

Strategic planning vision and some key directions for economic breakthroughs during 2021-2025 period:A study of Binh Duong-Vietnam and Smart City Program

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Abstract

Grounded by industrialization, in 2015, Binh Duong started to deliver a Smart City Program to drive disruptive socio-economic development in the province and build preparedness for the Industry 4.0 era, and has achieved great successes to lay the first stepping stones. At the entrance of 2021-2025 period with expected booms in the science and technology industry and new business models, Binh Duong envisions to drive further breakthroughs and transform itself to a higher level of development. However, the COVID 19 outbreak in early 2020 and resulting global economic downturns are creating new challenges, requiring Binh Duong to revisit its core leading industries for more focused investment. The paper will analyze the strategic planning vision and some key development directions in the next phase under the Binh Duong Smart City Program, in order to meet the pressing needs of the industry to tackle challenges, create stronger momentum of economic breakthroughs and lead the province to a new height.

Keywords: Binh Duong, smart city, 2021-2025 period, key project, economic development.

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In early 2020, the global economy was suddenly plunged into an exceptional stagnation due to the COVID 19 outbreak, and is expected to resume its growth within this year with a lot of changes to how people live, work, interact, and consume (McKinsey & Company 2020). In the coming months and years, many provinces are expected to face crisis due to declining investment and broken production chains, while people and businesses aspire for change, and the science and technology in the Fourth Industrial Revolution will find their additional grounds to move forward despite the pandemic. For developing countries where resources are limited, the challenges are multiplied.

In this context, the paper will analyze the case of Binh Duong province in Vietnam. With a population of nearly 2.5 million and land area of 2,695 km², Binh Duong is an industrial province whose GRDP is dominated by foreign investment and exports, so the economy is at risk of strong post-pandemic impacts. Binh Duong Government determined that, for 2021-2025 period, which is also a new term of the local government, it will further implement its Smart City Program based on its outcomes during 2016-2020 period to move towards Industry 4.0, with focused resources on key orientations to create a new momentum for the economy. Thus, Binh Duong needs to first determine what will be the key directions, why and how the implementation will be delivered to reflect local conditions and expectations of the province.

The answer will be provided in this paper, based on analysis of: first, semi-structured interviews in the Vietnamese context (Edwards and Holland 2013) (Nguyen Viet Long 2015) (Le Thi Hoa and Nguyen Viet Long 2012; 2011) with the participation of 53 experts and leaders in Binh Duong, including 36 from businesses, 5 from the research and education institutes, and 12 from local government; second, participant observation (Geertz 1973) as part of the author's direct participation in drafting and implementation of the Binh Duong Smart City Program, as well as future directions of the province.

This paper will be presented in two main parts: part 1 briefly introduces the Binh Duong Smart City Program during foundational period of 2016-2020, and part 2 as the key part presents the overall vision with seven key project clusters under the Smart City Program aimed to drive economic development and address business needs.

1. 2016-2020 period: kick-off of Binh Duong Smart City Program to lay the foundation for a new development model

Binh Duong is a province with a tradition of innovation. Since 1997, the province has strongly promoted its industrialization for a shift from an agriculture-dominated province to a strong industrial region in Vietnam. In 2015, in face of scientific and technological booming development as part of the 4.0 trends with new challenges and opportunities (Schwab 2017) while the provincial traditional manufacturing-based growth model has reached the critical point, Binh Duong determined to create breakthroughs and, in the period 2016-2020, built a new development platform to address emerging needs

of local people and businesses. The Binh Duong Smart City Program was born in such a context. By cooperating with its sister city of Eindhoven (the Netherlands) - one of the leading technology hubs in Europe (Nguyen Viet Long 2020), the program aims to shift Binh Duong's traditional manufacturing to a higher value-added economy based on services and high-tech production where innovation is a driving force for development and green urban cities create a platform to move forward to the knowledge economy and digital economy (Nguyen Viet Long 2019a).

