-structure among the people play a pivotal role in ensuring that Penang can operate effectively in a knowledge-based economy.

In Penang, many factories, business offices, schools and other institutions are equipped with computers and connected to the Internet. As the access to ICT has been made easier, the penetration rate of the Internet has also increased. As can be seen from Table 3, the rate of Internet dial-up penetration rate in Penang stands at 16.2 percent in the 3rd quarter of 2004, making it the state with the 3rd highest internet dial-up penetration rate in the country. Despite the fact that the internet dial-up penetration rate in Penang is much higher than of the other states in the country, it is barely half of the penetration rate in Kuala Lumpur.

The introduction of broadband has brought a new lease of life to Internet users all across the world. Users no longer have to be delayed by the slow rate of data transfer. With the broadband high speed that ranges from 384Kbps to 2Mbps, data transfer, downloading and uploading can be done at a breakneck speed. This will also accommodate e-business and e-commerce activities. Nevertheless, despite the fact that it had been introduced years ago, the level of broadband subscriptions in the country is still less than 1 percent of the total population in the country, a rather dismal figure. As of the 3rd quarter of 2004, the penetration rate of broadband in Malaysia was only 0.85 percent, whereby the number of broadband subscribers (ADSL, SDSL and others) in Malaysia is estimated to be about 218,004. As for Penang, Telekom Malaysia Berhad stated that 24 telephone exchanges are in place in the whole state. Telephone exchanges provide telephony to the customers and therefore, Telekom Malaysia can, technically, provide broadband Internet connection in areas that they provide telephone services. Presently, Telekom Malaysia has the capacity to service up to 75,000 ports/ customers and they are progressively installing more ports. However, the total number of customers (residential and commercial) in Penang currently stands at a mere 33,000 ports. This is only 44 percent out of the current capacity rate.

Table 3: Internet Dial-Up Penetration Rate By State

State	2003	2004		
		Quarter 1	Quarter 2	Quarter 3
Johor	9.6	10.3	9.7	9.8
Kedah	6.3	1.0	6.4	6.5
Kelantan	6.9	7.3	6.1	6.1
Melaka	11.5	12.7	11.6	11.7
Negeri Sembilan	10.5	11.4	10.6	10.7
Pahang	6.7	7.3	6.3	6.3
Penang	15.8	16.9	16.0	16.2
Perak	8.0	9.0	8.3	8.4
Perlis	8.3	9.2	8.8	9.0
Selangor	14.2	15.1	14.1	14.6
Terengganu	6.6	7.1	6.4	6.5
Wilayah Persekutuan Kuala Lumpur	32.8	35.9	33.4	33.7
Wilayah Persekutuan Labuan	17.8	16.3	16.4	16.5
Sabah	3.6	3.7	4.1	4.2
Sarawak	6.2	6.9	6.5	6.6
Malaysia	**11.4**	**12.4**	**12.2**	**12.3**

Source: Malaysian Communications and Multimedia Commission (MCMC)

...total number of broadband customers in Penang ... is only 44 percent out of the current capacity rate.

The introduction of Wireless-Fidelity (Wi-Fi) in recent years has continued to revolutionize the ICT scene. The unavailability of fixed networks cables is no longer a concern as the wireless local area network transmits and receives data via radio signals instead of wires. In Penang, major hotels, cafés, restaurants, colleges, hospitals and the Bayan Lepas International Airport have been equipped with wireless connectivity. Work, communication and transactions now can be conducted on the move.

In terms of software development, local software companies in Penang have begun to show their prowess in the ICT field. Many local software companies in Penang have ventured into new and more advanced technology and have been moving up the value-chain gradually, whereby operations now involve more R&D and high-tech activities. Over the years, the companies have introduced value-added products and services that include software for business solutions, taxations, eBanking, VoIP solutions in telecommunication and other products, in which a small majority has penetrated into foreign markets.

Issues and Challenges

Being heavy users of the Internet, most MNCs in general do not face problems of accessibility to the Internet. The MNCs are generally more concerned about the limitations of their broadband connections whereby the capacity of the broadband bandwidth is not adequate for their daily operations. As part of the MNC operations are done collaboratively and virtually with partners all over the world via internet, the low speed dial up line in the outskirt areas does not support the transmission of large-sized files. The bandwidth offered by broadband providers here in Malaysia is still relatively low compared to more advanced nations such as South Korea and the US but that is also due to the fact that those advanced countries have a larger customer base as compared to Malaysia.

PENANG ECONOMIC MONTHLY

There have been mixed views on the Internet connectivity services in the state. Some complain that there is limited access to broadband in certain areas of the state while others think that the commercial areas outside the Bayan Lepas FIZ area have been relatively marginalized. Some have claimed that broadband providers do not service their area and that they have been waiting for broadband to be made available to them for quite a while. As noted earlier, Telekom Malaysia mentioned that telephone exchanges are already in place in most of the areas in Penang and broadband connection can actually be established for both residential and commercial users in all the areas within 5 km radius of the nearest exchange. Nevertheless, certain areas face the last mile problem for telephony and these last miles will require DSL-enabled equipments to be installed to facilitate broadband Internet connection. Thus, the residents or commercial users in those areas are required to wait for Telekom Malaysia to install the equipments before broadband connection can be attained.

SMEs are still lagging behind in terms of embracing ICT as part of their business practice, making it difficult for MNCs to work together with them...

With the lack of Internet connectivity, there is bound to be a gap between the MNCs and the SMIs and in today's fast-paced economy, a high-speed broadband connection is needed by both the MNCs and the SMIs to collaborate or to conduct business between them. The level of ICT penetration among the SMEs is very low and is a far cry from the level of penetration at the MNC level. In spite of all the available infostructure in Penang, there is evidently very slow ICT take-up rate among the SMEs. SMEs are still lagging behind in terms of embracing ICT as part of their business practice, making it difficult for MNCs to work together with them and thus, are part of the reason for the lack of collaboration between the local and foreign firms. As Penang has more than 20,000 SMEs, their reluctance to move on with the times might prove to be disadvantageous for themselves and for the State's economic growth.

