

## **DIGITAL DIVIDES AND THE DENATURALIZATION OF THE ECONOMY: SOME MATERIAL REALITIES**

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## **Digital Divides and the Denaturalization of the Economy: Some Material Realities**

**ABSTRACT:** So what is at stake in the debates over digital divide? The issue of digital divides is not merely access to ICTs, although being able to access ICTs could immensely benefit those who are left out of the information revolution. It is essentially the problems created by the transformation of global economy through rapid advances in technology that is relegating the majority of the people in the world who are unable to catch up with those in the so-called knowledge-based economy. How profound is the transformation of modern capitalism as a result of the unleashing of ICTs and the consequent digital divide? There is nothing unique about this technology divide in that it involves yet an iteration of an earlier scenario of the logic of capitalist expansion. However, what is new about this transformation of capitalist economy due to ICTs, compared to other technological advances of earlier periods, is that it is significantly different in terms of extreme flexibility and specialization of production and quicker pace of innovation having both short-term and long-term implications for digital divide. There is a progressive dematerialization and denaturalization of the economy from material-based commodities to non-material and information-based commodities. Concomitantly, there has been a radical shift in the calculus of value creation from the production side to the consumption side. The so-called digital divide is basically a divide between those who are still in the production (industrial) world to those in the consumption (post-industrial) world. Therefore, a secondary research question that will be probed in this paper is to unpack the complexity of the substantially different nature of the value chain in modern informational capitalism. What are the conditions under which the primary producer's location in the value chain is redefined, and does this redefinition involve a rupture or iteration?

## **Introduction**

One of the most controversial and misunderstood topics in information and communications studies field is the so-called 'digital divide'. While some contend that the digital divide is rubbish or a corporate ploy to monopolize information and communication technology-based industries, others claim it to be the most important issue to be dealt with in order to alleviate poverty in the Third World. My position is none of the above. That there is no such thing as digital divide is not what I contend. There is, and it is a terrible reality. There is digital divide between nations, between regions within nations, between cities and villages, between middle and working classes, between men and women, and between young and old. I do agree that 'connectivity is productivity' and ICTs could improve welfare and material well being of poor citizens.

I argue that most analysts are hung up on the problem of digital divide in a narrowly construed instrumental sense of the absence of a technical artifact for a large number of people in the world that ostensibly deprives them to be 'on-line'. Digital divide is often seen as a mere technological problem that can be addressed by increasing telecommunication and Internet accessibility by making available cheap computing and communication technologies to the poor. Of course these actions would be meaningful in a world where everyone has equal opportunity to participate in the economy, polity, culture and pursuits of material acquisitions except being unable to be in cyberspace for whatever reasons.

What I argue is that digital divide is not merely a technological problem due to lack of connectivity or accessibility to cyberspace. The rather instrumentally confined discourse on digital divide is part of a modernist symptom to unreflexively categorize and compartmentalize complex socio-technological problems into one-dimensional social analysis in order to resolve them through specific technological fixes. Mark Poster (1997) rightly talks about the modern attitude to view the Internet like a 'hammer', a mere material configuration to do some simple tasks. He argues we need to view it like 'Germany', a social and politically mediated complex space, rather than a hammer in order to understand the complexity of the Internet. However, I will not go into the complex political analysis of the Internet and its impact on the public sphere, identity formation, political discourse, and democratization. What we do need to keep in mind is the way information and communication technologies have instantiated new forms of interaction and power relations between peoples and nations by profoundly altering the political economy of global capitalism, whether it is called post-industrialism, or cyber-capitalism, or informational capitalism, or knowledge-based economy.

The contradictory phenomenon of social, economic and technological exclusion of certain peoples and societies has been an enduring feature of the project of modernization despite the ethos of universality embedded in the Enlightenment credo from which modernization evolved. What makes the current social, economic and technological exclusion or what I call the digital divide different is the extent to which the exclusion has deepened despite the putative benefits of the integration of markets, technology, and countries promised by the neo-liberal mantra of economic globalization.

Digital divide is much more serious than previous technological exclusions during the mercantilist and colonial periods because of the unprecedented changes that globalization has wrought to the lives, families, and communities of these peoples due to information asymmetry and unequal economic and social opportunities for the majority of the people in the world. The technology and trade led globalization of capitalism has spawned a new era of constant innovation and creative destruction as enduring features of global and local economies. The impact of globalization on employment, nature of work, leisure, income distribution, primary, secondary and tertiary producers, and so on is so unprecedented in human history that those who are at the receiving end of these changes can hardly ever hope to cope with the changes. By the time they make any headway in bridging some aspect of the technology divide, the technology gap has widened to such an unfathomable chasm that makes any such effort a futile exercise in technological catch up. This aspect of globalization's exclusion of the majority of the world's population of more than five billion at the base of the human pyramid has become an unavoidable reality to wrestle with. This exclusion, despite its enormity, could be avoided if economic globalization is made more equitable and inclusive.

