

Dynamics of technological posthumanization: Distinguishing the anticipated paths of developed and emerging economies

by

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ABSTRACT

The processes of “posthumanization” can be understood as those dynamics by which a human organization or society comes to include members other than “natural” biological human beings who contribute to the structure, activities, or meaning of that organization or society. In the world of business, such posthumanization is commonly identified with the growing use of social robots, autonomous AI, and joint human-computer systems to perform work that in earlier eras would have been performed by human beings acting alone. Such “technological” posthumanization is often presented as a new phenomenon occurring largely in those developed economies that are pioneering Industry 4.0 paradigms (e.g., by expanding workplace automation) and that are uniquely positioned to harness such forces to drive economic growth. Here, however, we contend that such emphasis on the novelty of technological posthumanization overlooks forms of *non-technological* posthumanization that have been at work in human societies for millennia. Such dynamics of non-technological posthumanization have weakened significantly in many developed economies since the mid-20th century; however, they remain relatively strong in emerging economies. In this study, a conceptual framework is developed for identifying and comparing phenomena through which processes of technological or non-technological posthumanization manifest themselves in developed and emerging economies. It is argued that the ongoing and robust experience with non-technological posthumanization possessed by many of the world’s emerging economies may offer them unique and underappreciated psychological, social, and cultural mechanisms for integrating effectively into their enterprises, organizations, and institutions those novel forms of non-human agency that are at work in key Industry 4.0 technologies, like those relating to social robotics, autonomous AI, and advanced human-computer interfaces.

Keywords: Technological posthumanization, anthropocentrization, emerging economies, Industry 4.0, robotics, artificial intelligence, Internet of Things.

INTRODUCTION

There is much interest in the growing impacts on organizations, economies, and societies generated by social robotics, autonomous AI, advanced human-computer interfaces (HCIs), and other types of emerging technologies that augment, complement, or replace natural biologically-based forms of human agency. Such technological change has been conceptualized using a number of paradigms, including those of cyber-physical systems (Wang et al., 2008), the Internet of Things (Atzori et al., 2010), and Industry 4.0 (Gorecky et al., 2014). Another paradigm through which such changes can be analyzed is that of *posthumanization*, which is the focus of this text.

The processes of “posthumanization” can be understood as those dynamics by which a human society comes to include members other than “natural” biological human beings that contribute to the structure, activities, or meaning of that society (Gladden, 2018, p. 19). Here the prefix “post-” refers to the situation that exists after certain conceptual and practical boundaries separating the “human” from the “non-human” have been at least partially dissolved; a posthumanized society (or organization within such a society) has expanded its membership to incorporate intelligent social actors beyond just “ordinary” human beings.

Within the spheres of contemporary organizational management and economics, such posthumanization is frequently identified with the growing use of social robots, autonomous AI, and cybernetic systems incorporating sophisticated HCIs to perform types of work that in earlier decades or centuries would have been performed by human beings acting alone. Such “technological” posthumanization (Gladden, 2018, pp. 135-36) is often presented as a new phenomenon occurring largely in those technologically advanced, developed economies that are pioneering the adoption of Industry 4.0 paradigms and are seen as being uniquely positioned to harness such forces to drive economic growth. However, such analyses overlook an equally significant (and far older) form of *non-technological* posthumanization that has been the subject of much study in the fields of philosophy, sociology, anthropology, and critical and cultural studies (Graham, 2002; Badmington, 2006; Herbrechter, 2013, pp. 2-3, 106) but which – as a concept – has so far received little attention from contemporary management studies or economics. Such processes of non-technological posthumanization

might be understood as the “original” form of posthumanization, which from ancient times has expanded the boundaries of human organizations and societies outward to encompass members other than “natural” biological human beings.

This study’s hypothesis is that while the dynamics of non-technological posthumanization have weakened during recent decades in many developed economies, they remain relatively strong in many countries with emerging economies – and this ongoing familiarity with operating in *non-technologically* posthumanized environments may provide emerging economies’ participants with alternative (and perhaps unexpectedly robust) psychological, social, and cultural mechanisms for adapting to the rise of social robotics, advanced AI, sophisticated HCIs, and other manifestations of *technological* posthumanization.

METHODS

Identifying and understanding that which is “posthumanized” requires some coherent concept of the “human”; this study’s perspective is informed especially by the phenomenological account of the human being as a multilayered “relatively isolated system” developed by philosopher Roman Ingarden (1987), which is grounded in modern theoretical biology and systems theory in a manner that readily lends itself to an investigation of posthumanization.

