A TRANSFORMATION IN GLOBAL BUSINESS AND ENGINEERING:

THE RENAISSANCE OF MULTI-POLARITY IN INNOVATION

Abstract

The renaissance of non-Occidental cultural spheres recreates the historical normalcy of multi-polarity in engineering innovation. The purpose of this paper is to assess the impact of the renaissance of multi-polarity and the decline of the Occidental engineering innovation. Multi-polarity is a counterproposal of the implicit assumption of a continued Occidental dominance. This paper explicitly addresses the implicit assumption of continued Occidental dominance in the literature and research. It offers reasons for the reestablishment of multi-polarity. It contains a discussion of the ramifications of multi-polarity on engineering innovation. It assesses the implications of multi-polarity on the environment and health. Firms need to enhance their engineering innovation by a broader cognitive and cultural foundation. For firms, multi-polarity carries the potential of strategically expanding co-evolution and co-creation.

Keywords

Introduction

The time of the Occidental global dominance is ending. Globalization is enabling the reestablishment of multi-polarity. Several non-Occidental cultural spheres have achieved or are in the process of achieving the level of resources required for the demand and supply of process and product innovation congruent with their respective culture. A cultural sphere is a group of cultures based on the same roots. Cultural spheres include the Sino Sphere in East Asia, the Indian Sphere on the Indian Subcontinent, and the (Amerindian) Mesoamerican Sphere in Mesoamerica. The purpose of this paper is to assess the impact of the renaissance of multi-polarity and the decline of the Occidental engineering innovation.

The literature on engineering innovation is characterized by the – usually implicit – assumption of the supremacy of the Occident, including a continued Occidental global dominance. This is exemplified in technology forecasting where the continued Occidental global dominance is subsumed: Global government (Piketty, 2013), global commons (Last, 2017), and global brain (Heylighen, 2017), among others, are all concepts which implicitly contain the assumption of a continued Occidental global dominance. Multi-polarity is the opposite of these three concepts, because multi-polarity is founded on the respect of cognitive and cultural diversity, and the respect of all cultural spheres.

Increased complexity as a result of the globalization of value chains and cultural diversity has received attention in the literature (Doz & Prahalad, 1991; Levy et al., 2007), but this attention does not question the continued Occidental global dominance. This can be seen as an expression of the concept of the global mindset developed half a century ago. The global mindset (Perlmutter, 1969) developed in the 1960s is a projection of Occidental cognition and culture into non-Occidental societies, maybe even willful ignoring (Wieland, 2017). The concept of the global mindset might have been realistic half a century ago, but the renaissance of several non-Occidental cultural spheres renders the assumed economic and societal foundations of the concept of the global mindset increasingly questionable. It is time to recognize that the world has changed since the 1960s.

The implicit assumption of a continued Occidental global dominance is also predominant in international business research. An illustrative example is the discussion of start-ups by Knight & Cavusgil (2004), and Cavusgil & Knight (2015).   They have analyzed start-ups that engage immediately in international activities but they give no consideration to the question of cognitive and cultural proximity.

In Bresman, Birkinshaw, & Nobel's (1999) ABB case study, the cognitive and cultural proximity of Sweden and Switzerland is not addressed. Whereas Sweden and Switzerland are in the same cultural sphere, the cognitive and cultural proximity is high. The lessons from the ABB case are valuable in cases of a high degree of cognitive and cultural proximity, but they are not necessarily valid in cases of a low degree of cognitive and cultural proximity. Neither is the cognitive and cultural proximity argument developed by, e.g., Zaheer, 1995, Verbeke (2010), and Un (2016).

Cross-national distance has been seen to stem from cultural differences (Johanson & Vahlne, 1977; Berry, Guillén & Nan, 2010) – the cause of cross-national distance is similar to the cognitive and cultural proximity argument. As the literature analysis by Ardito, Messeni Petruzzelli, & Albino (2015) shows, the missing of the cognitive and cultural proximity argument is a common problem.

