

# PLACE IDENTIFICATION PRINCIPLES OF INNOVATION DISTRICT SUSTAINABLE DESIGN: KNOWLEDGE-BASED ECONOMIC DEVELOPMENT APPROACH

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## ABSTRACT

During the last ten years, globally, there was a transition process occurring in the economic activities of a large number of cities. Cities economies are progressing from industry-based to knowledge-based ones, for sustained economic development. Gradually, and usually, near universities and medical centers, a growing number of startups, accelerators, and incubators around the world are gathering around leading-edge companies and institutions in dense urban areas known as “innovation districts” (ID). By creating shared value, the place identification principle is an important design factor for the new evolving innovation districts idea in many cities. Place identification is stated as the empowerment and engagement of the people; as it has a significant role in the integrated strategy planned to attract, retain and pursue talent; to enhance the networking factor and communication skills among innovators; and make the district an explicit, unique destination. This paper, firstly, will have the chance to investigate the new idea of innovation districts, which reinvigorates innovation activities in the era of knowledge-based economies. The study then analyzed the type and degree of innovation in different innovation districts based on their clusters’ places and distribution inside the district. Next, the study introduces a new factor called “place identification”, which uses it to support and enhance the main ID design strategy. In addition, the study focuses on and analyzes the “place identification” main eight principles for a well-designed ID. Finally, a chosen case study is illustrated and analyzed according to these eight principles.

*Keywords: innovation districts, place identification, innovation activities, economic development, knowledge-based economy.*

## 1 INTRODUCTION

Changing demographic priorities leads to increasing the demand for more urban connections and city living. Meanwhile, businesses and institutions are seeking the concept of “open innovation” in which collaboration, rather than secrecy, is recognized as a challenging advantage. Concerning this, industries as varied as life sciences, IT, architecture, and even advanced manufacturing are starting to realize the importance and benefits of clustering within the same region or building structure. Consequently, the demand for innovation districts has risen [1].

Policymakers who have wished to develop their economies and enhance employment and the creation of well-paid jobs must realize the importance of the role of place and geography and integrate this understanding into their policy decisions. Clusters are geographic concentrations of interconnected businesses, suppliers, and associated institutions. They can contain anchor institutions, small firms, start-ups, business incubators, and accelerators.

Geographic proximity has a great role of high importance stated that innovation is a deeply human and skillful endeavor that needs personal networks and trust that could be smoothly built with various talented people close together. Innovation districts have a great role in increasing the level of innovation, efficiency, and productivity with which participating firms can compete, nationally and internationally [2].



## 2 INNOVATION DISTRICTS

A geographic region within a town or city that has the intention to attract and support skillful and entrepreneurial people, institutions, and firms. Researchers have introduced various definitions that focus on many features of innovation districts [3]. The Brookings Institution, in its report “The Rise of Innovation Districts”, declared them as “geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators” [4]. United States cities and other worldwide ones are proving innovation districts to advance many economic development goals, such as creating many job opportunities, revitalizing neighborhoods, and modernizing the economy [5].

### 2.1 Three main factors of innovation districts:

- Economic assets, as shown in Fig. 1, are the institutions, firms, and organizations that work, cultivate or support an innovation-rich region.
- Physical assets are the buildings, public and private spaces – open areas, streets, and other infrastructure – planned and ordered to enhance high levels of connectivity, collaboration, and innovation.
- Networking assets are the relationships among actors – for example between individuals, businesses, and institutions – that are enabling to create, sharpening, and/or accelerate the enhancement of ideas [6].

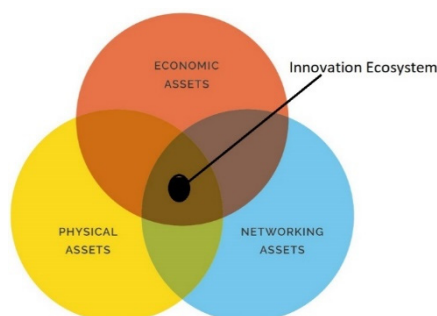


Figure 1: Factors of innovation districts. (Source: <https://www.pps.org/>, edited by the researcher.)

