



A view of Singapore with HDB and private homes, office and industrial buildings, against the CBD's skyline. The writers' ambition for Singapore is for it to go beyond investing in mixed developments, and go on to shine as an early adopter, if not a leader, in the new way of integrating advanced manufacturing and living – or urban manufacturing. And, in order to succeed, it will need to ensure that all stakeholders in a mixed development feel they can gain from it. BT FILE PHOTO

Taking the lead in urban manufacturing

Singapore can reap the benefits of mixed developments by integrating industrial and residential zones, and give the manufacturing sector a boost

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When we cycled recently along the Geylang River and the Pelton Canal, we observed that some of the old industrial estates were becoming encircled by residential buildings. The city seems to be encroaching onto these old industrial estates and may perhaps in the future drive out the light industry that is still there.

Indeed, we discussed whether it would be better to get rid of these industrial estates and move the factories and warehouses to more remote areas, such as Jurong or Tuas, and replace them with condominiums and Housing Board estates. Or perhaps Singapore should reduce its reliance on manufacturing completely and become a service economy.

Several government leaders have argued that Singapore as a city state needs manufacturing. Currently, the sector contributes close to 20 per cent of the country's gross domestic product (GDP), and that this is probably why advanced manufacturing in Singapore should remain. So, what should be done with these old industrial estates that are surrounded by residential developments?

SEPARATION IN ZONING

The old logic of urban planning would have dictated keeping the

industry and residential areas separate. The zoning principles developed in the 1930s and 1940s by well-know urban planners such as French architect Le Corbusier envisaged the creation of a functional city, where different activities would be grouped in separate zones of, for example, industrial activities, ports, administrative districts and areas of leisure.

City planners implemented the separation of living, working, recreation and mobility. Housing districts would typically occupy the best sites and, for hygiene and health management reasons, be separated from major transportation routes. Such a separation was quite logical. It reduced the cost of land for the manufacturing companies. It mitigated the negative effects of noise, air pollution and dust. It was easier to organise the logistics and helped in implementing strict safety and security measures.

But there were also disadvantages. Separating living and work places meant commuting became necessary. And with increasing commuting times, the work had to be organised in a more rigid way, as one could not easily return home in the middle of the day to take care of, for example, an elderly parent or a child.

Yet, there has been a drastic change in the relationship between working and living. First, older industrial parks outside the city are gradually being encroached on by the residential areas of an expanding city. In Kallang and Geylang, industrial estates are now surrounded by

residential blocks, housing a significant number of people working in these industrial companies. Relocating the industrial tenants outside the city would lengthen the commuting time for the employees.

Second, traffic jams and the negative impact of commuting raise questions about the long-term sustainability of this zoning. Longer commutes will also not help to reduce carbon footprints and greenhouse effects in Singapore.

Third, a further organisation of work-life integration will be needed. As a consequence of the coronavirus pandemic, workers now may prefer part-time arrangements, may want to manage childcare or elderly care while at work, or combine multiple projects with different organisations.

Long-distance commuting will not be compatible with such flexible work and lifestyles. Moreover, workers might find the manufacturing sector less attractive compared with the more flexible service sectors. Keeping manufacturing sites far from residential areas might worsen the manufacturing sector's shortage of highly skilled labour.

Fourth, advanced manufacturing is different from the image we have of traditional manufacturing, with its noise and smokestacks polluting the air. Additive manufacturing or 3D printing, and robotics or bioscience production do not come with such pollution and can be better integrated within residential areas.

Finally, there may just not be enough space in Singapore to accommodate zoning without having to continuously increase the distance between living and working zones.

Perhaps we need to look into the logic of mixed developments, as has been proposed in some areas

by the Urban Redevelopment Authority. A good example of the integration of residential and manufacturing is the redevelopment of the old estate of Sungei Kadut, which includes four main niches: The Agri-Food Innovation Park for research and development, prototyping and high-tech farming such as indoor farming and aquaculture hatcheries; Trendspace for furniture and related industries; TimMac for timber, metal and machinery companies; and Kranji Green for players in waste management and recycling.

TALE OF THREE CITIES

Singapore is not the only city that is experimenting with such mixed developments. In our research on urban manufacturing, we looked at places such as Manchester, Barcelona and Tianjin.

Britain's Trafford Park is a renovated industrial site in Manchester close to the city centre and is known as the world's first industrial estate. The 12-sq km site dates back to the 19th century, when it housed mainly textile works. At the start of the 20th century, it attracted engineering companies and, later, wartime

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suppliers. After World War II, it went into decline until the city of Manchester revived the brownfield site. Today, it houses a combination of manufacturing, warehousing and logistics, data centres, as well as attractions for locals and tourists, such as the Imperial War Museum, the Trafford Ecology Park and an attractively designed retail hub.

22@Barcelona in Spain is a similar renovation of an older industrial site close to the city centre. After a successful revival of the site, it has become over the past 20 years a strategic concentration of knowledge-intensive industries, with a strong emphasis on sustainability, and allowing for an urban, economic and social refurbishment. Several of its buildings were designed by world-renowned architects and have become tourist attractions.

Tianjin Economic-Technological Development Area (Teda) is a vast industrial park close to the Northern Chinese city of Tianjin, bringing together manufacturing, services, financial institutions, the Tianjin Contemporary Art Museum, a football stadium and residential housing.

Our ambition for Singapore is that it will go beyond investing in mixed developments, and go on to shine as an early adopter, if not a leader, in this new way of integrating advanced manufacturing and living, or what we call urban manufacturing. In order to succeed, it will need to ensure that all stakeholders in a mixed development feel that they can gain from it.

With such an ambition, the following three questions must be addressed.

One, how to design plants and factories that can fit within a residential area, and avoid the not-in-my-backyard or nimby effect. This, of course, requires the industrial buildings to be

aesthetically designed, as no one wants to live near unsightly buildings. Perhaps the buildings should also be transparent, like the Dresden factory of German automotive company Volkswagen which has glass walls so that people can see what is going on inside. Building trust is of utmost importance.

Two, the problem of emissions in all its forms, including noise, must be solved in a creative way. In other parts of the world, integrated production and residential sites where the concept of waste and residuals is obsolete are already being developed. For instance, waste from one partner in a mixed development can serve as biofuels for another. If waste can be creatively used as an input for another user, then interesting closed loop systems would be created.

Three, acceptable solutions for the logistics must be found. Separating industrial estates from living areas had the advantage of not having heavy traffic in residential estates. Residents in mixed developments would not want to put up with heavy trucks and constant deliveries. Again, creative solutions can be worked out, for example, by learning from the last-mile delivery systems used

by e-commerce companies, with the use of smaller vans and perhaps two-wheelers. With the ongoing World Cities Summit 2022 in Singapore (July 31 to Aug 3), which has the theme Liveable and Sustainable Cities: Emerging Stronger, it is a good opportunity for the country to champion the concept of urban manufacturing.

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