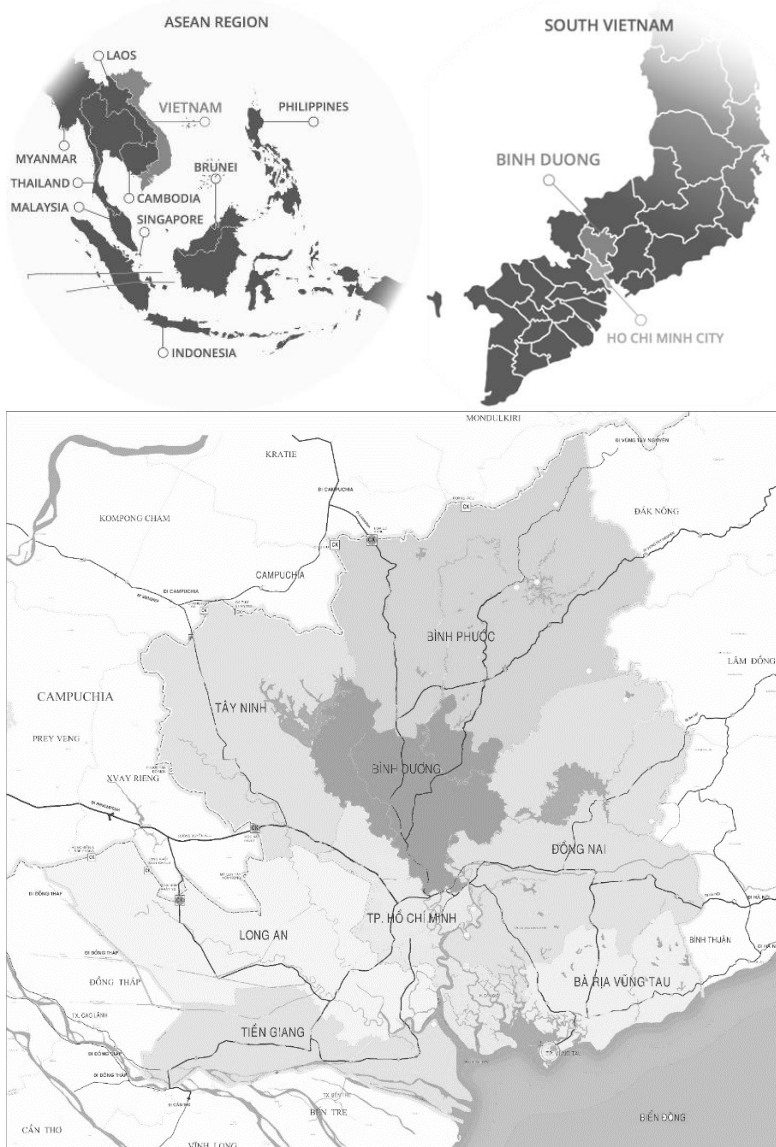


Figure 1. Research hypothesis
Source: Organized by this research

Thus, unlike the conventional approach in which the focus is only on application of technologies in urban cities, the impacts of Binh Duong Smart City Program would be more comprehensive, covering both technology and non-technology elements, with a focus on increasing knowledge and innovation content in daily and economic activities. In Binh Duong's approach, smart city is a vibrant, innovative and well-connected ecosystem in which all of its actors are constantly being improved, optimized and innovated. The province has delivered a concrete action plan named Binh Duong Navigator 2021 based on the Triple Helix model.

A. Triple Helix model

Theoretically, the Triple Helix model (Etzkowitz 2008) encourages, promotes and formalizes the close cooperation between (1) government, (2) industry, (3) academia to foster socio-economic development. The government consists of local government, and may be central government or other relevant regional governments. The academia mainly means universities, colleges, research institutes, as well as other educational and training institutions. The industry ranges from multinational corporations to regional businesses and startups. It is important that these partners establish close ties with a province, and are motivated to develop local socio-economic development.

Since the second half of the 1990s, this model has been widely adopted in many parts of the world, including the city of Eindhoven as a typical success story. (Van Gijzel 2016). Learning from Eindhoven, in 2016, Binh Duong started to promote the Triple Helix model (Nguyen Viet Long and Nguyen Thi Thu Ha 2020): people and intellects are placed at the center, the stakeholders cooperate on a flexible and voluntary manner, jointly discuss and share visions, challenges, opportunities and resources to develop mutually agreed development directions for the province, and commit themselves to implement the initiatives. In return, they can join in specific projects, which will help their own organizations to gain a higher competitive position within the region and outside. Triple Helix model will support each partner to make better decisions which are more suitable to the environment and link them to the joint objectives. In Binh Duong, Triple Helix has become a guiding principle for groundbreaking project implementation.

B. Action lines

Specific goals and guidance for the Smart City Program are presented in the Binh Duong Navigator 2021 program document. This document will indicate the joint ambition, identifies the directions to develop, and appoint and commit concrete actions to further develop Binh Duong from an important part of the Southern Vietnam Key Economic Zone to a technological and economic top world-class region for innovation, high-tech manufacturing and services. It is important to emphasize that the Navigator is a joint effort with contributions from many stakeholders in the Triple Helix from different domains, led by the provincial leaders. The program will evolve over time and can be updated regularly. Concrete actions will be appropriately adjusted for different situations, based on the overall shared-vision of the project.

The document includes 46 concrete actions which are organized under 14 programs and divided into 4 domains: “people”, “technology”, “business”, “basics”. (Nguyen Viet Long 2019a).