With the massive amount of investments made by both the Government and the private sector, it is actually disheartening to find that the penetration of ICT has yet to truly reach all levels of the community. The question remains as to how much the technology available has been fully utilised to spur the growth of the state's economy. Applications such as web-hosting, e-commerce, e-business, video-conferencing and other applications that can be done via the Internet have yet to be fully exploited by the people. For example, e-commerce, which has been introduced some time ago, has yet to be well accepted by Penangites as most of the general public is still relatively skeptical about Internet transactions.

...software companies in Penang struggle to find recognition in their own country.

In terms of software development, software companies in Penang struggle to find recognition in their own country. It is a huge task for the local software companies to gain the acceptance of the consumers to use the locally developed products rather than the international ones.

The recent conferral of Cyber City status to Penang has brought mixed reactions from industrialists. While some see nothing of its benefits and regard it as a mere publicity exercise, there are some who feel that the Cyber City will bring in a whole lot of good. It is hoped that the Cyber City status will be able to attract more foreign IT activities into Penang and eventually lead to the spin-off of more local IT industries as these foreign companies require local IT support to complement its business operations. The Cyber City offers 10 Bills of Guarantee (BoG) to MSC status companies. The BoGs include the provision of world-class physical and information infrastructure, and the provision of globally competitive telecommunications tariffs. While some players are of the opinion that these BoGs are beneficial to their operations, others feel that these BoGs are nothing new as they will have minimal impact on their existing operations. The main issue with the Cyber City is the lack of communication. Many people in Penang have not been made aware of how its implementation will affect their daily lives. Hence, the various layers of Penang society, which are capable of contributing to the success of the Cyber City in terms of support are unable to do so, purely because they don't know how to and where to start.

Many people in Penang have not been made aware of how the implementation of Cyber City will affect their daily lives….

Where does Penang go from here?

The Government of Penang has many plans for the state. It envisages the state to be an intelligent land or *i-land* by the year 2010. But it has a lot of work cut out for it before it can reach that status. The State must first ensure that the necessary info-structure are in place before it can expect the people to fully engage in e-business, e-commerce, e-government, e-learning, e-manufacturing and other e-related activities.

The Government has in the past put a lot of emphasis and attention on the continuous upgrading and upkeep of the various industrial zones in the state. It is high time for the Government to extend their focus to help the SMEs instead, especially in areas like Diamond Valley, Sungai Tiram, Paya Terubong and other designated industrial areas catering mostly to local industries. The Government should also play its part in encouraging the SMEs to adopt ICT. The SMEs have to understand the fundamental role that they play in Penang's economy and their capacity in helping to generate growth for the state and the country. Most of them still need to be educated on how ICT can benefit them in the long run.

It is very important for the younger generation to be exposed to the world of information technology. Thus, it is crucial for the Government to ensure that all students, especially the less fortunate ones, have access to computers and the Internet. Telekom Malaysia has been working closely with the Ministry of Education to establish and provide broadband accessibility to schools throughout the country. The Government not only must ensure that the students gain access to ICT but also ensure that they are encouraged to make the most of the available resources to spur innovation among them rather than only teaching them to obtain information.

Moving forward, Penang needs to equip its people to embrace the many opportunities that can be attained through the usage of ICT. To do so, people must have continuous access to the Internet. Many will agree that the nature of Penang's land size is a plus point as there should not be much of a problem for a small state like Penang to be totally wired up. Thus it is actually possible to establish Wi-Fi connectivity for the whole state of Penang. To encourage the usage of the internet, free Wi-Fi services should be made available at more places. Once the whole state is connected, the lifestyle of many Penangites will change.

Although there is much space for improvement, Penang does have the info-structure needed to operate effectively in a knowledge-based economy. It is, of course, not the main reason why investors choose Penang as the destination for their business interests but having said that, the availability of modern info-structure here in Penang will definitely serve as an added bonus to those who are considering Penang as an investment site.

Funding for K-Business Growth

Also necessary to support a k-economy is the development and viability of k-businesses in Penang. Defined as companies or organisations which are involved in the knowledge business, these firms are usually found in the area of health, medical and life sciences, technology, biotechnology and certain areas of the retail sector. As k-businesses lack physical assets, conventional methods of financing do not usually apply. Organic growth is not a viable option as growth via reinvestment of profits is too slow for companies involved in the generation and sale of ideas to catapult into viable businesses. The involvement of venture capitalists[3] (VC) becomes the springboard for their ideas and eventual growth.

Upon investment, venture capitalists seek two criteria, business viability and the skills of the existing management team. The general VC perception of Penang based companies are as follows:

PENANG
ECONOMIC
MONTHLY

Strengths	Weaknesses
Good start-up companies with viable ideas	Lack of business opportunity for growth and expansion
Possess high levels of technical knowledge	Not well positioned for regional and global competition
Perseverance and determination to source necessary funding by way of angel investors	Outdated management skills and practices

The main problems encountered by start-up companies in Penang are the lack of accessibility to funding and the lack of the necessary network connections to create a viable market for their product. Many companies are unaware of the role of VCs, especially the value-add that they can potentially bring to the business. Apart from financial backing in terms of capital injection, they are able to enhance the level of technological skills and provide input on the management systems and procedures in the company. VCs are also able to oversee and recommend viable business strategies such as product mapping and the introduction of new markets and customers to these companies.

...main problems encountered by start-up companies... are the lack of accessibility to funding and the lack of the necessary network connections to create a viable market for their product.

Market research indicates a demand for VC funding within the knowledge-based industries in Penang. However, for those who are aware, VC funding is not accessible to all. In most cases, **they do not fulfill the first criterion of the VCs, ie. business viability**. This is especially so in IT where there is minimal chance of business survival due to the lack of business opportunities. On the other hand, companies which do qualify for VC funding do not see the value in VCs. Many do not welcome the "intrusion" of an external party in core management decisions and worry about dilution issues.

The table above highlights the key strengths and weaknesses of Penang based k-businesses. While Penang entrepreneurs possess high-end technological capabilities, the other key elements to managing a successful business such as networking abilities, the willingness to exchange vital information and embrace global business practices are missing. This mindset must change if local companies wish to become an indispensable part of the value chain.

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[3] Venture Capital firms invest in private companies that need capital to develop and market their products. In return for this investment, the venture capitalists exact a price - significant ownership of the company and seats on the board of directors. Venture capitalists raise money from institutional investors, state pension funds and high-net worth individuals, usually in the form of partnerships. Sometimes the government is a source of funds for venture capitalists.

