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MANUFACTURING MUST CHANGE

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Since I wrote, more than a year ago, passionately in the Straits Times about the importance of Manufacturing to Singapore's economy, I regularly get the question whether I am really convinced that we should keep the role of manufacturing activities at about 20% of our GDP? Would it not be logical that Singapore becomes more and more a service economy, and that manufacturing moves out to our lower cost neighbours? I stand firm with my conviction and this for three reasons. First manufacturing provides good and well paid jobs. Second, a lot of the service jobs depend on manufacturing activities. Think of accountancy, engineering services, logistics, and even mundane activities like catering or specialised cleaning.

If manufacturing would move out of Singapore, these services would follow. Studies in Europe indicate that between 30 to 55% of service jobs are sourced in manufacturing and for every dollar of manufacturing output there is an additional service output of about 20 cents. Third manufacturers innovate more than service providers. More of them carry out R&D and invest in product and process innovation. And innovation is what a mature industrial economy like ours here in Singapore needs.

But I also will argue that the type of manufacturing we need must change. One of the subcommittees on the development of Industry Transformation Maps is looking at advanced manufacturing. I fully support the idea that we need to transform the manufacturing activities to adjust them to Singapore's environment. Manufacturing that requires masses of cheap labour or vast amounts of land will not be competitive if they stay put here in Singapore. But what does "advanced" mean?

In my opinion this entails four major evolutions. First we need to embrace the opportunities of data and analytics in order to merge services with manufacturing. Second, yes we need to automate and adopt new technologies like 3D printing, nano-technology, etc. in order to focus on economies of scope rather than economies of scale. Thirdly manufacturing in an urban environment needs to opt resolutely for sustainable operations. And finally we need to continue to integrate Singapore in global operations networks.

Manufactured products have always come with some services e.g. after sales service or systems integration. Services related to (big) data and analytics have increased exponentially the combinations of products with services. Just think of the vast amounts of data that are captured from an airplane engine during the flight as input for maintenance activities, or the delivery services and advice that comes with buying a book over internet. Clever analysis and use of data allows for example for further customisation of products, traceability of the origins of food, the use of smart materials, the installation of smart sensory devices to provide feedback on utilization, smart delivery systems for e-commerce, intelligent products that "know" where they are and where they want to go, up to some of the most complex products like autonomous vehicles. In short many products will also become bundles of data and information.

Automation, lower cost robots and 3D printing may improve customisation, and the reduced relevance of economies of scale. Nowadays you can have a baseline robot for around $25,000. I know that a robot on its own is not that relevant. There is a lot of programming and systems integration needed. But it does mean that a robotised factory may well become competitive with a factory based on manual labour. Do I believe that we will see soon full robotisation? In the eighties of previous century we dreamt about the factory where "you could switch off the lights", because robots did not need lights. Very few of such factories were built and ran successfully, because over-automation is in most of the cases ineffective. I still think that we will have more "co-botization" or the combination of gentle and intelligent robots with people. Therefore the man-machine interface will become all the more important.

Setting up factories in an urban environment will be only acceptable if they do not deteriorate the environment. Recycling, closed loop logistics, low noise levels, zero emissions are all part of sustainable manufacturing. And let's not forget that there is money to be made in sustainability: lower use of natural resources, better adjustment to regulation, and developing business in selling sustainable solutions have all proved to be very effective for North European manufacturers. Can Singapore develop the solutions for the countries on the Equator?

Finally every manufacturer in Singapore needs to understand that we are always part of a global supply chain. Thinking in networks and finding our correct positions in logistics chains and manufacturing ecosystems will help us to take leadership and become more effective in the value chains.

When you reflect on these four evolutions you may actually also start wondering what the real scope of manufacturing is? Often we still associate it with the obsolete view of noisy assembly plants with lots of movements of physical parts and the smell of grease and metal. But if products become bundles of goods and data we also realize that manufacturing principles extend into the production of digital products. Is for example code production really that different from the production of physical goods? Isn't what a software production engineer does that different from what a process engineer in a chemical plant does? It is all about well managed process executed by skilled people and supported by technology. Perhaps we should start thinking about extending manufacturing into the digital world? But that may well be a topic for another day. ■

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