Within the range of research methodologies delineated by Wilson (2010), this study constitutes an exploratory investigation employing an inductive approach and qualitative methodology. It relies on the collection, analysis, and synthesis of secondary data in the form of published scholarly texts. Data collection employed a purposive non-probability sampling method and cross-sectional time horizon; secondary data analyzed included works addressing posthumanism and posthumanization (Hayles, 1999; Graham, 2002; Badmington, 2006; Birnbacher, 2008; Ferrando, 2013; Herbrechter, 2013; Gladden, 2018); cyber-physical systems (Wang et al., 2008); the Internet of Things (Atzori et al., 2010); the Industry 4.0 paradigm (Gorecky et al., 2014); artificial and artificial general intelligence (Gunkel, 2012; Yampolskiy and Fox, 2012); swarm robotics and autonomous robots (Bekey, 2005; Barca and Sekercioglu, 2013; Brambilla et al., 2013); social robotics and human-robot interaction (Breazeal, 2003; Kanda and Ishiguro, 2013); virtual reality (Koltko-Rivera, 2005; Bainbridge, 2011); HCIs and neuroprosthetic enhancement (Clark, 2004; Fleischmann, 2009; Fairclough,

2010); and genetic engineering and synthetic biology (Cheng and Lu, 2012; Bera, 2015; De Melo-Martin, 2015); and biological computing (Lamm and Unger, 2011; Church et al., 2012). Through analysis and synthesis of information found in such sources, it was possible to create a conceptual framework for use in documenting and comparing the divergent types and degrees of technological and non-technological posthumanization possessed by countries with emerging or developed economies; this framework is the study's primary product.