People: People are the focus of this smart city program. Central to the ‘People’ domain are labor force and their working capacity, cooperation skills, education, job skills, and the ‘fit’ between people and work. The long-term goal is for Binh Duong to become a competitive global player in attracting, training, developing, and retaining science and engineering talents that drive innovation and economic growth. Empirical study centers/maker spaces (TechLab, FabLab, MakerSpace), which will be developed in Binh Duong, are where facilities are always available and shared between the institutes and businesses to enable students, startups, and small and medium enterprises to create and develop new ideas. This objective is backed by good education infrastructure and dynamic and cooperative working environment which can be formed thanks to solid finance system. As a result, the province will be able to possess talented and efficient labor force.

Technology: deploy projects to attract and strengthen R&D activities, encourage innovation, collaboration and knowledge transfer, connect new technology to key business sectors and daily life and put it into practice at living lab to facilitate research activities and improve people’s living standards. In recognition of the significance of this domain, the provincial government will take the lead in this effort, providing special supports, and obtaining buy-in from local and regional educational institutions and multinational companies. In long-term, Binh Duong needs a solid knowledge base to serve even more advanced manufacturing companies. In future, R&D facilities sponsored by private and public entities will serve not only Binh Duong province but also the Southern Key Economic Zone and stakeholders will work together to enhance competitiveness in manufacturing. Binh Duong can create a better future for their people and their businesses, by using advanced technology as a social-economic driver.

Business: The main goals of action programs in this domain include strengthening existing business, enhancing investment attraction, and promoting startups/entrepreneurship. Binh Duong possesses a great advantage of a large number of high-quality manufacturing companies which form large-scale industrial parks. The province continues working towards a business database and portal related to regional supply chains, and developing supporting industry, science and technology industrial parks, and business incubators based on international models. In the future, Binh Duong aims to create an innovative entrepreneurial ecosystem, and a supply chain network with solid, capable suppliers ready to integrate and attract high-tech domestic and foreign investors, both in industry and service.

Basics: The ‘Basics’ domain focuses on the preconditions for a strong region. Good infrastructure, a well-respected brand, a favorable business climate, a pleasant and attractive living environment, a distinctive culture, sports and recreation facilities, and ICT broadband are some examples of the ‘Basics’ domain. Binh Duong pays very close attention to building strategic intra-provincial and inter-provincial transport infrastructures, logistic centers, inland container depots as well as building broadband ICT infrastructure, ensuring stable power supply for high technological manufacturing. The long-term goal is

for Binh Duong to be known globally, not only as a comfortable region to live and work, but especially as a smart region of dynamism and innovation, and to become a member of globally accredited organizations.

A well-planned development road map towards a smart city will strongly attract foreign technological investors, local and international dynamic young people and intellectuals. The Triple Helix collaboration model as one adopted by Eindhoven with a focus on people instead of technology will help Binh Duong create a vibrant environment, encourage universities, businesses and the international communities to join hands in developing smart ideas, solutions and business models that benefits all stakeholders. Besides, Binh Duong also has a step-by-step development road map to avoid fragmentation of resources, starting from projects that can leverage the economy and well-planned urban areas in strategic location then upscaling to the whole province.

C. Foundation for a new era of Binh Duong

The Smart City Program was closely supervised by the provincial leaders and engaged the entire community for contribution of its efforts and resources; after nearly 4 years of implementation, it achieved great successes to contribute to economic leaps forward in the province (Nguyen Viet Long 2019a) (Plan 09/KH-BĐH, 2020). Binh Duong has repeatedly exceeded the targets, with particular sudden growth in terms of international cooperation, attraction of investment, trade surplus, etc. The number of enterprises in the province since 2017 has increased nearly one-half, from fewer than 30,000 to nearly 44,000. Binh Duong is ranked among the top provinces nationwide in consecutive years in different aspects: ranked first in terms of infrastructure, top 3 in foreign investment attraction, top 3 in domestic production, etc. Even in social security, Binh Duong is the first in the country to develop social housing projects for low-income people, to eradicate poverty, etc. Its northern districts, especially new Bau Bang district, have strongly developed industrialization while, in the South, the city of Thu Dau Mot has been upgraded to Class-1 city, and Di An and Thuan An towns have become cities. By 2019, according to the General Statistics Office of Vietnam, Binh Duong's per capita income ranked the first in Vietnam, and there was just a small gap between rich and poor communities. Binh Duong and its localities became members of the world's prestigious organizations such as Intelligent Community Forum (ICF), World Technopolis Association (WTA), World Trade Center Association (WTCA) etc. and hosted multiple international events on economic cooperation, science and technology, innovation, among others, to build Binh Duong's new position in the international arena. In two consecutive years of 2018 and 2019, Binh Duong Smart Region was honored as one of 21 regions with the exemplar smart city development strategy in the world (Nguyen Viet Long 2019b; 2018).