Despite the brilliant ideas and concepts, the lack of market opportunities in Penang has driven many local technopreneurs and entrepreneurs to new markets such as Kuala Lumpur and Singapore. Therefore, the government must assist in the creation of business opportunities for such firms. It should encourage both local and foreign companies to buy local products and services, and assist in promotional efforts both locally and internationally to increase market awareness of local Malaysian IT capabilities. Although the argument against local software usage is usually one of uniformity in standards of practice, i.e. where the software used locally should be the same as its Head Office, sufficient tax incentives and cost savings together with a proven track record of the local software reliability and conformity will make it attractive enough to warrant a decision change. Thus, with the appropriate incentives afforded by the government, local software can make business sense.

…the lack of market opportunities in Penang has driven many local technopreneurs and entrepreneurs to new markets...

It is important for k-businesses to be given the right operating environment to thrive and grow in Penang as they make up the depth and breadth of the knowledge-based industry here. Their presence is essential in creating the business opportunities needed for further development of the k-economy.

Conclusion

It is surmised that Penang does have the necessary infrastructure in place to facilitate smooth progression into the k-economy. Unfortunately the maximum potential of these existing infrastructure have not been fully utilized. To date, there have only been pockets of opportunities that have been created to harness the potential of these infrastructures. More must be done to facilitate a rapid shift and to reflect the serious commitment of Penang in becoming a k-economy. What Penang needs to do is to make visible changes, to flood the market with strong actions to support its policies and not introduce and implement weak policy actions which will result in ripple-like effects which are unlikely to succeed in the long run and turn out to be a waste of resources, financial or otherwise.

What Penang needs to do is to make visible changes...

At present, IHLs are operating under capacity, R&D operations are moving to Singapore and India, k-businesses are slow to take off, the full implications of Cyber City are not understood and the quality of fresh graduates leave much to be desired. At this rate, Penang will never be pioneer in high end value-added services. Neverthe-less we will survive; but unless pure survival is what we are after, we will never be market leaders in the region if no action is taken to further develop the ability of our indigenous companies and SMEs, if we continue to rely on the transfer of imported technology and if we do not address the issue of bureaucracy which permeates into the delivery system mechanism in the economy.

The creation of a supportive business environment by way of incentives where people who possess ideas and knowledge are encouraged to venture into the market will encourage further growth of the k-economy. At present, most of Penang's talent pool is locked within the MNCs as there is no reason for them to foray into the market where uncertainties abound.

Thus the government needs to demonstrate commitment by way of funds and in its "planning-to-action" time. Penang is well poised to be one of the first states to progress into the k-economy given the level of existing infrastructure and its historical competitive advantage. The actual process of rapid technology knowledge transfer began 30 years ago when MNCs first came to Penang. With its 30 year history, Penang today possesses a strong engineering and ICT base in terms of its workforce and technological capability.

The obvious role for the state government to play now is one of support. While many of the recommendations highlighted earlier in this article are Federal government decisions, the State government can play a highly influential role. After all, Penang is home to the most technologically advanced MNCs in the world and some of the most sucessful companies in Malaysia. ***§ Poh Heem Heem, Lim Wei Siong & Tan Yin Hooi***

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The Ninth Malaysia Plan 2006-2010: What it has to do

Malaysia's Five Year Planning

Like in any other year, government planners spend much of their time putting together the fiscal plan that is to be announced by the Finance Minister in his budget speech at the end of the third quarter. But this year, there is the additional task of conceiving the country's five-year plan that will appear as the *Ninth Malaysia Plan 2006-2010*. Malaysia has always had a five-year development plan, even before Merdeka. The first of these was the *Draft Development Plan 1950-1955* followed by the *First Malaya Plan 1955-1960.* Their origins might be attributed to the World Bank (then called IBRD) mission to Malaya, which culminated with the publication of *The Economic Development of Malaya*.[1] After the Second World War, prices for both rubber and tin had been rising, thereby creating a boost for Malaya's economy. But price instability following the end of the Korean War posed a balance of payments problem, because the *Colonial Office* in London had given instructions in 1954 to adopt deficit budgeting for financing rural development, education and other social services. Although rural export production was expanded by the establishment of FELDA prior to Merdeka, there was the realization of the need to create alternative financing and investment outside of the country's traditional economic pillars: rubber and tin, which together accounted for nearly nine-tenths of the exports earnings.[2] The policies and strategies that go into a more holistic development plan became the five-year plans for the country.

The earlier plans centred on industrialisation, but by the *Second Malaysia Plan 1971-1975*, the focus shifted to social distribution and economic restructuring. With the *Sixth Malaysia Plan 1991-1995,* the country began its quest to achieve developed nation status within the subsequent thirty years and began to look beyond traditional aspects of growth based on economic expansion and wealth distribution by also emphasizing the essential requisites of growth such as science and technology, research and development, human resource and knowledge creation, globalisation and competitiveness. The decade began with much optimism judging by the growth figures and putting the ambition for 2020 within reach. Then the1997 economic crisis struck and siphoned away much of the growth momentum. Since then, Malaysia has had to give economic recovery its central attention, resulting in many institutional strengthening steps being taken, including the pegged exchange rate policy, corporate governance and the capital markets master plan at home as well as multilateral efforts such as AFTA+3.

The question that is being faced is thus: will the *Ninth Plan* put the developed nation status target back on track, since we are now about midway through the time frame for achieving *Vision 2020*? One might thus imagine that the *Ninth Plan* could become a mid-term review for *Vision 2020* where some stocktaking would be in order, looking at growth rates in the various factors of production achieved over the past fifteen years and the rates need to be attained during the next fifteen years. What these numbers look like will point towards the need for policy as well as strategy that would reinforced areas where past momentums could be maintained and areas where resource inputs need to be boosted in order to realize the country's growth trajectory towards the year 2020.

