Taiwan's Path to Innovative R&D and Applications: Technology-Driven and Location-Driven Pilot Programs

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Regional Pilot Programs: The New Lab for Innovation and Research

Pilot program has become a recent buzz term in the media and in business circles, especially in China where Taiwan is forging increasingly closer ties. Armed with massive regional markets, the pilot programs in China have attracted the earnest attention of multinational companies and government agencies hoping to expand their markets and improve industry development by participating in the early-stages of development.

A pilot program usually refers to the development of a new product or application for a technical concept, or to the experimental operations of new business models, service models, policies, or systems in a specific region. The programs usually range in size from family or hospital use, to that of a community or city, with user feedback serving as a basis for subsequent improvement. This concept is similar in spirit and function to *Living Labs*, which were proposed by Massachusetts Institute of Technology Professor William Mitchell and have sparked a wave of innovative R&D and applications in Europe, the U.S., Japan, Korea, as well as in other countries. Both concepts emphasize employing a user-centered research method in various experience tests. This is done by observing users in live scenarios and then using feedback from their interaction with stakeholders (including governments, private enterprises, research organizations, and communities) to co-create value in the early-stages of innovation and creation, ultimately resulting in market-ready products or services.

In recent years, Taiwanese organizations, such as the National Science Council, Institute for Information Industry, National Taiwan University, National Chiao Tung University, and National Cheng Kung University, have invested in and promoted user-centered smart living labs. The Ministry of Economic Affairs' *Smart Living Technology & Service Program* (i236) is aimed at developing Smart Towns and Intelligent Parks in the pilot areas (test-beds) of Songshan, Nantou Puli, Yilan, Taichung, and Kaohsiung. If proven successful, they can serve as regional models for industrialization, where the results will multiply and bring Taiwan closer to the long-term goals of raising industrial value and expanding into global markets.

Technology-Driven and Location-Driven Pilot Programs

Many experimental plans related to pilot programs or Living Labs can be categorized into two types, based on the underlying motivation for innovation (Figure 1). Technology-driven pilot programs are those where the motivation is mostly to observe live scenarios of users using certain new technologies (e.g. smart grids, smart classrooms, telemedicine) in settings like homes, schools,

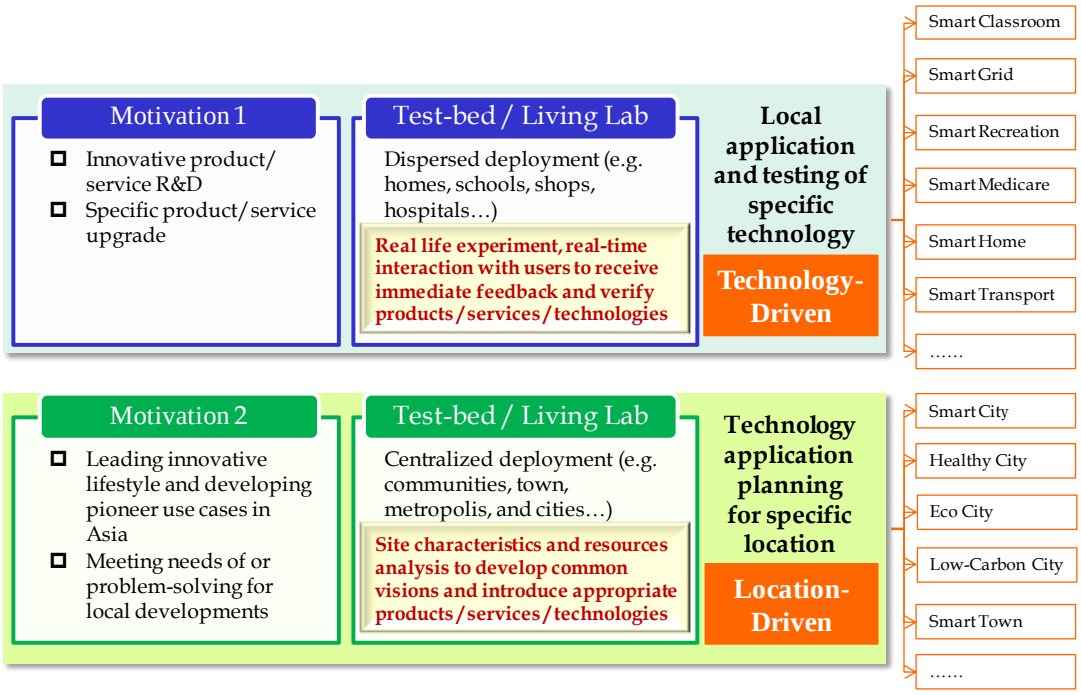

Figure 1. Technology-Driven and Location-Driven Pilot Programs.