Thus, in the period of 2015-2020, the Smart City Program introduced a new development model and built a solid foundation for the next phase of development in 2021-2025 period, of which 7 key project clusters aimed to create new momentum for economic development will be analyzed in details in this paper.

2. 2021-2025 period: key projects in the Binh Duong Smart City Program to address business needs and build economic rebound

A. Overall planning and strategic vision for 2021-2025 period:

In 2021-2025 period, the Binh Duong Smart City Program shall deliver focused investment with clear targets, while pursuing the overall goal, in order to build a high value-added economy based on intensive knowledge, technology and livable smart cities, with a stronger focus on the digital economy as a strong global trend after COVID 19. Binh Duong, with its potentials and new position in the international arena, is well placed to come up with bolder, stronger and more specific projects that create momentum and upscale impacts to the whole region and Vietnam.

Strategically, the province will keep promoting its advantage in industrial production as a key step, especially promoting high technological and advanced manufacturing, and further focusing on economic restructuring towards high quality services such as large-scale commerce, e-commerce, education and training, development of urban areas, etc. Higher proportion of services envisioned in the new period is a prerequisite for rapid and sustainable development, thereby driving strong industrial growth more effectively. Besides, Binh Duong government will also promote and create favorable conditions for businesses to upscale their production and business activities to other provinces and cities while contributing to the development of other localities and expanding the resource base for economic development in the province. In terms of planning, the province will further relocate the industrial parks to the north, providing enabling conditions for new infrastructure development to meet strict quality requirements while improving and upgrading service centers in the south, where the New City with modern and synchronized development plans is the center of the province.

Guided by this vision, Binh Duong determined that it is necessary to direct resources to implement 7 specific action plans in a rapid and effective manner in order to promote economic development and address the needs of businesses. First, it is further implementation of the Triple Helix model, engagement of stakeholders, mobilization of social resources, and development of a streamlined government structure. For disruptive development of services, urban areas, e-commerce and technology investment, the three cities of Thu Dau Mot, Di An and Thuan An have been projected to become smart cities, in which the New City will continue to play its core role, and the World Trade Center Binh Duong New City (WTC BDNC), which is being developed, will be a highlight. Linkage between the new city with the Science and Technology Industry Park in the north, where key future projects will be based, along My Phuoc - Tan Van - Bau Bang road axis, will drive disruptions in high technological manufacturing, promote innovation, and establish industry-university linkage with the support of the government. In fact, in order to effectively implement the above projects, fast development of transport networks for congestion relief and development of smart logistics with ports, waterway and railway transport systems to establish supply chain ecosystems are critical, in addition to focus on broadband infrastructure, application of technology and administrative reforms. Especially, in the Industry 4.0 era, high quality workforce and an innovative

Nguyen Viet Long : Strategic planning vision and some key directions for economic breakthroughs during 2021-2025 period:A study of Binh Duong-Vietnam and Smart City Program

environment will play the most important role for disruptive socio-economic development. Along with a roadmap to reposition the provincial image in the international arena, the synchronous implementation of these disruptive projects in Binh Duong will create a new driving force of development, attracting resources successfully to contribute to economic leaps in the province.

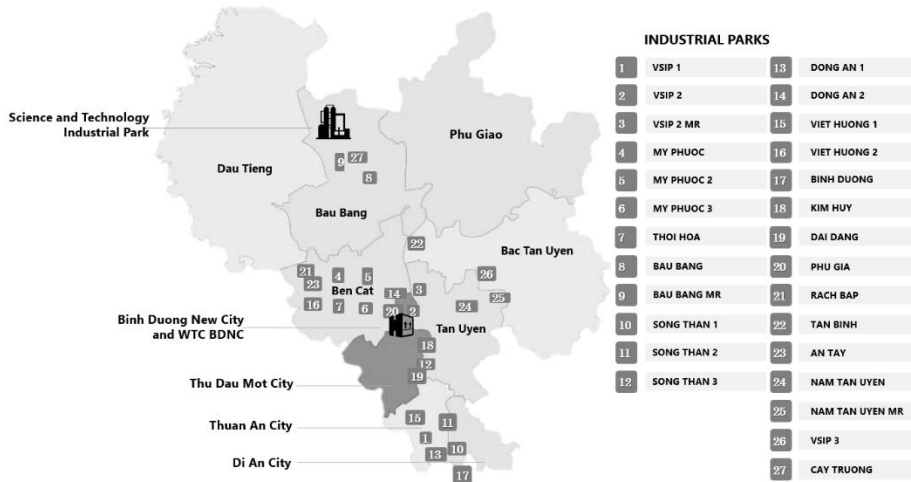


Fig 2. Binh Duong distribution map of districts, 3 cities, WTC BDNC, Science and Technology Industrial Park, and industrial parks

Source: Becamex corporation, 2020

B. Seven key project clusters for the subsequent period:

a. Cooperative and flexible environment

In any circumstances, engagement of stakeholders, cooperation, mobilization of resources and trust building in the whole society are always prerequisites. Moreover, connectivity generates opportunities for innovation and adaptation to all changes.