### 2.2 Innovation district design and open innovation idea

A cluster is stated as an example with the three factors such as a factory, a house (or market), and a museum (or public space). This section discusses the open innovation idea of the closed innovation cluster, the partially open innovation cluster, and the open innovation cluster, through an analysis based on the distribution of these three zones, and their relationships.

#### 2.2.1 Closed innovation cluster

The Macquarie Park Innovation District, as shown in Fig. 2, illustrates an example of a closed innovation cluster. When people in the house visit the museum zone, they do not go through the university and miss the chance to come across the university. As a result, this limits the interaction between the house and the university. This case shows a closed innovation cluster [7].

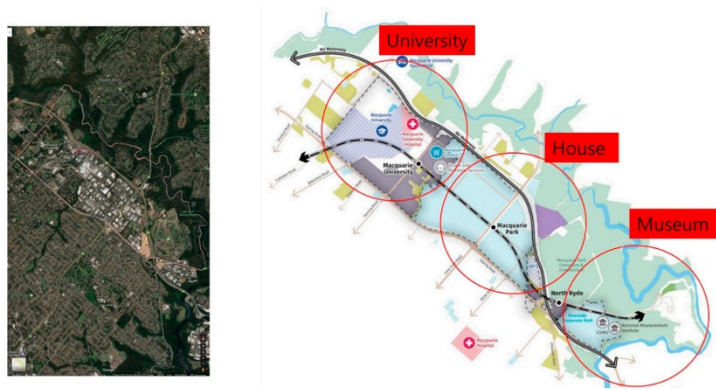


Figure 2: Macquarie Park Innovation District: A-type closed innovation cluster [7]

### 2.2.2 Half-open innovation cluster

One North Innovation District (Singapore), as shown in Fig. 3, is a development of 200 hectare strategically placed in the Singapore heart. It is planned to encounter a cluster of world-class research facilities and business park spaces, all constructed to increase the development of biomedical sciences, information and communication technology (ICT), media, physical sciences, and engineering. It is an example of a half-open innovation cluster. When people in the house zone visit the park zone, although they do not go through a university, they have chances to see the university. As a result, in this case, the interaction will be partially motivated between a house and a university. This shows an example of a half-open innovation cluster [8].

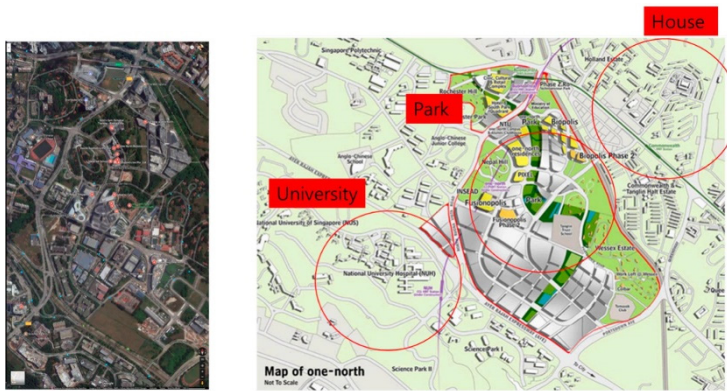


Figure 3: One North Innovation District: Type half-open innovation [7].

### 2.2.3 Highly open innovation cluster

The Strijp-S Innovation District (Eindhoven, The Netherlands), as shown in Fig. 4 is a neighborhood and former industrial park in the Eindhoven district of Strijp in the Netherlands. The region previously belonged to the huge electronics institute Philips in the 20th century. At the beginning of 2000, creative firms and housing units have been started in

the former industrial buildings. The Strijp-S Innovation District introduces a model of a fully open innovation cluster. For example, if the people in the house zone intend to visit the entertainment park zone, they must pass through a university. As a result, this case highly motivates the interaction between the house and the university. Hence, this case is an open innovation cluster [10].

