

## SEWG Symposium 2019

On June 13, 2019, the Socio-Economic Working Group (SEWG) of the NCCR Digital Fabrication hosted the first Symposium on the Socio-Economic Impact of Digitalisation in Architecture and Construction at ETH Zürich. The goal of the symposium was to bring researchers together with non-academic stakeholders to develop an understanding of the concerns and opportunities of digitalization and to identify questions to be answered by research in order to realise the full potential of digital technologies in the architecture/ engineering/construction (AEC) sector. The symposium also served to focus the mission of the SEWG and its future work program.

About 25 participants with a broad range of backgrounds in the construction industry, insurance, economics, law, and vocational training took part in the World Café-style dialogue. For each session participants moved freely between four tables focused on the topics of economic, environmental, social and political/legal impact of digitalisation in AEC. Each participant had the chance to contribute to all four topics. At the end, the results from each table were presented in terms of a prioritisation of relevant issues, potential research questions and a suggested mission statement. The Vice President for Research and Corporate Relations of the ETH Zürich, Prof. Detlef Günther, participated in the last part of the symposium and provided his view on the discussion and the relevance and mission of the SEWG.

In the following, the main insights are summarized around the four types of impact the symposium focused on.

### Environmental Impact

Main considerations were:

1. true (incl. hidden) costs of AEC digitalisation, such as energy, raw materials and transport;
2. life cycle assessment of durability, reusability, waste and resource depletion;
3. role of regulation and incentives for sustainability.

Participants specified some first steps to studying sustainability of digital fabrication technologies, including deciding how to define and measure sustainability, looking out for the trade-offs of digitalisation and not taking for granted that digital technologies are inherently sustainable, and following the process from beginning to end to fully analyse its impact.

### Economic Impact

Three main areas were identified:

1. economic value of innovations (e.g. consumer demand, new market opportunities, risk management and opportunity communication);
2. business models, strategies and opportunities (e.g. vertical integration);
3. cost of change in terms of liability, capital and people costs (e.g. health, safety, training).

Participants discussed a disconnect between the innovation that occurs in academia and the later short-term, cost-benefit considerations of economic stakeholders. To bridge academic and industry perspectives, qualitative research is needed to better understand opportunities for all stakeholders to create long-term value and social benefit.

## Political and Legal Impact

There was a strong consensus that a significant limitation to digital innovation in AEC is the legal framework within which the building process takes place. Particularly relevant issues are:

1. liability, where taking on responsibility comes with large costs for infrastructure, financing, compliance and reputation;
2. ethics concerning data collection, ownership and sharing, as well as questions of trust and corporate responsibility;
3. the building process itself (e.g. the competitive bidding process, building codes and the potential dominance of large, fully-integrated companies outcompeting SMEs).

Participants expressed the importance of top-down policy in these matters, while also stating that policy-makers are currently overwhelmed with these issues. Research can play an important role here to define evidence-based policy and incentives to realise the full potential of digital technologies in AEC. However, influencing policy requires direct contact with policy-makers also.

## Social Impact

The main issues discussed were:

1. evolution of jobs (e.g. defining skilled and unskilled labor, changing education, workplace relationships and generational differences);
2. human-machine interaction (e.g. augmenting skills, communicating with technology, accessibility);
3. governance and power in terms of privacy, control and safety;
4. digitalisation as a means to foster economic equity.

Participants defined a few fundamental requirements for research in this area: longitudinal, inclusive with all stakeholders, prospective definition of use cases, focus on micro-processes of technology adoption in the work place. As construction is bound by many regional and national characteristics, several local studies with a variety of companies (small vs. large, public vs. private, etc) will help to validate findings. Also, some comparative research in other more technologically advanced industry sectors would be useful.

## SEWG Mission Statement

The SEWG's mission is to conduct education and outreach activities to provide perspective and opportunity for all stakeholders in digital fabrication in architecture/ engineering/construction for long term value creation and social benefit.