Complexity

Special Issue on

# Tales of Two Societies: On the Complexity of the Coevolution between the Physical Space and the Cyber Space

# CALL FOR PAPERS

The digital revolution characterized by the current ICT and digital technology enables us to map what happens in this physical space into its cyber counterpart as if we have two simultaneously coexisting societies. One is a society of human agents and 'things' in the physical space; the other is the 'incarnation' of the former in the cyber space, further empowered by a myriad of software agents. The relation between the two societies provides a challenge for the science of complexity, since the mapping between the two is not just unidirectional (self-imaging), but also bidirectional (cyclical looping). Like a mirror, the cyber space can not only passively reflect the shape of the physical space, but more often than not it can actively shape that shape, which in turn results in the two societies having a feedback relationship with each other as they constantly coevolve. Understanding their coevolutionary dynamics becomes a research agenda that one cannot afford to have missing when looking ahead into the future well-being of humans. In the past, we have seen many individual subjects being developed as walks in between the two societies; however, works which address the complex interactions between the two are still limited. This Special Issue aims to meet the gap.

This Special Issue aims to solicit contributions which address the complexity interactions of the two societies in light of their emergent cooperation or/and competition, which are currently manifested in one of three forms. The first is transformation, in which the emergence of the cyber space as an image of the physical space prompts us to search for new solution principles for tackling problems that are otherwise difficult to solve in the physical world. Mathematically and technically speaking, one can first transform the problem into the cyber space, use tools or software agents available in the cyber space to solve the problem, and transfer the solution back to the physical space. We have seen many such kinds of applications, commonly titled as 'smart' applications.

The second form is extension. Once the cyber society is founded, it is better treated as an autonomous entity, having its own life and having its own problems to solve. In this regard, can the mechanisms that we learned from the physical space, such as the market, community, management, or governance be applicable to tackling problems appearing in the cyber space? The introduction of new auction mechanisms in the cyber space, called internet auctions, is one of the earlier examples.

The final form that manifests is repercussion. The previous two interactive relations address cooperation between the physical society and the cyber society; however, the cyber space can also bring threats to the physical space. The impact of the cyber space is not limited to jobs and business opportunities but can come on a much larger scale, as a cyber-tsunami to overwhelmingly alter the operations of the labor market, the financial markets, and the democratic system and even permeate the human decision-making routines.

Contributions to this special issue are expected to be placed in the context of coevolutionary and emergent dynamics.

Potential topics include but are not limited to the following:

- Complexity theory of cyber-physical interactions
- Cyber-physical interactions in financial markets
- Cyber-physical interactions in labor markets
- Cyber-physical interactions in management
- Cyber-physical interactions in governance
- Cyber-physical interactions in human decision making
- Smartness and cyber-physical interactions
- History of cyber-physical interactions

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/complexity/efmd/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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