Binh Duong shall continue to strongly deliver the Triple Helix model, based on lessons from Eindhoven. Provincial leaders shall provide close supervision and engage local, national and international partners, especially those from the Netherlands. The uninterrupted interaction with the partner organizations helped Binh Duong to early propose new ideas that reflect the changes in the environment, and, with much difficulty, share information, reach consensus and obtain support for implementation of specific projects. For streamlined implementation of new disruptive projects in the Smart City Program, Binh Duong established a steering committee, an advisory board, an executive board, and an office of the smart city, all on the principle of Triple Helix, with active participation of the pillars from all three sides. Recently, Vietnam National University, Ho Chi Minh City - a ministerial-level agency in Vietnam, has sent leaders to officially and jointly work with Binh Duong for the program development, asserting the role of universities and cooperation between provinces.

In addition to cooperation, adaptive flexibility is also considered an important principle in an innovative and volatile environment. After the COVID 19 outbreak, the concept put forward by the theory of evolution has become more relevant than ever: It is not the strongest of the species that survives, nor the most intelligent; it is the one most adaptable to change.

For administrative reforms to ensure a flexible and transparent environment, the Binh Duong government is also active in linking the people and businesses. Binh Duong is the first province in Vietnam to establish a single-window administrative center, and established a public administrative center in 2014 for stronger professional and digital management while also laying the first stones to build the smart city. The center has improved its performance over time by bringing together government agencies and managing the single-window center to both receive local people and deliver administrative procedures based on reforms and digitalization of procedures, ensuring to welcome about 50 domestic and international missions for experience sharing. The Center should further work more closely with government agencies, businesses and academia to promote the application of technology, create enabling conditions and engage local people in quality assessment, and promote connections and exchanges on social networks.

Finally, to realize the province's big vision, the government plays the important leadership role. Therefore, in addition to the industry and academia, the government officers also need capacity building for a streamlined structure and a pool of increasingly dynamic, creative, sensitive and more skilled officers. This is the first condition for disruptive and sustainable development in the 4.0 era.

b. Prerequisite foundation is the innovation ecosystem: Science and technology development linked with quality human resources

The development of high-quality human resources, promotion of education and training, innovation environment, scientific and technological research and application are the prerequisite foundation for the province. According to Deloitte research, (Deloitte et al. 2016) this is the most important requirement to attract high-tech investment and plays a decisive role in creating grounds for breakthroughs and moving to knowledge economy and digital economy, and meeting emerging needs in the 4.0 era.

As such, universities and colleges will continue to play a significant role to have above requirements met. In particular, e-learning is gradually becoming a new habit in the society after COVID 19, which will open a new wave of education. The government will keep creating conditions for, investing in and encouraging universities to strengthen international cooperation, deepen links with the industry and many other institutions around the world, learn and share experience, develop advanced training and research programs, and fostering online, smart education and training to match emerging trends.

Binh Duong currently has 8 universities, 8 colleges, 13 vocational schools and a large number of training centers. Vietnam National University, Ho Chi Minh City - one of the largest and leading universities in Vietnam with 8 member universities and more than 70,000 students, has a large campus in Binh Duong, and often strengthen engagement efforts with the province. In particular, Binh Duong

province, along with the industry and academia, has established its international linkage with many large-scale overseas training and research institutions such as Fraunhofer Institute (Germany), ITRI (Taiwan), and Chungnam National University (South Korea), Portland State University (USA), Eindhoven University of Technology (the Netherlands), etc. This creates the basis and potential resources to develop the province towards the knowledge economy.