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[1] *John Hopkins University Press for IBRD, Baltimore, 1955.*
[2] *See Harold Brookfield (ed.) (1994) Transformation with Industrializ ation in peninsular Malaysia . Oxford University Press*

Labour Productivity

In 1990, Malaysia had a total population of slightly more than 18 million people. Taking into account the working age group population and labour participation rates, there would have been roughly seven million people in the workforce. Given that Malaysia's gross domestic product, GDP (in 1987 constant dollars) was RM105 billion in 1990, the labour productivity (GDP/workforce) rate works out to be RM15,000 per worker. Malaysia's gross national product, (GNP)((in 1987 dollars) of RM102 billion (roughly 95 percent of GDP) meant that per capita income (GNP/population) was between RM5,000 and RM6,000 in 1991.[3]

Fifteen years hence, based on the current size of the country's workforce and GDP (in 1987 constant dollars), the labour productivity rate has risen to more than RM23,000 per worker, i.e., having grown by about three percent per year on an average. Based on the GNP (in 1987 constant dollars), the per capita income is more than RM9,000 today. This means that per capita incomes that grew annually by an average of about 3.5 percent have outpaced labour productivity growth rates by about a half percent point during the past fifteen years. Of course these rates are not reflective of rates experienced in any particular year, because the rate experienced prior to the 1997 crisis and after that would have been quite different. Basically, there is a kink, marking the 1997 crisis, in the growth path for both the GDP and GNP, which would not have been present in the growth of the country's population or its workforce.

Nonetheless labour productivity rates compared alongside per capita income rates give the answer to the question in most people's minds when they ponder over whether Malaysia will achieve its *Vision 2020* developed nation's target. It has often been said that Malaysians have become richer faster than its workforce could deliver in the workplace by way of productivity. These figures say that it appears to be so.

Government planners who are presently assembling the *Ninth Plan* for announcement next year will have to grapple with these figures when they set the course for the nation's growth during the next five years. If they go back and look at what was announced in the *Third Outline Perspective Plan* that appeared about the same time as the *Eighth Plan* in 2001 then the planners would confront numbers like 29 million people, 13 million in the workforce, labour productivity (in constant 1987 dollars) around RM33 thousand per worker and per-capita income (in constant 1987 dollars) of RM14 thousand. If these numbers are not adjusted downwards, then the nation will have to milk out labour productivity annual growth rates of more than seven percent and per capita income growth of more than eight percent per year. These numbers are about double the magnitude of that experienced between 1990 and 2005.

Investment rates

In drafting the *Ninth Plan*, a crucial question that policy makers will have to ask is how much investment will be needed to produce the desired level of output growth. In 1990 the investment rate, based on gross capital formation figures, was roughly 28 percent of the GDP. Since the turn of the century, this number has averaged 26 percent of the GDP. During the same period, the national savings rate, i.e., the portion of the GDP not consumed or transferred abroad, averaged 36 percent. Investment numbers being less than savings means that Malaysia has not been experiencing a resource gap. Technically speaking, the excess of savings over investments is equal to the current account surplus.

[3] *The GNP is GDP excluding factor payments (i.e., salaries, interest, rental, profits) received by non-nationals in Malaysia but including the same payments to Malaysians who received these from economies abroad.*

So what is the implication of these with regards to the *Ninth Plan*? Given that the gross capital formation requirements experienced in Malaysia has been between 25 percent and 30 percent of the GDP the danger of falling into a resource gap situation does not appear to be an issue. The country's savings rate is usually several percentage points more than 30 percent and thus if GDP target numbers are not set such that the capital formation requirements are very much higher than 30 percent of such numbers there will not be a resource gap (current account deficit) problem.

National priorities

Looking at the various national priorities that emerged at different phases of Malaysia's, the *Ninth Plan,* would have to review how successfully these targets have these been achieved. Following the typical pattern of growth, the country's economy began, a half-century ago, with primary resources and agriculture. But by continually implementing one five-year plan after another, Malaysia's economy became industrialized within a couple of decades and true to the typical pattern also saw the emergence of the services sector that now makes up more than half of the GDP. This only occurs when a nation, in its process of development, manages to create a sizable middle class population from which is formed the consumer base for domestic driven growth. Malaysia has been fairly successful in this regard. The country started out, after the end of the *Second World War,* like the developing nations of the rest of the world, mostly former European colonies. A half century later, the social structure bears no semblance of colonial times in which the local populace is made up of subsistence farmers, fishermen or working class folks. Only a small proportion are in the class of nobilities and landed gentries. The new society is in contrast largely middle class ranging from clerical to technical and professional staff and the bulk of whom came from subsistence or working class backgrounds during their fathers', grandfathers' or great grandfathers' time.

The existence of the middle class is critically important during times of global economic uncertainty, its creation and expansion a tribute to the success of development plans. Countries like Malaysia are remarkably open, where net trade is as much as its GDP. After the 1997 crisis, Malaysia was able to institutionalize an economic recovery package that depended on domestic sources as a supplement to growth traditionally driven by high export demand.

The social distribution and the restructuring of society goals put in place with the *Second Malaysia Plan, 1971-1975* was much more tricky, because while to a large extent the between group disparity in income distribution has been much improved, the within group income concentration remains as a challenge to policy makers. The restructuring effort has been based not on "robbing Peter to pay Paul" but instead on differential access to new wealth. A quarter of a century has gone by since. During that time, the target group for redistribution policies has expanded by another ten percent share of the nation's population. There are two opposing implications to this. First, this should make the continual restructuring effort much easier since new wealth will, due to the higher proportion of the population, more likely fall into the target group. However, if productivity rates are lower in the target group (the rational for affirmative action), then the higher proportion of population made up by the target group will act to hamper the creation of new wealth and accordingly the restructuring effort.

To ensure that restructuring of Malaysia's society achieve its desired goals based on access to new wealth the key is for the development strategy to also push for higher productivity among members in the target group. This will then ensure that the amount of new wealth needed can be created in accordance with the set path of growth in the nation's economy and if more of the access is to fall within the target group by virtue of increasing proportion in the total population, both growth and distribution can be simultaneously achieved.

Penang's part within the *Ninth Plan*

For Penang, it will be interesting to discover in the *Ninth Plan* what government planners are going to allocate in terms of the share of the state's gross regional product or GRP within Malaysia's GDP target for 2010. The GRP to GDP ratio for Penang has traditionally hovered around seven to eight percent. In the planning exercise, however, it will not be the simple issue of fixing, say a seven percent figure. Much will depend on the size of the labour force and the labour productivity that has to be achieved. Based on expected population growth rates, we can probably expect a labour force of round three-quarters of a million in 2010. Labour productivity in Penang has been higher than the national average. In 1990, the rate was higher by more than a thousand ringgit. In 2005 Penang's labour productivity rate is about seven thousand ringgit higher than the national average. If this margin of difference could be maintained between Penang's labour and the rest of the nation, Penang will be able to contribute its seven percent share of Malaysia's 2010 GDP during the next five years.

