

Mutualism

Subjects: Sociology

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From an ecological perspective, relationships range from to mutualism (i.e., beneficial/beneficial) to parasitism (i.e., beneficial/harmful). Mutualism in international production can be defined as international production that enables socially sustainable mutual prosperity growth between all countries involved in the international production.

Keywords: development geography ; ecological fitness ; ecosystem engineering ; moveable production technologies ; socially sustainable international production ; world-class production ; world-fit production

1. Lack of Mutualism in International Production of Physical Goods

Relationships between different peoples in different parts of the world are often not mutually beneficial^{[1][2][3]}. Notably, many relationships in the current international production of physical goods are often not mutually beneficial. International production involves processes such as extraction of raw materials, conversion of raw materials into formed materials, manufacturing of components from formed materials, and assembly of products from components. Often, different production processes, such as materials extraction and product assembly, take place in different countries. Currently, production is reducing in many countries as dominant production companies determine where production processes will be carried out and where production processes will not be carried out^{[4][5]}. Internationally dominant production companies can be characterized as having world-class productivity, quality, etc., and it has been argued that world-class production can be sustainable^{[6][7][8]}. However, the dominance of world-class manufacturers is not socially sustainable internationally because, by limiting where production is carried out, it brings the harms of limiting the generation of employment and provision of essential goods in many parts of the world^{[9][10][11]}. Indeed, rather than current international relationships being socially sustainable, some have even been framed as neo-colonialism^{[12][13]}.

2. Need for Ecological Analyses of Social Sustainability in International Production

Overall, it has been argued that the development of some countries leads to the underdevelopment of other countries and even the underdevelopment of regions with many countries^{[14][15]}. In particular, it has been argued that resources flow from what have been described as peripheral countries to what have been described as core countries. Within this conceptualization, work in peripheral countries is low-skill and labor-intensive during the extraction of raw materials for export to core countries that carry out world-class, high-skill, capital-intensive production. It is argued that this world system leads to core countries being enriched at the expense of peripheral countries, and peripheral countries being dependent on core countries. It is recognized that this world system has dynamics in which countries can move from being the most dominant core country to a less important core country and even being a semi-peripheral country^[16]. For example, it can be argued that the most dominant core country has changed in recent centuries from the Netherlands to the United Kingdom to the United States, and may now be changing to China. Nonetheless, it can be argued that whatever country is the dominant core country, other countries continue to be peripheral and dependent^{[17][18]}. As such views are focused on the fundamentally material nature of physical production, such as the local extraction and global movement of raw materials, production in this world system has been framed as being an ecological phenomenon that requires ecological analyses^{[19][20][21][22]}.

However, ecological analyses have not been carried out previously in relation to social sustainability within current international production. Rather, previous social sustainability studies have referred to social theory^[23] including social exchange theory, stakeholder theory, structuration theory, and transaction cost economics^[24]. There is no one universally agreed precise definition of social sustainability in the international production of physical goods. However, previous studies concerned with social sustainability in physical production have often drawn attention to operational factors. These include ergonomics, health and safety, training, and work-life balance^[25]. Other social sustainability studies in production have drawn attention to the importance of reciprocity and trust^[26], while others have drawn attention to a wider range of factors including diversity, learning, and self-organization^[27]. Social sustainability studies in the management of industrial supply chains have highlighted the importance of numerous factors, including community influence, contractual stakeholders influence, health, training, and safety^[28]. Other factors identified as being important

for social sustainability in industrial supply chains are diversity, health, labor rights, product responsibility, safety, and societal responsibility [29]. Thus, despite the fundamentally material nature of physical production, there has been little consideration of the need for ecological analyses of social sustainability. Relevant ecological constructs that are relevant to analyses of social sustainability are summarized in Table 1 in relation to moveable production technologies that are compatible with ecological goals and enabler their realization.

Table 1. Moveable production technologies related to ecological goals and enablers.

	Ecological concept	Moveable production technologies
Goals	Mutualism	Increase diversity of how and where production can be carried out through increased mobility and lower capital costs
	Ecological fitness	Situates production at supply locations when renewable sources are ready to be processed.
	Scalable sustainability	Overcomes common need for adaptability to depend upon having redundancies in networks
	Mobile linking organisms	Provides diverse options for development and evolution, while located in accordance with planned schedules or in response to unexpected events due to, for example, weather or conflict.
Enablers	Energetics	Increases the scope and the efficiency of energy flows through deployment of solar-powered production processes wherever needed.
	Ecosystem engineering	Does not require over-riding the natural evolutionary balance of equal ecological fitness among a wide variety of groups by increasing the number of fitness components needed for survival.

3. Conclusions

Mutualism is an ecological concept. Mutualistic relationships are mutually beneficial. However, as found in development geography studies, relationships between different peoples in different parts of the world are often not mutually beneficial. For example, there is lack of mutualism in international production that is dominated by companies that dictate where production is and is not carried out. This lack of mutualism leaves many other countries with little production capacity and persistent widespread unemployment. Thus, international production is not characterized by mutualistic social sustainability. International production has long been framed as being an ecological phenomenon that requires ecological analyses. Previous studies have focused on social theory and related operational practices. Therefore, it's necessary to provide ecological analyses of social sustainability concerning with production.

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