The extent of cognitive differences is not clear in the literature (Gavetti et al., 2012; Maitland & Sammartino, 2015). Differences – and proximities – are not dichotomous, i.e., they are not a yes or no phenomenon. Therefore, it is necessary to speak about degrees of differences – and proximities. Any difficulties in measuring differences – and proximities – is not a sufficient reason to simplify them into dichotomies.

The co-evolution concept (Dunning, 1988; Cano-Kollmann et al., 2016) and the co-creation concept (Teece, 2014) do not address the issues of cognitive and cultural proximity, and cognitive and cultural diversity. A low level of proximity and a high level of diversity increase the viscosity – i.e., the internal friction of a flow – in co-evolution and co-creation. Reducing viscosity contains the danger of reducing the experience of a basic human need, security (Rosnay, 2012). Identity (Wong, 2008) may have similarities with security, and differences in identity can increase viscosity. Whereas identity is partly defined by culture and cognition, identity is another manifestation of the level of cognitive and cultural proximity. Viscosity and security are thus drivers of multi-polarity.

The environmental and health challenges impact cognitions and cultures globally (Olsen, 2017), and this will give rise to conflict between cognitions and cultures. Contrary to the Occidental view that Nature can be exploited to benefit of humans (Feygina, 2013), the Amerindian Navajo people gives supremacy to Nature (Necefer et al., 2015). Solving the worldwide environmental and health challenges will require measures which are closer to the Navajo view, but the Occident may lack the cognitive and cultural readiness for this. At the same time, it is not only the Occident that suffers under the environmental and health challenges. The different values attributed to Nature are a recipe for conflict.

This paper is conceptual. It is based on the further development of existing literature in view of changing economic and societal circumstances.
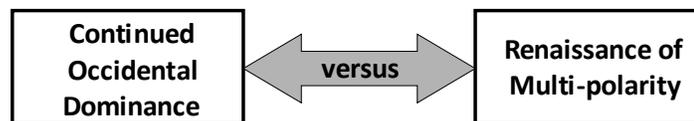
Implicit Assumption: Continued Occidental Dominance

Implicit assumptions are problematic in business research. Because they are implicit, they are not spelled out in the literature. Because they are not spelled out, they are usually not problematized in business research and in the literature. The existence of an implicit assumption means that the

(continued) validity reasons and ramifications for the implicit assumption in question receive little attention. An implicit assumption may no longer be valid, but the implicitness means that this goes unnoticed. One such implicit assumption is a continued Occidental global dominance.

The implicit assumption of a continued Occidental global dominance is not limited to the social sciences, but it can also be found in innovation and the foundations of innovation, particularly engineering. This would not be problematic, if there was one engineering worldwide. In reality, engineering is the product of society, because although there is one Nature, there are many possible interpretations of the one Nature. The result is that there are more than one engineering.

The implicit assumption of a continued Occidental global dominance has implications for technology forecasting. In technology forecasting, the implicit assumption of a continued Occidental dominance is common. It can be found in, e.g., concepts like the global mindset (Perlmutter, 1969), the global government (Piketty, 2013), the global commons (Last, 2017), and the global brain (Heylighen, 2017) as shown in Figure 1.


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┌──────────────┐              ┌──────────────┐
│  Continued   │   ◄ versus ► │ Renaissance of│
│  Occidental  │              │ Multi-polarity│
│  Dominance   │              │              │
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Implicit assumption underpinning:
Global Mindset (Perlmutter, 1969)
Global Government (Piketty, 2013)
Global Commons (Last, 2017)
Global Brain (Heylighen, 2017)
Etc.

Figure 1: Multi-polarity is the counterproposal of a continued global Occidental dominance. A continued Occidental dominance is implicitly assumed in many concepts related to technology forecasting.