Conclusions

In a world that has become more and more seamless in terms of telecommunications and the movement of people, goods and capital, competitiveness has become the key towards progress and growth. This means that output and inputs have to be brought closer to bear upon one another – what is referred to as value added - by getting more for less. The *Vision 2020* path of growth was based on Malaysia's average annual growth rate of between seven and eight percent experienced in the 70s and 80s. Projecting over the following 30 years would put the country nicely into developed nation's status. But regardless of whether this path was interrupted by the financial crisis in 1997, the indication that labour productivity has been expanding at a rate below expected GDP growth suggests that current projections are based on a surge of high growth at a time closer to the 2020 target year. This also means that the 2020 target would be missed if such a surge were not to be obtained. Thus rather than wait for a time longed for when Malaysia would make this leap and become a developed nation, the alternative strategy would be to apportion the expected productivity and growth more uniformly over the next fifteen years. The same amount of performance achieved in the previous fifteen years will not be enough. Each factor critical to the nation's growth has to be looked at carefully so that the appropriate strategy can be identified and implemented – the production sectors, the needed knowledge and skills as well as discipline, the institutional strengthening necessary and the external pressures exerted by the competitive world. This is what the *Ninth Plan* has to do. ***§ Dr. Chan Huan Chiang***

FORUM

The article below is the 2nd part of Prof. Dr Suresh Narayanan's series of articles on the Goods and Services Tax (GST) which is scheduled to be implemented in Malaysia in 2007. As the GST will affect each and every one of us, we invite you to put forward your comments via email at seripg@tm.net.my so that they can be taken cognizance of by the policy makers. Please note that the views reflected in this article represent the personal views of the writer and do not necessarily reflect the views of SERI.

UNDERSTANDING THE SALES AND SERVICES TAX (GST): Methods of Preferential Treatment

by Prof. Dr. Suresh Narayanan

Introduction

In the first article, we looked at a hypothetical numerical example of how the GST—generically known as the VAT— is collected in multiple stages along the production and distribution chain.

In this article, it will be shown that the VAT collections are invariant to the number of stages in the production/distribution chain. Particular attention will also be given to the methods of extending preferential treatment under the VAT and the consequences of these measures. An understanding of the impact of the measures of preferential treatment under the VAT is crucial as there have been calls to "exempt" certain sectors from the VAT to reduce the burden on the poor. However, not all well-meaning commentators realize that under the VAT, "exemption" *does not* result in *complete relief* from the tax. In fact, under some circumstances, granting an exemption to a good or service will lead to the perverse result of it bearing a final tax rate (or *effective rate*) that is higher than the government legislated (or *statutory*) rate! Under the VAT, the only procedure that will truly relieve a commodity from tax is to apply a zero rate to it. And even in this case, unless the zero rate is applied to the final product, complete tax relief is not assured.

A Review of the Basic Operations of the Credit Type VAT on Consumption

Let us quickly review the basic operations of the VAT and expand it further to highlight more of its features. In order to do so in a less cumbersome fashion, we will construct a table that illustrates the collection of VAT at the various stages, using notations rather than actual numbers.

Let us use subscripts m, w and r to denote the manufacturer, wholesaler and retailer, respectively. Let P stand for *ringgit* value of output, and t stand for the tax rate. As before, we will assume that the manufacturer purchases no inputs to produce output. Thus, the VAT collected at the manufacturing stage, under the credit approach, will be given as:

$VAT_m = t_m P_m - 0$

Similarly, the VAT collected at the wholesale stage is written as:

$VAT_w = t_w P_w - t_m P_m$

Finally the VAT collected at the retail stage is given as:

$VAT_r = t_r P_r - t_w P_w$

Of course, this process can be repeated for any number of stages in the production/ distribution channel.

To illustrate how the expressions above can be converted to give actual values, let us assume, as before, that the manufacturer produces an output valued at RM 200. Thus, P= RM200; if the tax rate is 10 percent, $t_m = 0.10$. Using the expression for the manufacturing stage, we compute his tax liability as:

$VAT_m = 0.10(RM200) - 0 = RM\ 20$

This amount is exactly what we obtained in Table 1, previously.[1] In a similar fashion, if we know the value of output in each stage, and the appropriate tax rates, we can compute their respective tax liabilities.

Table 2 that follows illustrates various possible scenarios under the consumption based VAT that uses the credit or invoice method of collection, and their effects.

A Multi-Stage VAT is Conceptually Equivalent to a Single-Stage Tax on Retail Sales

Case 1 is simply a more generally stated illustration of the numerical example demonstrated by the example given in Table 1. We assume a uniform rate of tax (t) is imposed at every stage (that is, $t = t_m = t_w = t_r$), and the manufacturer purchases no inputs. It is clear from the table that the purchases made at each stage (except for final consumption) represent the sales of the stage before it. As was pointed out previously, the seller at each stage collects the taxes paid by purchasers and submits them to the tax authority. The buyers at each stage (unless they are final customers) receive credit for the taxes they paid on purchases and this can be used to offset the taxes due on *their* sales. This procedure is repeated until the final consumption stage.

The final consumer buys from (say) the retailer, pays the VAT due but receives no credit for the tax on his purchase. Thus the tax is fully passed forward to the consumer. The total tax collected by the tax authority (from the various points of collection) is given by the expression (tP_r) in the final column.[2] The expression suggests that the sum collected is identical to the amount that would have accrued if the same rate of tax had been levied on the value of the retail sale. Thus, conceptually, a VAT that is collected at various stages of the production/distribution chain yields revenue identical to a tax imposed on, and collected from, the final point of consumption

The Number of Stages a Good or Service Passes Through Leaves VAT Collections Unchanged

Case 2 demonstrates the fact that VAT collections do not depend on the number of stages in the production/distribution chain. If retailers, for example, purchase directly from the manufacturer (thereby skipping the wholesaler), the VAT collected on the final commodity does not vary. In contrast, the revenue derived from a turnover tax, for example, varies directly with the number of intermediate stages the commodity passes through.