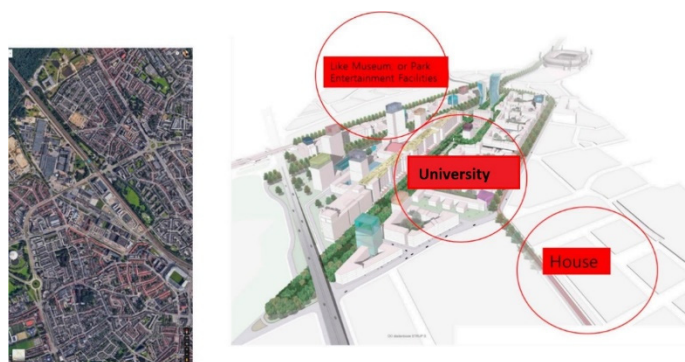


Figure 4: Strijp-S Innovation District: C-type open innovation cluster [7].

### 3 PLACE IDENTIFICATION PRINCIPLE

Place identification could be stated as the empowerment and engagement of the people in a community to realize, understand and take part in the rise of these areas that explicate that community. These eight principles define a framework for innovation district place identification [9].

#### 3.1 Identity: Make innovation visible and public

Prosperous innovation districts will be successful as the best market districts; vigorous public places where economic activities are visible, where social and commercial activities interchange and meld together, and where there are no barriers to participation [10]. For instance, when a firm represents one of its interesting pieces of their products or works in a transparent ground floor space or via programming in a public place. This may cause another firm to adopt its neighbor's products or display techniques, differentiate its sales items, or cooperate with its neighbor. So engaging in this dynamic could lead to a complex, self-organizing network of economic relationships that encourage each vendor to check out new things. Spaces like cafeterias or public places supplied with internet and power outlets create places to socialize, work and think in public. In accompanied by the right policies and spaces, startups with urban orientation could even evaluate their services and products in public space. This type of visibility also improves the utility of "open innovation" in such districts [11].

#### 3.2 Diversity: Mix innovation with a range of other uses

Economic specializations give identity to innovation districts, but these specializations cannot be the only factor for these districts to survive and sustain. Therefore, to maintain and attract talented people, a district must also give a great share of convenience, leisure, and social utilizations for workers and employees. In some firms, employees got attracted by a

virtual Main Street containing many services within their fortress walls – cafeterias, gyms, game spaces, many stores, and even cinemas, beauty Salons, and bowling alleys. However, such facilities need many subsidies, as they are so inefficient, and employees become lazy over time. Companies like Google and Facebook, which are worth hundreds of billions of dollars, can afford such luxuries and other preferences, but startups and smaller firms cannot [11]. innovation districts bring together retail, multipurpose buildings, and multi-use public spaces to enhance leisure and quality of life for users. In addition, innovation districts make public areas more liveable and accessible by [12]:

- Designing bike lanes and new pedestrian pathways;
- Creating dining events;
- More seating areas;
- Designing smart zones, a place for researchers, tech-based firms, and other institutions to meet and share ideas.

### 3.3 Sociability: Gather the district's people through places and programming

Sociability is considered nowadays the main quality factor of enhanced public spaces, but “networking assets” are also an indispensable factor for innovation districts [11]. Granovetter, the leading scholar on networks, identifies networks as two types; either having “strong ties” or “weak ties”, which are based on certain facts such as the frequency of contact, and the emotional intensity of the relationship, and the reciprocity of commitments between the actors [3].

The sociability factor is improved through three main factors:

- Social programming: provide public accessible places with educational and cultural activities celebrating different cultures. Programs that provide experiences considering the history or the environment of a specific area have been proven to be effective and successful in mingling people together. People need to gain knowledge, and when they meet to have experience and share it, social divisions often disappear. When programming these public areas and making them ready for the celebration of various cultures and histories, this could realize a better impact.
- Accessible public areas such as parks, plazas, and playgrounds to serve all the communities to enhance the social diversity of public places. But, as Setha Low and others maintain, good access and linkages are about much more than simply physical proximity [13]. “Third places”, cafeterias and bars, for example, can supplement this rich stew of social opportunities. In other words, providing spaces that people want to share with their friends and colleagues helps improve the self-organizing network of bonding and enhances sociability [11].
- Considering young people in the place identification process is very significant for not only themselves but also for community organizations and the stakeholders. As youngsters have a chance to learn communication skills, and decision making, and improve their communications and relationship with “adults”. This step in any community could have a great impact on future town designers and community leaders.