Even with the implicit assumption of a continued Occidental global dominance, an increased complexity as a result of the globalization of value chains and cultural diversity has received attention in the literature (Doz & Prahalad, 1991; Levy et al., 2007). Multi-polarity increases the complexity further. The increased complexity is a challenge for firms operating across the borders of cultural spheres. For such firms, there will be incentives to broaden the cognitive and cultural foundations of innovation.

In the Occident, the achievements and foundations of non-Occidental have received little attention (Verloren van Themaat, 1989). Koskinen and Mäki (2016) have divided science into – Occidental – academic and pluralist science. Whereas Occidental science does not encompass non-Occidental science, pluralist science is a way for non-Occidental science to enter Occidental science. It is noteworthy that Koskinen and Mäki (2016) have not explicitly included non-Occidental science in – Occidental – academic science, or that they have not created a third category for non-Occidental science that is equal to Occidental science.

The implicit assumption can be interpreted as an analogous case of Fiske et al.'s (2002) Stereotype Content Model and Diamantopoulos et al.'s (2017) country-related stereotypes. A stereotype can be favourable or unfavourable. In the case of Occidental global dominance, the stereotype on the part of the Occident is that everything outside of Occidental science is inferior, i.e., the stereotype is unfavourable. In the case of multi-polarity, all stereotypes are equal, i.e., the stereotype is neutral.

The implicit assumption of a continued Occidental global dominance means a projection of Occidental cognition and culture into non-Occidental cultural spheres, maybe even willful ignorance of them (Wieland, 2017). Contrary to Occidental global dominance, multi-polarity means that all cultural spheres are considered equal. Multi-polarity broadens the cognitive and cultural foundation for innovation. The implicit assumption of a continued Occidental global dominance misses other cognitive and cultural foundations for innovation rendering technology forecasts erroneous.

Occidental Dominance: A Historical Anomaly

The current worldwide Occidental dominance in business and engineering is a historical anomaly. Prior to the late 15th century, there were several cultural spheres globally. With the destruction of Amerindian cultural sphere particularly in Mesoamerica and South America started the military aggression around the world that gave rise to the worldwide Occidental dominance in business and engineering that can be observed today. Multi-polarity has been historically the normal state if affairs as outlined in Figure 2. The emerging renaissance of, e.g., the Indo cultural sphere and the Sino cultural sphere evidence the reestablishment of the historical equilibrium.
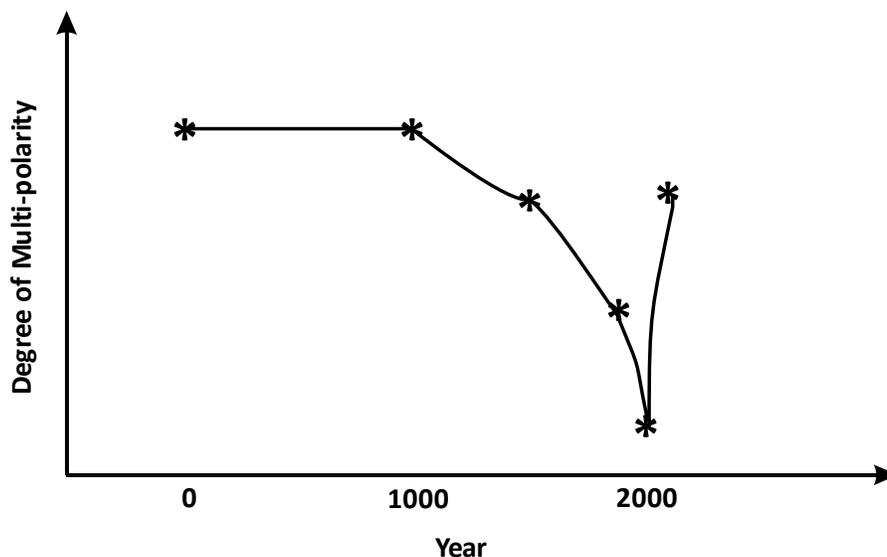
Figure 2: The Occidental dominance commenced with the destruction of the Amerindian cultures after 1492, and continued with imperialism and colonialism. The renaissance of non-Occidental societies re-establishes global multi-polarity in the early 21st century.

