



Management of electrical devices and waste in global value chains in the practice of the circular economy

Organizers: **Mr. Balázs, Forman, Mr. József Kárpáti, Mr. Hans Westlund**

The research topic is the product life cycle of electronic devices and their waste, their material flow, as well as their economics and geography. In our opinion, the spatial configuration of the production of various electronic, communication and computing devices and the global spread of their use have created a completely new situation for environmental protection.

The production of microelectronic devices, semiconductors, chips, displays, and batteries requires more and more lithium and other metals that have not been widely used so far. A large percentage of the lithium deposits known so far are in areas with no infrastructure, in high mountainous areas, such as the Andes. The difficulties of extraction and local enrichment and the expected environmental impacts are still difficult to predict. The most significant, almost monopoly deposit of rare earth metals is China. The internal functioning and interests of the electronics cluster that has emerged in East Asia - Tokyo, Seoul, Taipei, Shenzhen, Hong Kong, Singapore - are discussed in Professor Henry Wai-chung Yeung's book "Geopolitics and the changing landscape of global value chains and competition in the global semiconductor industry: Rivalry and catch-up in chip manufacturing in East Asia". We know from world trade and consumption data in individual countries how electronic devices manufactured in East Asia are spreading around the world.

However, if we want to analyze the life cycle of electronic products and the management of waste generated from them based on the theory of the circular economy, we can see that the issue has become one of the most serious environmental problems of our time. At the same time, we are very far from the economic processes in the life cycle of electronic products becoming circular. The reasons for this are as follows:

1. In developing countries, the population penetration of computing devices is catching up with similar data in the most developed countries. As a result, their per capita e-waste emissions are also similar to those of developed countries. Their environmental protection systems and infrastructure are not prepared for the treatment of locally generated waste and e-waste.
2. Unused household electronic and microelectronic devices are released into the environment in an uncontrolled manner, and their materials are also considered hazardous waste.
3. Due to continuous miniaturization, material use is dispersive and high-entropy. Even when e-waste is collected, recycling its materials is a problem.
4. The most spatially concentrated sector of the world economy is the production of microelectronic devices and components. Among global value chains and interconnected multinational companies, it is still unclear which corporate level would be responsible for the take-back and recycling of used electronic devices.