and hospitals. Here, user feedback is used to substantiate the development results of the new technologies, ultimately giving rise to the development of market-ready innovative products or service models. In contrast, location-driven pilot programs are those where the motivation is to analyze the resource structures and characteristics of larger settings like communities, towns, cities, counties, and metropolitan areas, to gain an understanding of development needs while developing common goals with residents. Only then are experimental products, services, or technologies introduced to ensure that the innovation and research results receive the backing of residents, spurring their participation. When local residents form a user base, they create value for the new technologies and contribute to the establishment of innovative lifestyle models, such as smart cities, healthy cities, low-carbon cities, and eco-cities.

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Experiences from International Models

The Taiwanese government is currently promoting *Smart Taiwan* through the *i-Taiwan 12 Projects*, which use emerging technologies that give rise to comfortable, convenient, and smart lifestyles. The projects involve recruiting participants for small-scale pilot programs in order to develop successful prototypes. Even so, when compared to technology-driven international case studies similar to those found in Taiwan, such as the Digital Environment Home Energy Management Systems (DEHEMS) project within the EU's 7th Framework Programme, Taiwan is shown to be lacking. Although Taiwanese companies and industries are good at developing technical products, they lack an understanding of user needs and behavioral models. In most cases, the development of new products and technologies seldom have sufficient information from user surveys until they are already fully developed. As such, there is room for improvement in the surveying of user behavior and the establishment of usage scenarios. Products and technologies under development are more likely to succeed if they are designed based on user behavior at an early stage, and where user feedback during experimental operation is used to improve the performance of the products and technologies. In addition, after choosing and defining the user characteristics of a user experience test, it must also be designed in a way that stimulates and maintains users'

internal and external incentives for participating. By maintaining stable and frequent interaction with users, users will take a proactive role in the test and provide high-quality feedback. This interaction also allows the research and development team to have a better grasp of user behavior so they can make modifications as needed. In addition, they can drive more business models revealed by the user behavior they observe, as opposed to limiting the results of a pilot program to the development of a single product.

As a member of the EU, the U.K. is able to expand the R&D and the application results of its pilot programs to foreign markets by means of the EU network of countries. In contrast, due to Taiwan's political situation, Taiwan has the need of cultivating a network of international relationships and gaining an intimate understanding of foreign markets and cultures. During the early planning stages of projects, Taiwan needs to take the inevitability of long-term international cooperation into consideration and identify partners at various stages. By establishing the knowledge and technology diffusion process early on, Taiwan can avoid the development risks of delayed or aborted projects.

New Opportunities of Local Development

With the restructuring of Taiwan's urban governance on December 25, 2010 and the implementation of the Statute for Industrial Innovation, the central government is increasing the role of local governments in driving and guiding the development of their own jurisdictions. Under this new agenda, location-driven pilot programs for innovative technologies, products, and services which meet localized needs and industrial development objectives will likely increase in the future.

With this situation, Taiwanese local governments can use small seminars and focus groups to learn about residents' hopes for city development, and they can record residents' lives in text and video to explore their lifestyle and important issues to solve, thereby establishing a consensus with future vision. At the same time, local governments should evaluate their human, financial, and environmental resources and introduce relevant technologies or product and service experience tests based on the strengths and shortfalls in their resources. Location-driven pilot programs should be launched in partnership with residents, and only after local characteristics, resources, and resident needs are fully understood.

Turning Taiwan into a Showcase for Innovative Soft Power

The purpose of pilot programs is not only to involve users in the development and design of products and services, but also to use their feedback to improve functionality. The result of this is a win-win situation. While these products and services will better meet users' needs and bring them a more comfortable and convenient life, the companies or industries offering products and services will also benefit from the users' ideas that were involved in the co-creation process. No matter technology-driven or location-driven pilot programs, both show that the participation of users as well as government, industry, research and academic sectors is paramount. In particular, the resources and support of the local government undertaking the pilot program are most important. However, the majority of pilot programs in Taiwan are limited to a single organization. In the future, Taiwan should consider pilot programs spanning different units, sectors, and countries. In addition, given new urban developments following the restructuring of the five municipalities and increasing cross-straight collaboration, Taiwan should focus on leveraging its current development experience, seek local consensus, and borrow from successful case studies in planning the development of certain cities and regions, all the while taking government resources into consideration. This way, local governments can introduce suitable technologies or services that support their development, helping Taiwan become a showcase for innovative soft power. Furthermore, the large-scale deployment of pilot programs will help Taiwan's emerging industries achieve scale in their development, in turn expanding their Asian and global markets.

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