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[1] See Table 1 in Penang Economic Monthly, Vol. 7, Issue 1, January 2005, p.16.
Thus, the total VAT collected = $(tP_m - 0) + (tP_w - tP_m) + (tP_r - tP_w) = tP_r$.
[2] A similar procedure is followed to compute VAT collections for all the remaining cases.

Table 2: The Effect of Preferential Treatments under the VAT

Case	Manufacturer	Wholesaler	Retailer	Total VAT
1. Uniform rate ($t_m = t_w = t_r = t$) No zero rate No exemptions	tP_m - 0	tP_w - tP_m	tP_r - tP_w	tP_r
2. No wholesale stage Uniform rate No zero rate No exemption	tP_m - 0	Skipped	tP_r – tP_m	tP_r
3. Exemption of intermediate (wholesale) stage Uniform rate	tP_m - 0	0	tP_r – 0	$t(P_m + P_r)$
4. Exemption of final (retail) stage Uniform rate	tP_m - 0	tP_w - tP_m	0	tP_w
5. Zero-rating intermediate stage Uniform rate	tP_m - 0	0 - tP_m	tP_r – 0	tP_r
6. Zero-rating final stage Uniform rate	tP_m - 0	tP_w - tP_m	0 – tP_w	0
7. Multiple rates ($t_m < t_w < t_r$) No exemptions No zero rates	$t_m P_m$ - 0	$t_w P_w$ - $t_m P_m$	$t_r P_r$ - $t_w P_w$	$t_r P_r$
8. Multiple rates ($t_m > t_w > t_r$) No exemptions No zero rates	$t_m P_m$ - 0	$t_w P_w$ - $t_m P_m$	$t_r P_r$ - $t_w P_w$	$t_r P_r$

Some general observations may be useful at this point:

First, the continuous issue and receipt of invoices creates the so-called credit (or invoice) trail. The strength of this invoice trail is that it minimizes the scope for evasion. Both sellers and buyers have an incentive to report their transactions accurately. Any overstatement of sales by the seller means he must submit a correspondingly larger VAT to the tax authorities and he also ends up inflating any tax that is due on his income. The accurate reporting by the seller is reflected in the invoice he issues to the buyer and prevents the latter from overstating purchases in the hope of inflating the input tax credit he enjoys. Buyers must also report purchases accurately to receive full credit for the VAT paid on them. This, in turn, deters sellers from understating their sales since crosschecking is theoretically possible. This self-enforcing feature is a useful deterrent to tax fraud.

Second, the collection of taxes in stages from different points in the production/ distribution process also reduces the potential loss of revenue from evasion. Evasion by anyone party is difficult; it requires collusion by others in the production/distribution chain to be successful. In fact, complete evasion is only possible by the collusion of every agent in the process. Partial evasion leads to only partial loss of revenue. If the tax is collected from only one point, as in the case of a retail sales tax for example, successful evasion at that one point of collection will result in the loss of the *entire* tax revenue.

Third, the invoices on sales and purchases create an additional source of information on the incomes of traders. Thus, if VAT payers are also income tax payers, their income tax returns can be verified through this new source of information.

Preferential Treatment Under the VAT: Exemption, Zero-Rate and Multiple Rates

Under a VAT, favourable treatment to various sectors or stages in production can be granted through three mechanisms: an exemption, imposing a zero rate of tax and utilizing more than one rate of tax (usually lower than the standard rate). The impact of each of these mechanisms may be illustrated using the notational model developed earlier and is reflected by Cases 3 to 8 in Table 2.

Exemption

Well-meaning lobbyists have already sounded arguments for "exempting" a particular sector or class of goods from the VAT on equity or other considerations. It is important to bear in mind that under the VAT, "exemption" does not provide complete relief from the tax. An exempted firm under the VAT is not liable for the tax on its sales *but it also does not receive credit for the VAT already paid on its inputs*. The tax embedded in its inputs is thus passed forward to purchasers in the form of higher prices. The exact impact will depend on whether the exemption is given at an intermediate stage (say, wholesaling) or at the final stage (say, retailing).

Exemption at the Intermediate Stage

Case 3 demonstrates the effect of exempting an intermediate transaction from the VAT. An exempted firm is technically out of the VAT framework. It is therefore not liable for the VAT on its sales and gets no credit for the tax paid on input purchases either.

In our example, the wholesaler is exempted from the VAT. It can be seen that there are no VAT related transactions attributed to him. The final VAT collected in this case is shown by the expression in the last column [$t (P_m + P_r)$] or, equivalently, $t (P_m) + t (P_r)$.

What are the consequences of an exemption at an intermediate stage?

First, such an exemption disadvantages the subsequent purchaser (the retailer, in our example) in two ways. Not only are the sales of the subsequent buyer liable for VAT (as indicated by the expression tP_r), but he also cannot subtract the taxes imbedded in his input purchases because they came from an exempted seller. This is evident from the table. The sale of the wholesaler to the retailer is tax exempt. Hence, the former files no VAT return and breaks the credit trail. The invoice issued by the wholesaler to the retailer will show the sale but not the tax payment. The retailer, therefore, gets no tax credit to set against the tax he must submit to the tax authority on his sales. The entire tax that he collects on his sales must be transmitted to the tax authority. In addition, the VAT collected on the manufacturer's sale to the wholesaler is not deductible by the wholesaler (because of his exemption status) or by the retailer (because this prepaid tax does not appear on the invoice issued to him by the wholesaler). Consequently, this tax element is imbedded in the final product (as shown by the expression (tP_m) in the last column.

Second, exemption at an intermediate stage disrupts the credit trail, thereby undermining the self-check mechanism inherent in the VAT.

Finally, the total VAT collected on the final good has actually *increased* as a consequence of the exemption as compared to the no exemption case. This is because all value added prior to the exempted stage is taxed twice and results in a cascade effect that a basic VAT is designed to avoid! Planners should bear in mind that a commodity given an exemption at the intermediate stage will be disadvantaged. This is because the effective or actual rate of tax borne finally by the good exceeds the statutory rate. This can be demonstrated as follows:

The actual or effective VAT rate on any commodity can be found by:

$$\text{Effective VAT rate} = \frac{\text{Tax Revenue on Final Sales}}{\text{Value of Final Sales}}$$

In the no exemption case, the statutory rate is t; the effective rate is $tP_r / P_r = t$. Thus, both are identical. In the intermediate exemption case, the statutory rate remains t, but the effective rate is $t\,(P_m + P_r)/P_r$, which is clearly higher than the statutory rate.

