SMART ENVIRONMENT, THE DEVELOPMENT OF HEALTHIER CITIES

AS CLIMATE CHANGE AND ENVIRONMENTAL PROBLEMS ARE BEING POINT OF CONCERN, SMART ENVIRONMENT BECOME A TREBD IN MANY SMART CITIES AROUND THE WORLD. TO ENHANCE SMART ENVIRONMENT, MANY CITIES HAVE DEPLOYED SEVERAL AUTONOMOUS **TECHNOLOGIES IN ORDER TO MONITOR AND CONTROL ANYACTIVITIES THAT NEGATIVELY IMPACT THE ENVIRONMENT.**

EXECUTIVE SUMMARY

When environmental problems and climate change become point of concern in most city around the world as the city environment has significantly impacted on its tourists' decision making on visiting the city. Bad environment has discouraged current tourists and damaged destination's image for the future arrivals. Smart Environment refers to the city that concerns about the impact on environment by deploying autonomous technologies and management system in order to help monitoring and controlling any activities that harm the environment such as Air Quality monitoring and air pollution reduction, Smart Energy and water management, Waste Management and AI Disaster Prediction.

KEY TAKEAWAYS FOR MICE:

• Air pollution problem increases the costs for business travelers including the cost of seeing health professional which is about 1,000 baht per person per visiting and about 120 baht for a piece of N95 mask.

• Oslo, the capital city of Norway monitors the city's air quality by deploying ThingFarm Smart Air, providing real-time information for the authority to consider actions toward solving and improving air quality problem.

• Singapore's solar power generation capacity is likely to exceed 420 GWh which considers as 5% of the country's total energy consumption. And by 2030, it aims to increase solar energy production to power 350,000 homes.

• Japanese AI-based tsunami-forecasting system will be ready in 2020. The system will allow japan to predict the chance of tsunami and its damage scale which help limiting the loss of life and properties.

SMART ENVIRONMENT AND HOW IT IMPACTS TO MICE INDUSTRY

Environmental change is a big concern in many countries around the world especially in the urban cities that normally have greater consumption of energy and food than rural areas which generate negative impacts to the environment. To reduce environmental impacts, many smart cities around the world come up with smart environment practices which refers to the adoption of technologies and management systems that allow the authority to track, monitor and control any environmentally harmful activities in real-time. The practices mainly empathize on improving water and air quality, controlling noise pollution, having good waste management as well as ability to predict and manage the coming of natural disaster.

THE IMPACTS ON TOURISM AND MICE INDUSTRY

The urban environment has several impacts on residents as well as tourists including business travelers. The cities with Smart Environment come up with several digital solutions to have healthier and flourishing environment including air quality monitoring, energy efficiency, smart water and waste management systems. With these technologies and management systems could positively affect the tourism industry as it could reduce the production of solid waste for up to 0.35 kilograms per tourist per day or about 130 per year, and also save up to 80 liters of water per tourist per day.

In contrast, the cities with poor environment might negatively impact tourists and the cities' images. In the early 2019, the greater Bangkok, the capital city of Thailand was covered with toxic smog or Particulate Matter (PM 2.5) at an unsafe level. The air pollution became a big problem in the city as it causes long term health issues to the residents and also short stay visitors. This problem has several impacts especially extra costs for MICE travelers including the cost of seeing health professional which is about 1,000 baht per person per visiting according to Kasikorn Research, and about 120 baht for a piece of N95 mask. Moreover, the MICE travelers might need to consider buying extra health insurance which costs depend on age, duration of stay and types of insurance plan. According to Thailand Convention and Exhibition Bureau (TCEB), in 2018, the numbers of MICE travelers were approximately 700,000 people. Therefore, the overall travel cost of MICE industry is estimated to increase at least 84 million baht excluding the cost of extra insurance for traveling into the cities covered in smog.

SMART ENVIRONMENT PRACTICES AROUND THE WORLD

Many cities around the world is moving toward creating smart environment by investing on technologies that transform themselves to become greener and illustrating their concerns on environment and people's health and wellbeing. These technologies and practices include using renewable energy, automated waste collection system, AI Disaster Prediction and Air Quality monitoring.

SMART ENERGY MANAGEMENT

With the concerns about climate change, the authorities of Singapore have a plan toward accelerating the use of renewable energy. As a small country with limited land, Singapore has less alternative energy choices as the country has limited hydro and geothermal resources or wind energy. Approximately 95% of the country's energy supply is relying on natural gas which mostly imported from Malaysia and Indonesia. To battle with the climate change and improve energy efficiency, the city is planning to use solar energy by launching SolarNova program. SolarNova program is to install 350 megawatts-peak (MWp) solar photovoltaic (PV) systems on the rooftop across 5,500 residential housing, state properties and government buildings by 2020. This will annually generate approximately 420 GWh of solar energy which considers as 5% of the country's total energy consumption. In the long term, Singapore will increase the solar energy production to be able to power 350,000 homes across the country by 2030. The launching of SolarNova program will help the country reducing the energy cost and carbon emission rate.