To conclude this topic, an example of a youth-specific space is analyzed and illustrated, this example is The Factoria Joven, or “Youth Factory” in Merida, Spain.

They construct a facility that is more than a playground for youngsters. The space is designed and built containing [14]:



- Graffiti walls for urban art workshops;
- Skate and bmx ramps, bowls, and rails;
- A stage for a performance.

The facility is also designed to include some indoor spaces as:

- Spaces for group counseling sessions;
- Spaced supplied with wi-fi.

### 3.4 Continuity: Begin with existing places, buildings, and people

The last fact that innovation districts could go to is to choose a clean slate. The less the continuity in the community or urban fabric, the less the sociability and identity that a neighborhood can build over time. At the end of the work hours, employees return to their homes, residents are the people who give support to local businesses and maintain the streets lively and safe; they're the people who attend community gatherings, and be together in crisis times; with a chance to join educational and training opportunities, they also give the future talent that innovation districts need to remain competitive. In addition, the vernacular or historical architecture of existing buildings can give support to the district's identity [11].

### 3.5 Proximity: Build spaces close together on the ground – not just on the map

Proximity increases innovation through other factors such as strong networking assets and a culture that accepts the risk. Walkable streets containing ground floors and active public spaces present another such factor that unites with proximity to construct connections and efficiencies in the district. For instance, in the same Oklahoma City survey, 84% of respondents in Kendall Square stated experiencing such interactions, while only 55% did in Oklahoma City. Oklahoma City's innovation district is lacking ground floor uses and needs sidewalks for social interactions. Moreover, interactions in walkable Kendall Square take place in publicly accessible areas like restaurants, plazas, or the streets [11].

### 3.6 Mobility: Ease of transportation inside and through the district

Linking between local transportation networks and regional or global transportation gives the district a competitive edge. In a report published by the World Bank on New York City's innovation ecosystem, researchers figured out that many transportation options could increase the advantages of innovation to the district. For an innovation district, solid multimodal transportation means that there is an ease in the movement inside and through the district, and it means district employees have a wider choice of residence and lifestyle options [11].

### 3.7 Flexibility: Community is the expert

Nowadays, top tech startups appreciate working software over "high quality" design, evaluate their products with users early, and include changing needs instead of sticking to the plan despite them. Later on, the design is reached once you get the functionality right, and the end-users – not the designers – are the experts on what functionality they want and need [11]. Streets can also be converted into living labs to easily evaluate new innovations.

In Boston, Barcelona, Eindhoven, Helsinki, and Seoul, streetscapes and public spaces are assessing innovations in street lighting, waste collection, traffic management solutions, and



new digital technologies [11]. Recognizing a specific space before a place identification process and analyzing how it was used, can help to realize what activities and amenities need to be provided in such space [12].

### 3.8 Unity: Govern with vision and holistic, inclusive strategies

A district cannot use and develop these principles unless come in contact with the issue of governance. To truly enhance the strategy of place identification for increasing innovation, districts must investigate new models of place governance. Which indicates breaking down silos between disciplines and addressing facts with integrated strategies of policy and place. This means planning to take action with workers, students, and residents – those end users again – not just leaders and experts. It means encouraging a vision for the district's future, meanwhile leaving space for people to make many little plans. The place identification process brings together people from across disciplines, sectors, and interests, and provides tangible little wins that form the basis of shared trust for bigger endeavors [11].

## 4 CASE STUDY: CORTEX INNOVATION COMMUNITY

The following case study, as shown in Fig. 5, was studied and analyzed based on the eight principles of place identification principle previously stated in this paper.

- Location: St. Louis, MO, United States
- Size: 200 acres
- Year: 2012

The Cortex innovation zone was previously a privately owned, aging industrial area that was bought to develop an innovation zone with various partners [15].