Recently, according to the directions for the Smart City Program, the local agencies in the province have cooperated with the universities and enterprises to establish advanced labs and model research such as TechLab, Fablab, and laboratory 4.0 to generate practical and modern technology experiences, and test new research ideas, etc., paving the way for hands-on training to meet actual requirements while promoting innovation and technology transfer. Typical examples include the lighting technology lab jointly established by Eastern International University and the multinational corporation of Philips, the IT Lab between the local Thu Dau Mot University and the national telecommunications corporation of VNPT, or Fablabs that can join the global 1500 FabLab network, etc. Besides, the ideas confirmed feasible can be potentially submitted to start-up support centers, incubators which can be either universities or colleges, and provincial innovation centers, for incubation of future businesses. Examples of many successful start-ups began to pile up, e.g. a student startup in electronics design, after 2 years of development at the incubator of Eastern International University, entered the market and recorded a revenue of over USD 1 million (2019). In addition, starting a business is becoming a culture in Binh Duong. The culture can be felt among businessmen, university students and high schools, with STEM/STEAM training programs (interdisciplinary approach to solving life problems), paying the way for early incubation and promotion of innovation and passion for scientific and technological research among children and youth. The priority is to focus strongly on pushing Binh Duong science and technology development to a new level and gradually engage research and development centers of enterprises, universities, or even central government agencies; the National Institute of Applied Mechanics and Informatics under the Vietnam Academy of Science and Technology, for example, has recently launched a high-tech center in Binh Duong new city. Research funds of corporations are also being seen as a new source of motivation that can drive the development of science and technology; among others, Becamex is one of the local companies that can offer such funds.

These programs, as well as the attraction of new investments in science and technology, have made exciting initial steps, with expected further development and investment by the whole society to soon establish the science and technology, innovation and startup ecosystems.

c. Increased proportion of services sector, development of three cities of Thu Dau Mot, Di An and Thuan An, and launch of World Trade Center Binh Duong New City

Recently, there have been positive changes to Binh Duong's service platform, both for services to support industries, urban development, education and training or financial services, etc. However, in order for truly prosperous and sustainable socio-economic development, Binh Duong shall take stronger steps,

especially the services with a high grey matter content or e-commerce, while further providing support and promoting financial and banking investments in the field of innovative technology development. Higher proportion of services sector will, in return, drive industrial development. Thus, after the industrialization period, this will be one of the most important strategies for Binh Duong to further rise.

Currently, the three cities under Binh Duong province Thu Dau Mot, Di An and Thuan An, present a lot of potentials for development, requiring new and disruptive measures. The three cities need re-planning and further investment by the government, especially in terms of mobilization of resources in the whole society, to become a civilized, modern, livable and green city, and a high-quality service zone for the entire region. In order to deliver this objective, in the coming months and years, Binh Duong should update its urban development plans to reflect new directions, environment, socio-cultural elements and engagement of manufacturing enterprises, address traffic congestion, upgrade power systems, establish robust water supply and drainage systems, develop infrastructure and information technology, and improve broadband connection, contributing to the development of services and connectivity in the region and the entire key economic region.

In 2019, in Binh Duong New City, the set of mixed quarters has met the conditions to join the World Trade Centers Association (including about 330 members which are commercial and trade centers from 90 countries), and recognized as the World Trade Center Binh Duong New City. This is a strategic turning point, creating a basis for a breakthrough in international services and trade activities of the province. The center is being gradually planned in the Smart City Program, which will strongly contribute to a big and trusted image of Binh Duong. This will be a symbolic project that can provide added values to the region, become a global service-trade center, attract the participation of partners, investors, intellectuals and human resources, facilitate the formation of an international trade ecosystem for regional connectivity, thereby establishing linkage with the development of Science and Technology Industrial Park to introduce new disruptive technologies, open up many business opportunities for industries, including small and medium enterprises. In particular, WTC BDNC will be an important driving force for e-commerce in Binh Duong, an increasingly booming trend after the COVID 19 pandemic.

As planned, Binh Duong shall have specific, large-scale programs and projects, and task assignment to relevant stakeholders for strong promotion of the services sector. For the key project of WTC BDNC, in the coming months and years, it will be of importance to have support, including provision of enabling conditions, from actors in the Triple Helix model, especially the local and central governments, to implement important plans, such as finalization of the overall design, development of services related to international trade, membership admission programs, training courses to support local SMEs, construction of commercial buildings, international exhibition areas, trade - service - cultural center, etc. This will also be central TOD (Transit-Orientated Development) in the province, facilitating the development of BRT (bus rapid transit) and other TODs along My Phuoc - Tan Van road axis, and linkage with the Science and Technology Industrial Park in the north.

d. Science and Technology Industrial Park, smart and advanced manufacturing

In order to realize the goal of making a shift from labor and land intensive industry structure to higher value-added and knowledge- and technology-based industries, and relocating industrial parks to the north, Binh Duong shall start planning for major strategies and clear policies, in which the development of Science and Technology Industrial Park in Bau Bang District is a specific and significant step to be taken. This will be a disruptive project to lay the ground for development of an innovation ecosystem, calls for human resources and investment in high technology in the strategic manufacturing industries in the region, linkage of industries with the New City along the main road axis of My Phuoc-Tan Van-Bau Bang.