RESULTS

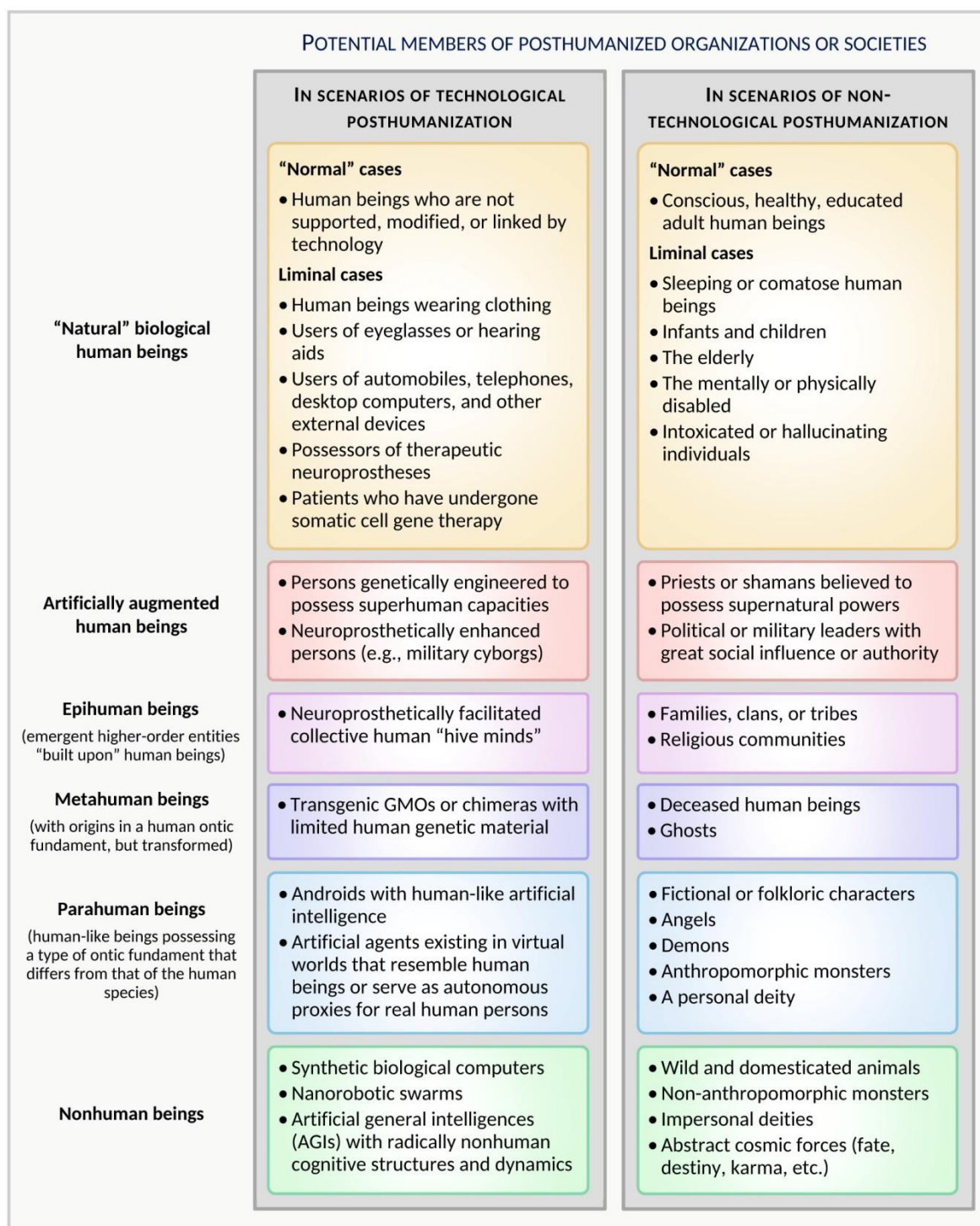


Figure 1. Potential members of technologically and non-technologically posthumanized organizations or societies.

Analysis and synthesis of the gathered sources enable us to construct the schema depicted in Figure 1, which suggests that the types of artificially augmented human beings, epihuman beings, metahuman beings, parahuman beings, and nonhuman beings that become

incorporated into human organizations and societies (or which their human members come to *believe* are active elements of such organizations or societies) through processes of technological posthumanization differ significantly from those incorporated by processes of non-technological posthumanization – while simultaneously sharing certain similarities in their roles and characteristics.

To the extent that a contemporary society already incorporates members listed in Figure 1's left-hand column, it can be understood to have undergone technological posthumanization; to the degree that it is striving to incorporate further such members (i.e., by developing more sophisticated forms of AI or neuroprosthetics), it demonstrates processes of ongoing technological posthumanization. To the extent that a contemporary society includes (or is understood by its human members to include) members of the sort listed in Figure 1's right-hand column, it displays traits of non-technological posthumanization.

DISCUSSION

Drawing on Figure 1, it might be observed that the default condition of the world's political states, economies, and cultures over the last few thousand years has been one of considerable non-technological posthumanization. For example, the prosperity and survival of many historical civilizations depended on the use of domesticated animals like the chickens or cows that provided food, dogs that warded off predators, oxen that plowed fields and powered mills, and horses that drew wagons and carried soldiers into battle. Similarly, throughout much of human history, a belief in deities, angels, and spirits of the deceased connected with folk spirituality or organized religion has exerted a strong regulating force on the social expectations for and behaviors of persons and institutions. Historical societies that incorporated such elements were non-technologically posthumanized and partially de-anthropocentrized: while ordinary human beings played a key role in them, they were by no means the only members whose real or supposed existence and activities helped shape the conduct of those societies; human beings had to “share the stage” with other types of entities.

For millennia, the effective functioning of non-technologically posthumanized economies was thus based on human beings' successful collaboration with (or at least, openness to) such radically non-human intelligences and their effective inclusion in the structures and activities of commercial enterprises, state institutions, and other organizations.

Many changes occurring in developed economies and societies beginning in the mid-20th century had the effect of temporarily and anomalously de-posthumanizing such societies and making them more anthropocentric. Indeed, the semi-automated assembly lines that characterized developed economies in the 1960s and 1970s – and later, the office suites of the 1990s full of cubicles equipped with desktop computers – arguably reflected the most anthropocentric and non-posthumanized workplaces in history: rather than being surrounded by domesticated animals that needed to be persuaded and cajoled, the human worker (and his or her intellect) was not only the supreme decision-making agent and actor but the *only* one. The human employee became the sole intelligent social actor within most enterprises, surrounded by highly effective (but passive) electronic tools that would do exactly – and only – what they were instructed to do by their human operators.

Simultaneously, beginning in the mid-20th century, nations with developed economies (on the whole) also became more secularized and less spiritual (McCleary and Barro, 2006; Johnson and Grim, 2013), their birth rates began to fall, and elderly family members increasingly came to reside in specialized facilities rather than in the home with their adult children (Rowland, 2012; McDaniel and Zimmer, 2016). Instead of involving extensive and diverse daily social interaction with (or, at least, social behaviors directed at) wild or domesticated animals, children, elderly relatives, deities, ghosts, or angels, the everyday life experience of the adult workforce in developed economies has in recent decades become more homogenized, anthropocentric, and de-posthumanized: it has now largely come to involve interaction with other adult human beings. That *status quo* now promises to be upended by a “re-posthumanization” of developed economies – this time brought about not by farm animals but by social robots, autonomous AI, and cyborgs.