The reestablishment of the historical equilibrium in the form of multi-polarity can be likened with a dynamic equilibrium in chemistry. The worldwide Occidental dominance has created an anomalous

situation that has been underpinned by the weakness of the cultural spheres outside of the Occident as the result of the aforementioned Occidental military aggression. Global trade has established the material prerequisites for the re-strengthening of the non-Occidental cultural spheres in the context of business and engineering.

The reestablishment of the historical equilibrium is a dynamic process. In the initial phases of the process, Occidental business and engineering have been tolerated in the non-Occidental cultural spheres. Tolerance should not be confused with adoption. The tolerance gives the non-Occidental cultural spheres the resources for the renaissance of their own cultures and everything that are products of culture, e.g., arts, business practices, engineering, law and science.

Reasoning differs in the cultural spheres. Norenzayan et al. (2002) have found that intuitive reasoning is more prevalent in the Sino Cultural Sphere than in the Occidental Cultural Sphere, and the opposite is the case for formal reasoning. Senzaki et al. (2014) have concluded that there are differences in narrative construction in individuals from the Sino Cultural Sphere and Occidental Cultural Sphere are different. Such differences impact the products of culture, including engineering and science. It is noteworthy that cognitive diversity differs from demographic diversity: Norenzayan et al. (2002) have observed that the reasoning of individuals of Sino ancestry is either identical to the one of Occidentals, or intermediate between the reasoning in the Sino Cultural Sphere and the Occidental Cultural Sphere.

The reestablishment of the historical multi-polarity raises the issue of the reason for the renaissance of the non-Occidental cultures instead of what has been – implicitly – assumed in much of the literature, i.e., a continued Occidental global dominance. Several mechanisms come into question, and these mechanisms may interact catalytically. The basic human desire for security is one mechanism.

Considering the motivations of human security, the emotion of security is probably one of the strongest. One way to safeguard security is through solidarity. Rosnay (2012) emphasizes the need for solidarity. Although global solidarity would be conceivable, it is likelier that solidarity is sought in an individual's immediate vicinity. An individual's immediate vicinity is characterized by the culture in the cultural sphere in question. Solidarity is strengthened by shared characteristics between individuals, including a shared cognition, culture and identity. Thus, the security argument tends to favour multi-polarity instead of a continued Occidental dominance.

