

Mada Fablab – Social Transformation through accessible Digital Fabrication

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Digital Technology Access and Inclusion

Today, more than **half of the world's population is using the internet**, that means that the way its cooperated and communicated among citizens, and between citizens and the governments is changing dramatically. However, according to the International Telecommunications Union, in a global scenario where **digital access and its adoption are not distributed uniformly or inclusively for everyone**. Only 24.4% of Africa's population was online in 2018, while Europe had a 79.6% internet penetration rate. At the same time in the USA, it is registered at 69.6% (other statistics show that countries in Africa and Asia have driven growth during recent years in mobile cellular subscriptions and mobile broadband subscriptions).

In order to reduce the digital gap, it is essential to **create more inclusive and participatory digital communities and spaces, this reinforces affordability while also increasing digital awareness and skills**. By gaining access to increasing amounts of digital content, people can become better able to understand and navigate the digital systems which increasingly rely upon producing and delivering services or products related to their needs (health care, education, employment, and civic participation).

Greater digital access can improve the quality of life, especially for the most vulnerable. However, we should not think exclusively about access to the internet and its data, but how that data can be connected to our physical world. This process is known as the **Internet of Things**, or "IoT". IoT is designed in order to allow us to **develop new products and services which are surrounded and operate by networks of smart, web-connected devices and services capable of sensing, interconnecting, inferring, and acting**.

According to the *World Economic Forum* (WEF), we are living today the *Fourth Industrial Revolution* (4IR) that represents a fundamental change in the way we live, work and relate to one another. The 4IR is a **new chapter in human development, empowered by outstanding technology advances** along with those of the first, second and third industrial revolutions. These advances are **combining the physical, digital and biological environments**. The speed, breadth and depth of this revolution **are forcing us to rethink how countries develop, how organisations create value and even what it means to be human**.

Through this dramatic change, it is essential to understand that the **4IR** is not just a technology-driven change. Although its focus seems to be on technology and its advances, it is an enormous opportunity **to help and include everyone**, where we can join efforts and objectives between **leaders, policy-makers and people from**

all income groups and nations, to harness converging technologies in order to create an inclusive, human-centred future.

As part of this revolutionary change, a close and strategic relationship has been generated between the **information and communications technology and digital manufacturing, which has dramatically expanded access to industrial-grade digital fabrication technology, and is transforming the landscape of business models, value chains, and cross-border trade.** Fab Labs play a critical role in this innovation ecosystem by providing the facilities and support services that make it possible for entrepreneurs, researchers, and small businesses to access technologies allowing them to turn innovative ideas into working prototypes.

What is a Fab Lab? It is an educational outreach component that started at MIT's Center for Bits and Atoms (CBA), as an extension of its research into digital fabrication and computation. "A Fab Lab is a technical prototyping space for invention, typically equipped with an array of flexible computer-controlled tools that cover several different length scales and various materials, intending to make almost anything ", Gershenfeld, Neil A. (2005). A Fab Lab is also a platform for learning and innovation: **a place to play, to create, to learn, to mentor, to invent.**

One of the characteristics of Fab Labs is flexibility in the interaction with their users, from accompanying them on a specific section of their innovation journey or merely during the time of their stay at the lab, through the use of the equipment, and their experience of a well-run personal production process.

Overall, Fab Labs can change patterns of fabrication, promote science, technology, engineering and mathematics (STEM) skills, create businesses and jobs, and drive economic growth and productivity. They do this by providing the opportunity for practically **anyone in the broader public with creative ideas to participate in the design, production, and distribution of products and services.** A growing global network of Fab Labs has generated an entirely new realm of possibilities at the local level to stimulate innovations, inventions and applied research across industries.

However, as mentioned in the beginning, just as the internet has not been distributed uniformly or inclusively for everyone, some Fab Labs around the world have made this same mistake. Their approach has neglected an **inclusive design, focusing on collaboration resulting in "one size fits one person", which is very different from "universal" design and its "one size fits all" mandate.**

That is why, remarkably, the process that MADA has been developing to build and launch very soon the **first Fab Lab designed 100% for people with disabilities,** will become a world reference. Since not only its space and furniture will be proposed for the integration of people with special needs, but also their content will be developed with the same approach, **where assistive technologies and online courses will be mixed with digital fabrication.** This approach will help the process of changing social norms, values, and attitudes while addressing unconscious biases and stigma, and adopting policies and practices in training centres accordingly. **In a**

world where change is occurring ever more rapidly, driven by science and innovation, inclusive education and training must leverage technology to bolster the cause of universal access and increasingly personalised learning.

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Costa Rican, Architect specialized in digital fabrication and social innovation. He holds a Master's degree from the Institute of Advanced Architecture Institute of Catalonia, a Diploma on Digital Fabrication from the Fab Foundation, and is a Certified Innovation Manager by Leipzig University. In 2011 he received the "Excellence in Business Management" prize by the Total Quality Association in Guayaquil, Ecuador. Selected by the Costa Rican newspaper "El Financiero" as one of the 40 most influential persons under 40 in Costa Rica for 2016. He currently serves as Operations Manager at IbTECHar Digital Solutions, Doha Qatar.