To realize this vision, the project for Science and Technology Industrial Park has been jointly proposed by Becamex, its Korean, Singaporean and Dutch partners and WTA as follows: The block of universities/institutes to attract and provide human resources training and technology transfer; the technology industrial park for innovative and startup businesses; business park for offices and research facilities - technology laboratories; high-service urban areas with a livable environment to meet requirements of scientists and experts; the block for cultural and sports activities.

In addition to modern and synchronous infrastructure, the key to the success of Science and Technology Industrial Park lies at soft institutions with incentive policies, modern management systems and capacity building for innovation, based on close cooperation and interaction among regional actors, where Triple Helix is the pillar. In addition, the province shall establish a system to promote strategic industries in the region, provide support to businesses, incubation and attraction of technology companies.

In particular, leveraging the advantages of its strong portfolio of manufacturing facilities, Binh Duong and the Science and Technology Industrial Park can work on research on smart manufacturing and advanced manufacturing: cooperation with large corporations and companies with modern models and advanced designs to assist manufacturing enterprises to transform and build their manufacturing capacity and human resources in line with Industry 4.0 trends (such as digitization, automation, artificial intelligence, Internet of Things (IoT), 4.0 training, etc.). These directions will open doors to a potential market, and create a new breakthrough in attracting investment in hi-tech manufacturing in Binh Duong. In 2020-2021, it is necessary to first establish a smart manufacturing center, tentatively in the new city center, to attract the active participation of Binh Duong's key partners in this field such as Schneider, Philips, Bosch, Intel, Amazon Web Services, TMA, ITRI, National University of Singapore, Vietnam National University-Ho Chi Minh, Institute of Applied Mechanics and Informatics - Vietnam Academy of Science and Technology, etc.

Along with WTC BDNC, the Science and Technology Industrial Park will be disruptive projects, building a vision and strategy for marketing and brand building for Binh Duong in line with the requirements of the province in the next period.

e. Transport development, prevention of congestion, and establishment of a supply chain ecosystem, smart logistics

In the coming time, Binh Duong will further promote transport development to the North as planned to address congestion in the province, enhance connectivity with the southern key economic region, and build linkage with seaports and airports. These are decisive tasks for Binh Duong's new driving force of freight and passenger transportation. Therefore, the province needs to direct its resources on development of logistics infrastructure such as waterways and railways and upgrade of road infrastructure, towards an intelligent transportation system and stronger connectivity between urban areas, services and industries (Nguyen Viet Long and Pham Thuy Linh 2018). In addition to development a supply chain database, these projects will contribute to establishment of a supply chain ecosystem for the whole region.

The province needs to quickly streamline toll stations, undertake electronic toll collection, and invest in roads of My Phuoc - Tan Van - Bau Bang, Provincial Road DT 746, DT 747B and DT 743 for better connectivity. A number of specific and urgent projects need to be implemented: Solutions to address traffic congestion, construction of tunnels and overpasses to speed up traffic flows, development of properly-designed, efficient and well-connected road corridors, creating incentives to increase added value, development of northeastern routes such as Bac Tan Uyen, Phu Giao and Bau Bang, expansion of the backbone national road 13, BRT development project, installation of TOD stations along My Phuoc-Tan Van road, proposal for 1.8 km extension of the Ben Thanh - Suoi Tien metro line to Binh Thang (Di An, Binh Duong), with further extension to the center of the New City.

The province also shall make disruptive investment in port clusters on the Saigon and Dong Nai rivers, opening a waterway transport system for regional connectivity, and undertake the feasibility study of the Bau Bang - Di An - Bien Hoa (Dong Nai province) - Cai Mep (Ba Ria-Vung Tau province) specialized railway to reduce the pressure on road transport, time required for transportation and product costs for businesses, meeting the urgent development needs in the next period.