Another mechanism is cognition. The culture in which an individual grows up impacts the cognition of the individual. The more cultures there are, the greater the cultural diversity. The reestablishment of multi-polarity means that more cultures are involved in the global business and engineering thus increasing cultural diversity. As outlined in Figure 3, cultural diversity increases cognitive distance globally. This increased cognitive distance results in more innovation, if there is sufficient absorptive capacity.
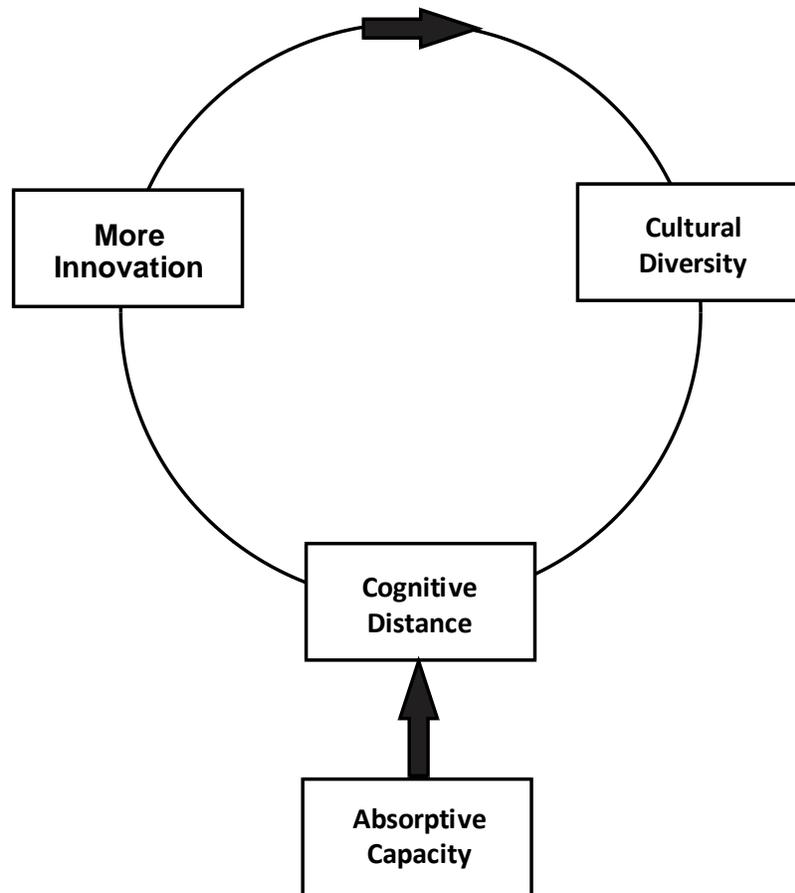
Figure 3: An increase in cultural diversity increases cognitive distance that – with sufficient absorptive capacity – results in more innovation that increases cultural diversity.

In the literature, scant attention has been paid to the varying levels of cognitive distance, or its opposite cognitive proximity (Gavetti et al., 2012; Maitland & Sammartino, 2015). As already observed, cognitive proximity is not a dichotomy (yes/no). Rather, it is a 0 – 100 per cent continuum. The measurement of cognitive and cultural proximity is not straightforward, because it encompasses all aspects of society. Suffice to say that this is a complex undertaking. One of the points of multi-polarity is that the level of cognitive and cultural proximity decreases with the renaissance of non-Occidental cultural spheres. Because of the implicit assumption of a continued Occidental global dominance is so widespread in the literature, a few examples will be used to highlight the situation.

Knight & Cavusgil (2004), and Cavusgil & Knight (2015) have argued that some start-ups engage immediately in international activities. They do not provide an assessment of cognitive proximity. Such a business strategy requires that the start-ups adopt the cognitions and cultures of their respective markets. In view of the current strength of the Occident, this business strategy effectively means the adoption of the Occidental cognition and culture by the start-ups. Thus, such start-ups are examples of a continued Occidental global dominance and not of multi-polarity. In a multi-polar world, direct engagement in international activities can be envisioned, but this is limited by the boundaries of the cultural spheres: A firm from the Cultural Sphere A can adopt and this engage in business with Cultural

Sphere B, but it cannot engage in business with Cultural Sphere C. The issue is that the firm would need to adopt the culture from Cultural Sphere B and Cultural Sphere C in the opposite case.

A caveat is in place: Expat communities may be bridges across the formal boundaries between countries belonging to different cultural spheres. Therefore, a firm from Cultural Sphere A may operate in expat communities from Cultural Sphere A in Cultural Sphere B and Cultural Sphere C. With the re-strengthening of multi-polarity, the role of expat communities in the context of innovation may strengthen.

Bresman, Birkinshaw, & Nobel (1999) do not address cognitive and cultural proximity of Sweden and Switzerland. This raises the issue of the applicability of their results in situations where there is a lower level of proximity. Considering the complexity of cognition and culture, this also raises the issue of the importance of different aspects of cognition and culture on the overall level of cognitive and cultural proximity. Not assessing the level of cognitive and cultural proximity may have been satisfactory as long as there has been an Occidental global dominance, but with the renaissance of non-Occidental cognitions and cultures the circumstances are fundamentally changing. This means that the cognitive and cultural proximity need to be addressed.