SMART WASTE MANAGEMENT

Smart waste management is an important factor in smart city. Songdo International Business District (Songdo IBD), a smart city in South Korea that was built along side of Incheon's waterfront on 600 hectares (1,500 acres). The smart city is located 30 kilometers away from Seoul and also directly link to Incheon International Airport. This brand-new city came up with automated waste collection system, the advance waste management system that is easy and convenient to manage. The city collects waste from all buildings and transfer it into waste processing center via Pneumatic underground pipes. All of the trash will be sucked into the underground pneumatic pipes, then it will be automatically categorized and recycled according to their types. The organic wastes that were sorted in waste separation process will be taken to incinerator for energy generation. Moreover, every building or kitchen has built-in with pneumatic pipe for residents to easily manage their wastes. With all of these automating processes, the city can reduce cost especially the cost of logistic as there is no requirement for garbage trucks to run around the city. Furthermore, the system is required only 7 employees to run a whole system which also help reducing the labor costs.

AI DISASTER PREDICTION

Disaster is one of the serious issues that the authority of any cities should have ability to predict and manage. Japan as the country that most affected by natural disaster. The natural disaster prediction system has been developed for many decades. However, the current tsunami-forecasting system can only estimate maximum height of a tsunami but cannot forecast its damage scale. Tokio Marine & Nichido Risk Consulting Co., risk management consultancy company and the National Research Institute for Earth Science and Disaster Resilience will jointly launch an Artificial Intelligent (AI) based tsunami-forecasting system that will be ready in 2020. The AI technology will calculate waves height and predict damage scale by analyzing the data from government's databases including earthquake-prediction, topographic and height of seawalls. This system will enable Japanese authority, companies or other facility operators to predict the chance of tsunami and its damage scales for each postal address. This helps the authority to know where about in the country that is more likely to have serious damage scale in order to remove people into the safer places and come up with damage preventing program which help limiting the loss of life and properties.

AIR QUALITY MONITORING AND AIR POLLUTION REDUCTION

Having fresh air is a fundamental to all human well-being. The air pollution will cause damage to the health of residents as well as tourism industry. Oslo, the capital city of Norway has deployed Thing Farm Smart Air, an air quality monitoring station. This IoT solution allows the residents and authority to monitor and access the air quality conditions in real-time. When the air quality is turning to be negative, the authority will have ability to consider any actions to reduce the effects. For example, the city can close down the roads or traffic areas that cause polluted air as well as planning for future improvement of infrastructure. Moreover, the city can also track which type of cars that create pollution and come up with the idea of charging higher tax for that type of cars.

THE IMPLEMENTATION OF SMART ENVIRONMENT IN THAILAND

In Thailand, the Thai government has planned to achieve the target of 30 smart cities in 24 provinces across the country by 2020. It aims to transform the existing cities to become smarter with the use of innovation, smart technology and modern designs. One of the sectors including to create smart environment practices that concern on the impacts on the environment and climate change. There are some cities that already started their smart environment practices.

KHON KAEN'S SMART WASTE COLLECTION PROGRAM

Khon Kaen, the province in the northeastern region of Thailand has been selected to become the smart city model. In the Smart environment part, the city concern about to enhance better waste management, as the increasing of populations and business sectors, the waste becomes a big problem. The amount of waste is approximately 270 tons per day, so the city authority comes up with the Smart Waste Collection program. The program consists of three parts including application for driver that allow the driver to know the direction and be able to report the operation performance to the authority for future evaluation. Secondly, the development of application for residents that allow them to know waste dropping points, garbage trucks location and also allow them to make a complaint or suggestion. Thirdly, Web Backend that allows the responsible agency to manage the waste management system. Moreover, the city also plans to invest on constructing disposal plant that will convert the waste into electricity. The disposal plant can dispose up to 600 tons of waste per day.

PATTTAYA CITY: AIR QUALITY MONITORING

Pattaya City, the MICE city and famous tourist destination in Eastern Thailand. The city implements several activities to enhance its smart environment. Pattaya City and DEPA jointly launch smart sensors network for air quality monitoring to install around the city area. This allows the city's authority to monitor the air quality in real time, and notify when the air quality exceed the safe level. Then, the authority can come up with action plans to reduce air pollution problem such as removing smoke-belching vehicles off the roads, dust control in construction, informing residents to aware about any activities that produce air pollution and increasing green areas. In addition, the city also launches the smart grid project which is the collaboration with the Provincial Electricity Authority (PEA). The smart grid aims to enhance the city's energy efficiency and ensure that the power resources were used the most beneficial way. The total of 120,000 homes in Pattaya city were replaced by the smart meters. The smart meters allow the authority and residents to access and monitor their energy consumption in real time. This could help the residents to control their energy usage which help saving energy as well as their electricity bills. Moreover, with the use of data analytics, the authority can predict the demand for energy consumption which help efficiently managing energy generation to the city.