Figure 5: Macquarie Park Innovation District: A-type closed innovation cluster. (Source: <https://www.cortexstl.com/visit-cortex/>.)

The district is analyzed based on the eight principles, and it achieved five factors of identification principles, as follows:



- Proximity: This is achieved as the well-designed masterplan, shown in Fig. 6, is organized closely to each other, and also due to the district's location being near the campuses of BJC HealthCare, the Missouri Botanical Garden, St. Louis University, and Washington University. It also gets advantages from the near green space in Forest Park, many magnificent public museums, and the Central West End MetroLink (light rail) Station. All of these attributes sustain the existing efforts to encourage entrepreneurial activity in the region. The district is concentrated on encouraging bioscience and technology research and promoting a space for associated businesses to grow and thrive [16].
- Continuity: The Cortex master plan, as shown in Fig. 6, is planned and constructed around existing elements, such as elements of a Knowledge Community, giving an energetic environment to study, work, live and play. Cortex is well planned as an urban neighborhood with many activities [17].



Figure 6: Cortex's master plan. (Source: <https://ayerssaintgross.com/work/project/cortex-innovation-community-master-plan/>.)

Cortex is an example of a university-affiliated innovation district that uses one urban location to raise a culture of cooperation and discovery. Every single structure, each lobby, and each green area is planned for a purpose and choreographed, as so more social interactions [18].

The Center for Emerging Technologies (CET), a state-designated innovation center providing incubator space and offering services to start-ups, already runs two buildings in the district. The first one is owned by the city of St. Louis and rented to CET at a decreased rate, while the second is a historic redevelopment building financed by the collaboration of Historic Tax Credits and New Markets Tax Credits [19].

- Diversity: Cortex is planning a mixed-use innovation community with various building types, such as technology buildings, retail structures, and residential so as a result, the residents have the chance to walk to work and stay in the district to dine in the evening [20]. CORTEX includes some amenities as shown in Fig. 7 such as:
  - Biomedical science and overall technology research facilities to incubate some of the nation's most promising technological advances
  - Customizable lab and office space for rent



○ Innovation Centers:

1. The Center for Emerging Technologies (CET), a state-designated innovation center providing incubator space and offering services to startups, and Cambridge Innovation Center, known as CIC [21].
2. Tech Shop runs fabrication studios: well furnished with equipment, and software used in the design and manufacturing of prototypes [22].

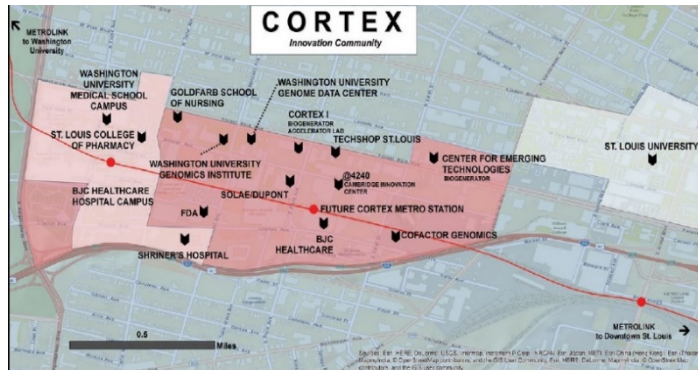


Figure 7: Cortex's location in Midtown St. Louis is in close proximity to several institutional partners participating in the development project [21].

- Mobility: A comprehensive transportation plan is designed to efficiently serve and meet the needs of the whole district's residents. The district consists of six main streets, as shown in Fig. 8, passing through the whole district and connecting it to the rest of the city. Four of which are the north-south streets, and the other two are the main horizontal streets throughout the district.
- Parking lots: A large number of parking lots with large dimensions penetrating the district and located within the blocks, decrease the negative impact of parking structures on the streetscapes and open spaces of the district.
- Metro link line: The public transportation system penetrating the Cortex and linking it to surrounding neighborhoods and institutions [23].