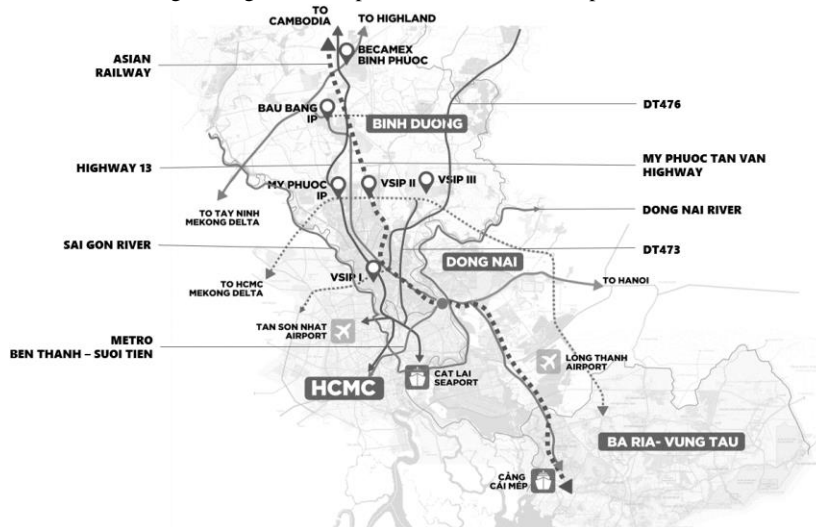


Fig 3. Binh Duong and major roads, connection with ports and airports

Source: Becamex corporation, 2020

Based on the database of companies that is now gradually shaped, Binh Duong also shall ensure successful development of supply chain ecosystems. This is a key project to help strengthen the government management capacity, create conditions for connections and growth of companies, promote regional linkage, and strongly incentivize investment.

f. Broadband infrastructure, databases, administrative reforms, application of technology, readiness for digital economy:

In the future, mobilization of resources for digital development is an inevitable global trend. The province should further engage domestic and foreign enterprises and universities, especially in the field of information technology and smart and advanced manufacturing, to invest in research, testing and pilot of new project, and establishment of living labs. The province has reaped initial success with Vietnam's first provincial database of companies, province-wide GIS (geographic information system) application, public engagement center by phone (1022), Zalo, Facebook, etc. Entities and local people should be further encouraged to join hands in contributing to disruptive technological projects towards a smart city such as development of high-gitech systems, big data, and smart city operating Center, IoT applications, artificial intelligence, smart digitalization, administrative reforms, e-government, etc. For these programs, it is important to focus investment resources on:

- Broadband infrastructure, creating a basic ground for digital economy and society
- Shared, integrated, and open databases as the basis for all analytics and innovations.
- Administrative reforms moving towards e-government, application of technology in management and, in particular, provision of better support to local people and businesses.

g. Revisit on the Binh Duong brand on the international arena:

In recent time, Binh Duong province, by delivering its initiatives and the Smart City Program, has achieved great disruptive development in terms of international relations, establishing a new position for the province and opening up many great opportunities. In the new period, Binh Duong should further establish and intensively enhance international cooperation, with efficiency and practical values as critical indicators among others.

(a) Hosting and organization of global events:

Since 2016, Binh Duong has hosted global events, in collaboration with UNESCO, WTA, WTCA, Horasis, Eindhoven and the Dutch embassy, etc. attracting thousands of business leaders, multinational corporations, universities, politicians, mayors of provinces and cities across the continent, generating tremendous and practical benefits with opportunities for investment, cooperation and experience sharing, and presenting its image on global stage. Therefore, the province should continue to develop its infrastructure (such as WTC BDNC as one typical example) and deliver activities in a manner that it will become a host of national and international events, forums and exhibitions. In particular, the province

should continue to effectively organize annual meetings such as the Asian Economic Cooperation Forum, or Horasis, which can be delivered as a series of events in order to coordinate resources, improve synchronization and effectiveness. In addition to the focus on economic and trade forums, the province should also exert extra efforts in attracting international exhibitions, contests and seminars on science and innovation. Large-scale events will enable great conditions for active and effective investment, opening up opportunities for experience and knowledge sharing, technology transfer, exchanges of human resources, mutual commercial activities, etc.

(b) Expansion of international cooperation, accession to globally accredited organizations:

Binh Duong has built a solid foundation as the province itself or its districts became members of the world's prestigious organizations such as World Intelligent Community Forum (ICF), World Technopolis Association (WTA), World Trade Center Association (WTCA). On its way to success, the province shall further promote cooperation in many aspects, and apply for accession to and leverage the advantages of international organizations, especially in terms of science and technology, smart city development, economic development and trade, bridging resources, sharing experience and enhancing cooperation with other members of the network. Strict compliance with the criteria of global organizations will also enable province to move long the global trends. This will be a future bright spot for Binh Duong to create new breakthroughs.

3. Conclusions

The Binh Duong Smart City Program has recently strongly contributed to the province's outstanding growth, laying the steppingstones for readiness to the next period of 2021-2025. A new era has started with expected booming development of the Fourth Industrial Revolution while the COVID 19 outbreak did come as a surprise. Therefore, adaptive flexibility, enhanced cooperation and engagement of all stakeholders, and the leadership and political will of the governments at all levels will play a more important role than ever. Resources shall be directed to the most important directions as leverage for strong growth. The paper suggests key economic projects, within the framework of the Binh Duong Smart City Program, to meet the pressing needs of business community, from 2021 to 2025, with a vision to 2045. This is expected to be a new period of disruptive development for Binh Duong when it can realize its potentials, earn socio-economic breakthroughs, enhance value added and international competitiveness, reach the knowledge economy and digital economy, drive further innovation to move towards a livable and smart city in Industry 4.0 era.

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