The level of cognitive and cultural proximity does not only impact current and future research, but it can be used to reinterpret past research. An example of this is the data of Laursen, Masciarelli & Prencipe (2012). The issue is that the substance of social capital is different in a world characterized by Occidental global dominance and multi-polarity.

The interrelationship between cognitive proximity and cultural proximity has not been developed in the literature as exemplified by, e.g., Zaheer, 1995, Verbeke (2010), and Un (2016). Culture has a decisive impact on cognition (D'Andrade, 1981). Whereas culture impacts the formation of cognition via socialization, a significant correlation between cognitive proximity and cultural proximity would be reasonable to expect, but it cannot be taken for granted. Adding to the challenge to understand the interrelationship is that the interrelationship may be different in various cultural spheres.

Cross-national distance has been seen to originate from cultural differences (Johanson & Vahlne, 1977; Berry, Guillén & Nan, 2010). The Occidental global dominance has reduced the cross-national differences at least in the field of engineering-based innovation, because there has been only one dominant engineering worldwide. Multi-polarity calls this into question. The cross-national distance is likely to increase as the cultural differences are not covered over by the tolerance of the Occidental global dominance. This can increase the tensions between cultural spheres, but the diminished factual requirement to tolerate the Occidental global tolerance is conducive to reducing tensions within the cultural spheres.

The literature analysis by Ardito, Messeni Petruzzelli, & Albino (2015) shows, the missing of the cognitive distance / proximity argument is a common problem in the literature. Thus, it should not come as a surprise that scant attention has been paid to the reduction of innovation as a result of its narrow cognitive and cultural foundation in a world characterized by Occidental global dominance.

Multi-polarity and Innovation

The reestablishment of multi-polarity does not necessarily mean isolation. There were commercial contacts between China, India and the Occident before the Occidental dominance. There was

international trade in Mesoamerica before 1492. Multi-polarity means respect for other cultures, a respect that needs to be combined with absorptive capacity. The different poles in multi-polarity compete with each other, but they also complement each other. The reestablishment of multi-polarity broadens the foundation of knowledge – e.g., engineering – that forms the basis of innovation as shown in Figure 4. This is demonstrated by the increased width. The broadening of the foundation can occur on the demand and supply side of innovation. On the demand side, the renaissance of the non-Occidental cultural spheres recreates the domestic demand for processes and products compliant with the local culture. On the supply side, the renaissance of the non-Occidental cultural spheres enables the development of, e.g., business and engineering concepts based on the local culture.
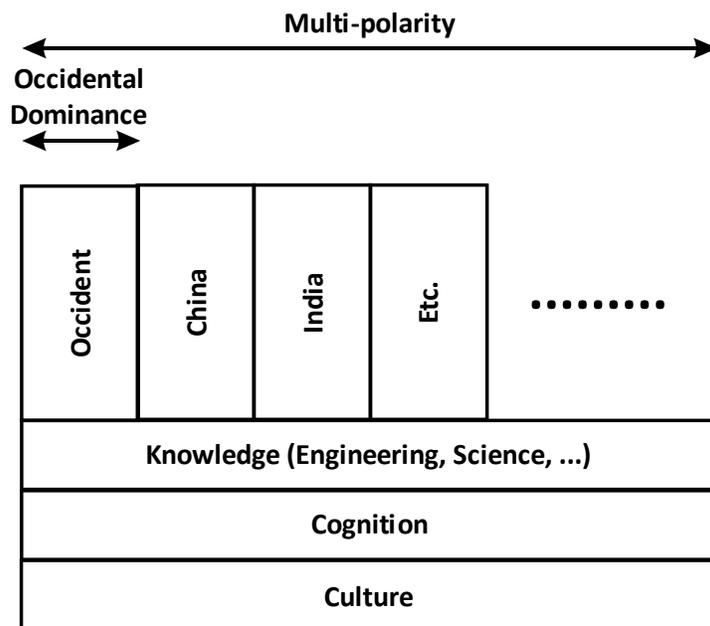
Figure 4: The re-emergence of multi-polarity means that the cultural and cognitive foundation for knowledge used in innovation is broadened.