Exemption at the Final Stage

Case 4 in the table illustrates the effect of exempting the final stage (or retail, in our example) from the VAT. As before, the exempted retailer attracts no VAT on his sales but cannot claim credit for prior taxes paid on his inputs. Thus, his final product carries a hidden tax element and the statutory rate will diverge from the effective rate. Furthermore, the audit trail is broken, impairing the self-check mechanism. However, exemption at the final stage does provide some preferential treatment to the commodity concerned since the effective tax rate is now *lower* than the statutory rate, and VAT collections are consequently lower as well.

The effective rate in this case is given by the expression tP_w/P_r, which is of course, lower than the statutory rate of t.

Planners and special interest lobbyists must remember that if exemption is used to grant preferential treatment to a commodity it must be given at the final (retail) stage. Nonetheless, the commodity will not be entirely free of the tax since some VAT is still collected.

Zero Rate

Zero-rating is the only device that truly relieves a commodity from the VAT. Even so, to achieve this result, the zero rate must be applied at the final stage.

A firm whose product attracts a zero rate of tax remains within the VAT framework. It therefore enjoys tax relief on its sales (because a zero rate is applied) and the firm receives credit for all taxes imbedded in its input purchases. However, given its status within the VAT framework, the firm must prepare its returns like all other firms.

As intimated earlier, zero-rating an intermediate stage will yield an outcome quite different from the case where the zero rate is applied to a final product. This will be obvious from the cases discussed below.

Zero- Rating an Intermediate Stage

Case 5 shows the outcome of zero- rating an intermediate (wholesale, in our example) stage. Despite the fact that zero- rating frees the wholesale stage completely from both the tax on it sales and gives full credit to taxes incurred on input purchases, there is VAT collection at the end. Thus, zero- rating an intermediate stage has the impact of completely relieving that stage from taxes—both direct and hidden—but does not free the final commodity from the tax, though it does lower the tax on the product. In fact, the VAT collections at the end are identical to Cases 1 and 2 where no exemptions or zero rates were applied! Zero-rating an intermediate stage is a device to relieve intermediate enterprises from the VAT (for hopefully well grounded reasons) without affecting final tax receipts!

Note that unlike exemptions, zero-rating an intermediate stage does not disrupt the credit trail, does not affect final tax collections, causes no divergence between the statutory and effective tax rates and does not generate the cascade effect.

Zero-rating the Final Stage

Case 6 in the Table 2 demonstrates this case. Zero-rating a final transaction truly relieves the commodity from tax because zero tax collections are made. This should be contrasted with the previous case where zero-rating an intermediate transaction only relieved the zero-rated stage from tax but not the commodity—because it was still taxed. Once again, the preferential treatment is accorded to the commodity without the perverse effects of cascading, rupturing the credit trail or creating a wedge between the effective and statutory tax rates.

Multiple Rates

Multiple rates are often utilized as a device to extend preferential treatment to some commodities and discriminate against others. Thus goods viewed as "necessities" attract lower rates of tax relative to those considered as "luxury" items. Under the VAT, the only effective way to lower or raise the rate on a given commodity is to implement the desired rate at the final stage. Raising or lowering rates in the intermediate stages will simply be "washed away" without giving the desired outcome.

Cases 7 and 8 illustrate examples where the intention is to effect a change in the tax rate on the commodity, by varying the tax rates on the stages prior to the final one. Case 7 shows the outcome when an attempt is made to *lower* the tax rate on the good by imposing lower tax rates on all stages except the last (retailing) one. Thus $t_m<t_w<t_r$, where t_r is the standard rate. Case 8, on the other hand, details the attempt to *raise* the tax on the final commodity by raising the tax rates on all stages prior to the final one above the standard rate. In this case, $t_m>t_w>t_r$, where t_r is still the standard rate.

It is clear that in neither case has the intended outcome materialized. Varying tax rates on intermediate stages below or above the standard rate does not change the tax liability on final sales. This is because taxes paid on intermediate stages are allowed as credit and lower or higher rates only lower or raise these credits. Thus, the impact of higher or lower tax rates are "washed away" with no net impact on the tax at the final stage.

Concluding Comments: The Choice of Preferential Treatment

If preferential treatment is to be accorded, which device best suits this purpose? Based on our discussion we can summarize as follows:

If preferential treatment is to be accorded to a *commodity* it is best enacted at the final stage, regardless of whether an exemption or the zero-rating approach is used.

The exemption lowers the rate of tax on the commodity while zero-rating frees it completely from tax.

On the other hand, if the intention is to extend preferential treatment to a *stage* in the production/distribution chain without affecting the revenues generated, zero-rating that stage is preferable to exemption. The latter, as we saw, generates several undesirable consequences and is best avoided altogether.

In general, it is unwise to zero- rate an entire firm; rather, zero-rates should be allowed for particular commodities since no tracing of inputs is necessary. Goods that are almost universally zero-rated are exports and food consumed primarily by low-income households.

Zero-rating a commodity (to relieve the product from tax) or a stage of production (to relieve a stage from tax) is economically efficient but can be administratively cumbersome. Recall that firms involved in zero-rated activities or products do not attract taxes on their output but are nonetheless required to keep records and invoices (just as any other firm liable for the VAT), if they are to receive the credit due on taxes imbedded in their purchases. The registration and evaluation of a large number of such firms adds to administrative costs without adding to revenue.

In addition, under the VAT, if the credit of a firm exceeds its tax liabilities on sales, the firm's excess credit can be set against future tax liabilities. But if no tax liability on sales is incurred (as in the case of zero-rated firms), the firm is eligible for a refund. Widespread zero-rating therefore imposes a financial burden on the tax authorities when refunds have to be made promptly. Failure to do so will shift the burden to the firms instead.

In the case of exemptions, it must be given at the final stage in order to avoid perverse consequences as we saw earlier. Also, unlike the case of zero-rating, granting exemption to an entire firm is easier to implement administratively.