The picture in many emerging economies is quite different. While there are numerous notable exceptions, *in general* contemporary emerging economies are associated with societies that have maintained a higher degree of non-technological posthumanization since the mid-20th century: in comparison to countries possessing developed economies, it is more likely in emerging economies that adults share a home with large numbers of children and with elderly relatives (Rowland, 2012; McDaniel and Zimmer, 2016); that individuals acknowledge some religious affiliation and a belief in ghosts, angels, deities, or other supernatural entities or forces (McCleary and Barro, 2006; Johnson and Grim, 2013); that wild animals are routinely encountered; that families raise their own animals for food; and

that domesticated animals are employed for farm work, transportation, and other forms of labor (Common and Stagl, 2005; Pingali, 2007).

This suggests (as reflected in Figure 2) that as ever more sophisticated technologies relating to social robotics, autonomous AI, and advanced HCIs are deployed worldwide, the resulting technological posthumanization of organizations and societies may unfold in distinct ways in developed and emerging economies, insofar as they begin from different starting points. In developed economies, the advent of such transformative technologies pushes human beings from their recently acquired position at the center of all organizational and societal decision-making and action; it forces organizations' human workers to develop means of collaborating successfully with the types of para- or nonhuman members that during the second half of the 20th century they had endeavored to exclude from their midst. On the other hand, participants in emerging economies are (on the whole) already more accustomed to living in a highly posthumanized society in which they must collaborate effectively with many augmented, meta-, para-, or nonhuman members. For them, the arrival of social robots, autonomous AI, and sophisticated BCIs might thus be more likely to be seen as just adding additional types of posthumanization to their already posthumanized world.

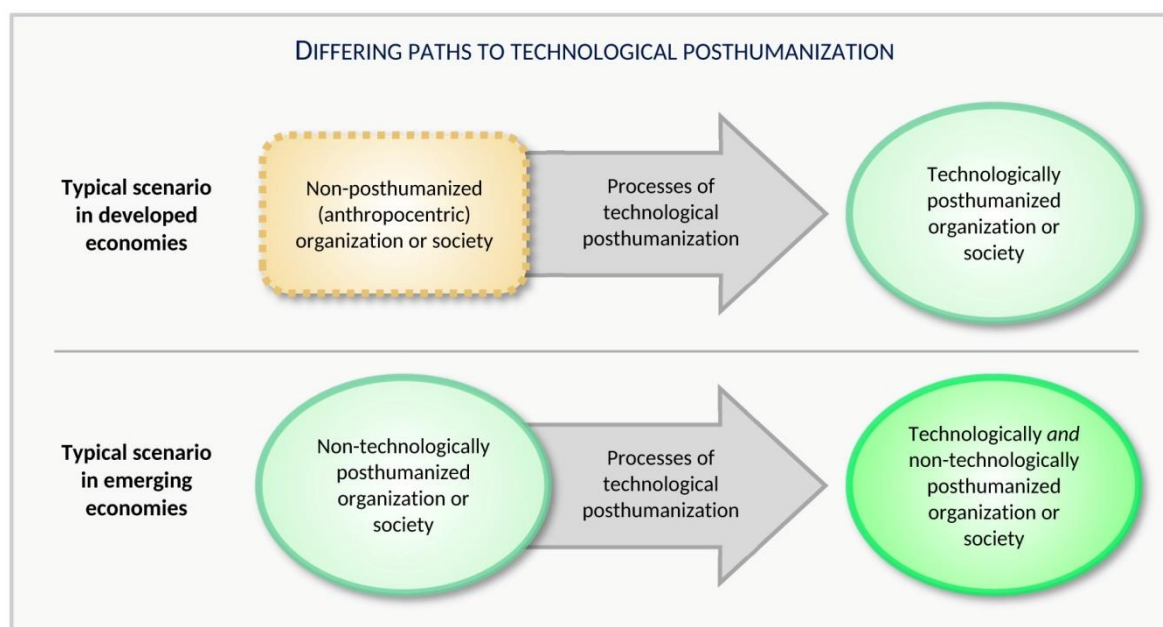


Figure 5. Differing paths to technological posthumanization in developed and emerging economies.

It may even be hypothesized that some countries with emerging economies likely possess unique psychological, social, and cultural resources in the form of deep reservoirs of ongoing experience with non-technological posthumanization that might give them a “head start” in grappling with, developing, and exploiting the forces of technological posthumanization in novel and creative ways. For example, the forms of epi-, meta-, para-, or nonhuman agency possessed by future generations of online communities, self-driving automobiles, companion robots, smart-home AIs, and web algorithms that are being pioneered by firms like Google, Facebook, and Amazon may appear alien or mysterious in anthropocentric societies with developed economies that – in recent decades – have employed paradigms based around the exclusivity and supremacy of human agency; however, they may be readily comprehensible using concepts and categories already present in non-technologically posthumanized societies of the sort associated with many emerging economies. It is hoped that the conceptual framework developed in this study can provide a tool for investigating such issues in more detail from both theoretical and empirical perspectives.

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