An example of the ramifications of multi-polarity is the role played by environmental and health issues on innovation. The absolute primacy given to Nature by numerous Indigenous peoples, e.g., the Navajos (Necefer et al., 2015) and the Huaorani, Quechua, Tagaeri and Taromenane (Sovacool and Scarpaci, 2016), creates a different cultural and cognitive foundation for innovation than the Occidental view that Nature can be exploited to benefit of humans (Feygina, 2013). Thus, multi-polarity facilitates innovation that is ecologically sustainable in an absolute sense in two ways. First, innovation is sustainable without being relativized by economic considerations. Second, the cognitive and cultural foundation of innovation, including engineering, encompasses more than Occidental knowledge. This increases the likelihood of finding solutions to environmental and health challenges.

The competition between and complementation of the poles in multi-polarity suggests a development reminiscent of co-evolution and co-creation, but implicit assumptions make the use of these two concepts difficult in multi-polarity. The co-evolution concept (Dunning, 1988; Cano-Kollmann et al.,

2016) and the co-creation concept (Teece, 2014) are based on the implicit assumption of a continued Occidental global dominance. Hence, the co-evolution concept and the co-creation concept do not address the issue of cognitive and cultural diversity. At the same time, multi-polarity broadens the foundation of co-evolution and co-creation in two cases. First, co-evolution and co-creation could facilitate innovation in a multi-polar world within the same cultural sphere. Second, co-evolution and co-creation could facilitate innovation across the boundaries of cultural spheres. This would require a broadening of both concepts.

Conclusion

The purpose of this paper was to assess the impact of the renaissance of multi-polarity and the Occidental decline on engineering innovation. It offers reasons for the reestablishment of multi-polarity. It contains a discussion of the ramifications of multi-polarity on engineering innovation. It assesses the implications of multi-polarity on the environment and health.

Globalization is creating the economic and societal foundations for a reestablishment of multi-polarity in innovation. Several non-Occidental cultural spheres are starting to have the resources which allow a demand and supply of engineering innovation congruent with the cultural sphere in question. A key ramification of multi-polarity is that it broadens the cognitive and cultural foundation of engineering innovation. The broader foundation is conducive to different and more innovation. Multi-polarity thus creates a situation of competing and complementary engineering innovation.

The implicit assumption of a continued Occidental global dominance in engineering innovation underpins much of the technology forecasting literature. Multi-polarity is the opposite of this implicit assumption. Multi-polarity is thus a counterproposal to concepts founded on the implicit assumption of a continued Occidental dominance, e.g., the global mindset, the global government, the global commons, and the global brain. Multi-polarity strengthens the role of environmental and health considerations in engineering innovation, because environmental and health considerations play a stronger role in numerous non-Occidental cultural spheres. Multi-polarity creates demand and supply of engineering innovation that gives absolute primacy to ecological sustainability. Multi-polarity also has the potential of expanding co-evolution and co-creation.

Research limitations in this research are the pace of the transformation to multi-polarity, and the contents of business models and engineering need to be identified. Additional research is needed on implicit assumptions in the innovation literature.

The practical implications for businesses are that they need to broaden the foundation of engineering innovation, and that new markets are being created complying with the social norms of different cultures. The reestablishment of multi-polarity calls into question business strategies based on an (implicit) assumption that there is a more or less homogeneous global market.

The originality of this paper is that it explicitly addresses the implicit assumption of the supremacy of the Occident in engineering innovation in the literature and research.

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