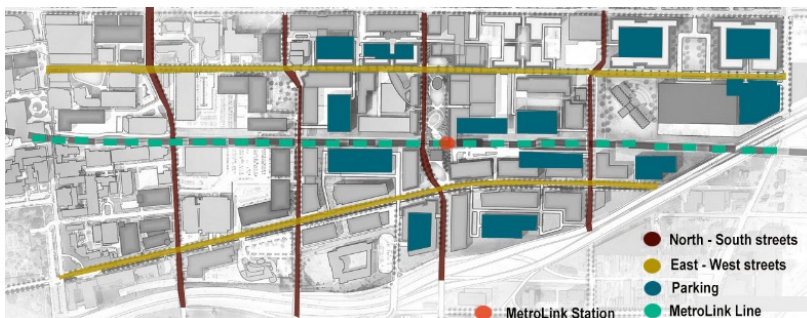


Figure 8: Cortex's street grid analysis.

- Bike lanes: A well-designed bike path, as shown in Fig. 9, is serving as a greenway extension of the green open spaces and innovation hub. Each building in the district will have a bike-share facility in the lobby. This encourages the cycling culture and improves the mobility of the tenants.
- Shuttle bus: Shuttle stops as shown in Fig. 9, are located throughout the districts to ease the transportation of tenants to and from the surrounding regions of the city.

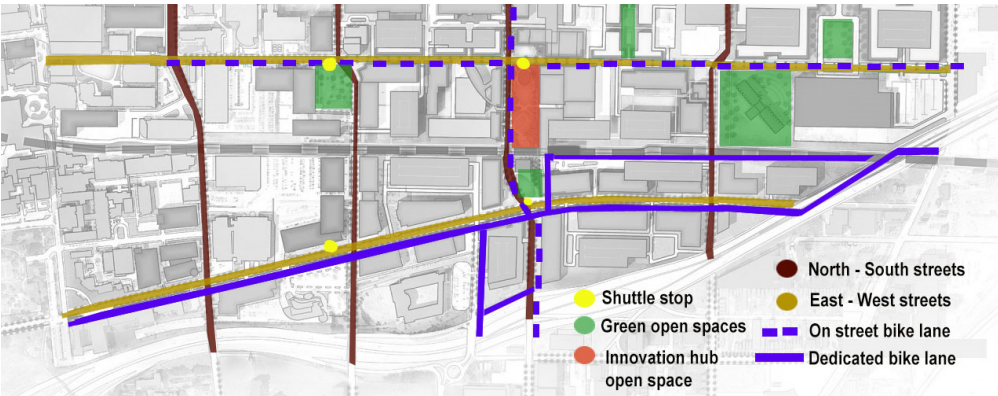


Figure 9: Cortex's Bike lanes and shuttle stop grid analysis.

- Sociability: Residents have many activities in the public open spaces. At the innovation hub located in the center of the cortex, as shown previously in Fig. 10, two pavilions and a water spray park, shown in Fig. 10, may provide a social area for recreational sports, outdoor games, and fitness classes, book readings, and children's activities.



Figure 10: A view of Cortex's central commons. (Source: <https://swtdesign.com/project/cortex/>.)

## 5 CONCLUSION

Innovation districts integrate research institutions, innovative companies, and businessmen with the advantages of urban life. These districts have a specific prospect to provide productive, sustainable, and economic development. Place identification, however, is not a new idea, regulation, or field of study, but an emerging movement that is important to achieve the best professional skills. It is all about the people, a well-balanced approach to improve the quality of people's daily life, from work to public transportation to leisure. Consequently, there are more significant ties to the community, more chances for them to take place in the economic activities, and increase the opportunities for innovative knowledge-based economic development. A well-designed district with all of its parts well connected is a perfect indicator of its success – such as transit, bike paths, sidewalks, and car-sharing. The idea of proximity, for example, or the relationship between building design, residents, employees, and activities – is what differentiates one interesting district from a boring one. It also differs one successful district from the other. The eight factors of this principle could enhance the overall performance and progress of the innovation district.

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