Dynamic Networks: Brain and City

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The brain and the city are dynamic networks. They are relational and never fixed. Networks are understood as interconnected dots, dixit Manuel Castells. When the network is dynamic —like in the brain and the city— these dots are never fixed. Dots become more like a statistic. Fix data give not an appropriate response for the future design of the city. Ideas and new stimuli change and also neurons that connect to each other. The city and the brain are both networks that are flexible. We can compare metaphorically the brain and the modern city, to find the problems they generate and to be able to propose solutions.

In the city, neuro-architecture has traditionally studied the effects of architecture in the emotions of the inhabitants. The whole population of the world is affected by architecture. The novelty is that the brain creates new neurons and their connections can change. They allow, for example, the brain to rehabilitate when suffering a brain injury. The new understanding of dynamic networks is a new way to study how the city is organized and functions. Studying the brain as a dynamic network allow us to know how to remediate some of problems that currently the cities have —especially the big cities and metropolis.

Initially neurons are affected by stimuli. Sensitivity is what the brain does when it gets a stimulus. Differences in brain sensitivity are produced by neurogenesis. When the brain receives new stimuli, it creates new neurons. This influences creativity, having new experiences and often producing different results. In the city these stimuli are englobed in what we call “big data”. Data is the basic component of the city. Big data can explain the city as new data can be added or changed creating new results. The distribution of housing in the city, and how the people live are related to big data. Housing patterns, like neurons in the brain can change. Architects use creativity to design new ways of living.

The neurons of the brain are dynamic, connected through synapsis. Plasticity is the variability in neurons connections. Changes in the synapsis of neurons can always occur changing the connection and the response. In the city, mobility (geographic mobility but also social mobility) affects connections between people and spaces. We can expect that

the future of mobility is flexibility. The pandemic of coronavirus has changed our relationships with each other, and has altered the mobility within the city. But our European city model is not a copy of the American urban planning model of suburbs and one center. Instead, the "city of 15 minutes", limits our mobility by creating multiple centers, connections, and more services. The smart mobility defines the city and makes it more complex and less frequent.

The brain is something more than connections. It is important to look at a connected group of networks to understand how the brain reacts and produces a response. These groups of networks helped by technology can change their function. Like wearing glasses, it can change the perception in our brain. The city is organized in neighborhoods that relate with each other and can change their function. But the "Brain City" concept is fundamentally a human perspective. It debates the idea that technology can solve all the problems. In the Brain City perspective errors are understood as a positive thing, as they allow for opportunity. It defies also the technological singularity represented by the urban concept of "smart cities". Because it can change through time it declares itself more landscape oriented. For example, the 22@District, in the city of Barcelona, is a change of a part of the city that was once an industrial center transformed into a knowledge district. The strategy tries to overcome —in a concrete area of the city of Barcelona— some of its problems of inequality and poverty. These changes in a district can follow the model of smart cities but they have to be solved in a real way focusing on the city problems.

City problems can be global and affect the global economy. We know that a brain injury may affects the whole body. For example, it can prevent you from walking. Emergencies affects every part of the city. Air pollution is a global emergency, that tends to increase social inequalities and poverty. These experiences are global emergencies that affects the city completely. To solve these problems, we have to rehabilitate. It is a slow process but we can apply architecture, urbanism, and landscape. Each of these offer a different perspective about the reality of dynamic networks making the process of solving problems more flexible.

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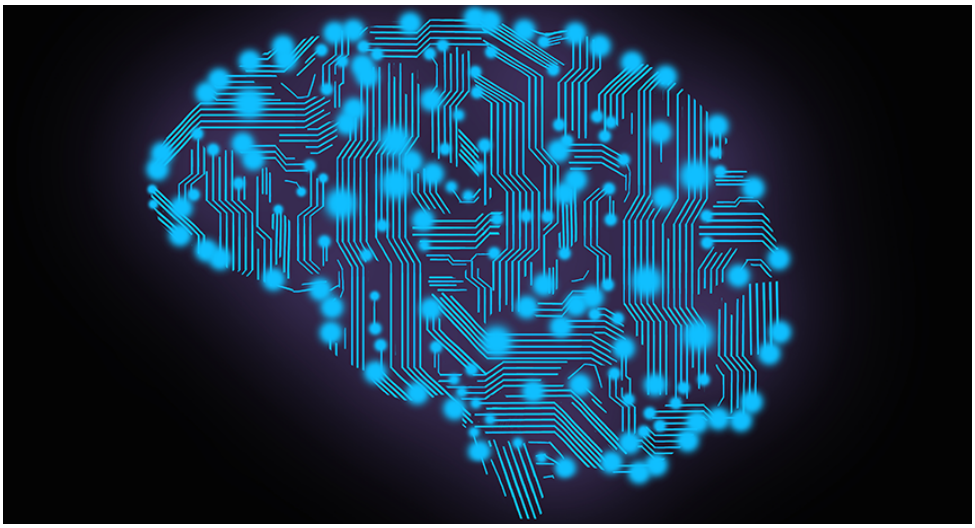

Plasticity Brain

https://www.sciencenewsforstudents.org/classroom-question/questions-brains-may-need-flexible-networks-learn-well

Flexible Housing

https://www.karinkrokfors.fi/research.html

Air pollution Barcelona

https://www.barcelonacheckin.com/en/r/barcelona_tourism_guide/articles/dark-barcelona.php

Smart Mobility,

https://www.tnet.it/en/portfolio_page/smart-mobility-and-intelligent-transport-system/

22@ District, Barcelona, painting by Robert de Miguel