However, regardless of how exemption is given, it breaks the credit trail and generates distortions. Furthermore, it cannot provide complete relief from the tax. Despite it being inferior to zero-rating as a device to provide preferential treatment, it is nevertheless used widely because of the ease of implementation. Exempted firms are out of the VAT framework altogether—they do not register nor are they required to keep records and invoices.

Further complexities emerge when both exemptions and zero-rating are implemented together or separately. Firms supplying exempted and taxable goods (or exempted and zero-rated goods) will be burdened with complex book and record keeping. On the input side, purchases must be distinguished between those pertaining to each category of goods since they are treated differently under the VAT. While taxes on purchases related to zero-rated goods or taxable commodities may be credited, those used for exempted goods are not. Similarly, on the sales side, tax liabilities vary. In most cases, this involves more work but where inputs are used jointly to produce/distribute all three categories of goods—like warehouse facilities, transport, telecommunications or electricity –the distinctions must of necessity be arbitrary. It would also provide opportunities for tax fraud since records can be doctored to categorize purchases for exempted items under purchases for zero-rated goods, in order to claim a bigger tax credit.

In our next article we shall examine the treatment of imports and exports under the VAT.

INTERNATIONAL HEADLINES

As High-Tech Exports Drop, US Warned It Could Lose Competitive Edge
February 17, 2005, Channel News Asia

The US share of worldwide high-tech exports has dropped from 31 percent to 18 percent over the past 20 years in what could foreshadow the loss of the country's leadership position in science and technology, a blue ribbon expert panel has warned. The Task Force on the Future of American Innovation created by leading US companies and scientific and business associations sounded the alarm Wednesday as it presented a report indicating that the United States was gradually losing its position as the world leader in scientific and technological research, primarily to the fast-growing economies in Asia. As the US share in global high-tech exports was dropping, China, South Korea and other emerging Asian economies boosted theirs from seven percent in 1980 to 25 percent in 2001, according to the study. Moreover, the high-tech industries of many Asian countries grew faster in the 1990s than that of the United States.

Singapore Economy Up 8.4 Percent In 2004 After Strong Q4
February 17, 2005, Bernama

The Singapore economy grew 8.4 percent in 2004 after a strong performance in the final quarter. The full-year economic growth was better than the government's earlier estimate of 8.1 percent and exceeding economists' expectations for an 8.3 percent expansion. Data from the Ministry of Trade and Industry (MTI) revealed that Singapore's Gross Domestic Product (GDP) grew an annualized 7.9 percent in the fourth quarter, sharply above the third quarter's annualized expansion of 0.7 percent. The fourth quarter figure was 6.5 percent higher than a year earlier, outpacing the advance estimate of 5.4 percent. The MTI said that a better-than-expected performance in December of manufacturing's biomedical cluster was the main reason for the upward revisions in the overall economic figures for the final quarter and the whole of 2004.

Small Economies and New Members to Drive EU Growth in 2005: UN
February 22, 2005, Channel News Asia

Smaller economies and new, mainly central European, member states are set to drive growth in the European Union this year, as traditional powerhouses continue to lag behind the world's other major economies, the United Nations forecast. Despite a slowdown, growth in eastern EU economies will help keep the 25-nation bloc's forecast average growth rate above two percent at 2.2 percent in 2005, according to the UN Economic Commission for Europe (UNECE). Average growth is expected to dip by 0.4 percentage points but remain strong at 4.6 percent in the eight central European states that joined the EU last year, the UNECE economic survey for 2005 said.

Germany and Japan – Shrinking Giants
February 22, 2005, The Economist

The world's second and third biggest economies each got a little smaller last quarter. Japan's gross domestic product contracted at an annual rate of 0.5 percent in the final quarter of 2004, according to figures released on Wednesday, February 16. The numbers from Germany the day before were grimmer still. Its economy shrank at an annualised rate of 0.9 percent in the same period. Both economies started 2004 well, but failed to live up to the expectations they fleetingly raised.

China Upbeat on Economic Growth
February 22, 2005, Reuters

China's economic growth this year is likely to exceed the government's annual target of 8 percent and it's too early to reach a final conclusion on inflation. China's consumer price index rose 1.9 percent in the year through January, slowing for a fifth consecutive month, partly because of easing inflation in food. The economy grew 9.5 percent last year despite government tightening steps, including the country's first interest rate rise in nine years in October, to cool heated investment growth and head off inflationary overheating. The annual inflation rate has been declining since it reached a seven-year high of 5.3 percent in July and August of last year. Falling inflation has reduced the likelihood that China will raise interest rates any time soon, analysts say.

Steering By A Faulty Compass
February 24, 2005, The Economist

Last week, for the first time, America's Federal Reserve published its forecast of inflation over the next two years. Many observers took this as a sign that the Fed had moved closer to setting an inflation target, as many other central banks have done. The minutes of the Fed's February meeting, published this week, confirmed that its policymakers have discussed the idea. Advocates of targeting argue that it would increase the transparency of America's monetary policy and maintain its credibility after Alan Greenspan retires as Fed chairman in 11 months'
time. But at which measure of inflation should the Fed take aim?

US Economy Shows Solid GDP growth
February 25, 2005, BBC News

The US economy has grown more than expected, expanding at an annual rate of 3.8 percent in the last quarter of 2004. The gross domestic product figure was ahead of the 3.1 percent the government estimated a month ago. The rise reflects stronger spending by businesses on capital equipment and a smaller-than-expected trade deficit. The new GDP figure, announced by the Commerce Department on Friday, also topped the 3.5 percent growth rate that economists had forecasted ahead of Friday's announcement. Growth was at an annual rate of 4 percent in the third quarter of 2004 and for the year it came in at 4.4 percent, the best figure in five years. However, the positive economic climate may lead to a rise in interest rates, with many expecting US rates to rise on 22 March.

China Says Will Move on Yuan in '05
February 26, 2005, Reuters

China will gradually open its capital account in 2005, another step in its plan to make the *yuan* currency fully convertible, state television said on Saturday, quoting the country's foreign exchange chief. China, facing criticism from the West that a cheap *yuan* gives its factories an unfair competitive edge, has held its ground against demands it revalue -- but has promised to progressively free up trading in the currency.

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