### **Technology and Capitalist Expansion**

The process of modernization set off more than two centuries ago in Europe with the onset of a new productive relationship. The ensuing industrial revolution saw the rapid proliferation of industrial, transportation, communication, and military technologies. The conflictive practices of various social actors during this period of rapid socio-economic change centered on such categories as production, consumption, power, and experiences saw the rise of industrial capitalism. The rise of industrial capitalism concomitantly caused a radical shift in the modes of scientific and technological knowledge production, diffusion and utilization. The transformation in the means and modes of production and consumption set off a long wave of innovation clusters around such key technologies as steam engine, electricity, chemicals, electronics, computers, and most recently, the Internet and genetic engineering. The coming of mass industrial society with the onset of modernization was also characterized by the proliferation of nation states as the unit of political economy. The essential features of this stage of social transformation, or what Beck (1992) calls the period of 'first modernity', were controllability, certainty, security, linear progress, and convergence. Technological innovation during this stage was notable for energy intensive production, efficiency of operation, systematization, communication based on bottom-up dynamics, and vertical integration of firms and businesses.

Although most of Asia, Africa and Latin America were under colonial rule, European modernity did not make any serious impact on the social and economic structures of the colonies until after World War II when many former colonies began to gain independence and started to formulate their own development agendas. The modernization project with the infusion of new technologies implemented through different economic development models began in earnest in the former colonies during the 1950s and onwards. The common denominator of the economic development models was modern technology, the rapid infusion of which was expected to materialize through

its transfer from industrialized nations. The modernization project also considered foreign aid in capital and technology as vital for achieving development. The basic assumption of modernization theory is convergence, an important ontological premise of the project that first appeared in Europe during the Enlightenment. That is, the world is on a particular Eurocentric path of economic and social change engendered by the ideals of Enlightenment; the West arrived there first, and the rest is expected to reach there eventually through a process of technological catch up.<sup>1</sup>

It is axiomatic in modernization theory that Third World ('traditional') societies could be transformed through a concerted project of economic development, which can be achieved by changing the means of production (technology) and by transforming and remoulding archaic social structures that lack the wherewithal for technological innovation. It is assumed that changes in the means of production would entail a change in the relations of production. Modernization can, thus, be achieved by adopting the 'right' technology policies by the government. By formulating and implementing the 'right' package of policies, the state and other agents of economic power could induce technological change, where technological is equated to a problem solving activity. This minimalist, though profoundly effective, model can be a useful heuristic to understand technological innovation. However, the economic development and modernization drive of Third World countries stalled and became victim to the contingencies of geo-strategic power struggle between the super-powers after the Second World War and the ensuing Cold War.

The new phase of globalization that set off in the 1990s after the end of the Cold War was qualitatively different from the previous globalizations of the nineteenth century (when colonial capital and certain key technologies like railways and telegraph was introduced in the colonies for territorial conquest and consolidation, primary product extraction and export of cash crops from plantations) and of the sixteenth century when the colonizers began to integrate the colonial outposts with Europe through mercantilist trade relationships.

### **Information Capitalism and Knowledge Economy**

The modernization project characterized variously by such structural and functional categories as industrial capitalism (Marx), rationalization and bureaucratization (Weber), and systemic and functional differentiation (Parsons) underwent a qualitative change towards the end of twentieth century. Industrializing societies began to show structural transformation in their modes of interactive and inter-subjective practices based on the notional possibilities of new technologies and modes of production centred on information and networks (Castells 1996). This structural transformation of industrial societies is variously characterized, but most commonly, as 'post-industrial society' (Bell 1973), or as 'informational capitalism' (Castells 1996). In this new phase of capitalism knowledge became the most important factor of production as opposed to machines, labour, and natural resources, the predominant factors of production of the industrial society (Drucker 1993).<sup>2</sup> The coming of the post-industrial society<sup>3</sup> coincided with the newest phase of economic globalization as well. Flexible

production and free movement of capital on a global scale characterize the so-called 'new economy'.<sup>4</sup> Replacement of industrial capitalism by financial capitalism and the intensification of 'free' trade on a global scale are the other features of globalization.

The new phase of globalization is in certain definite ways different from its previous forms of the sixteenth and nineteenth centuries (UNDP 1999). The new era of globalization is marked by: (i) The emergence of *new markets* which link foreign exchange and capital markets on a global scale operating in real time or selected time, thus eliminating spatial differentials; (ii) Strengthening of *new and old actors* like WTO, IMF and other supra-national entities that exercise authority over national governments of Third World countries; (iii) The rise of MNCs which enjoy greater economic and political power over economically weaker governments where they operate plants but often disregard environmental and labour norms that would often be deemed violations in their home bases; (iv) Enactment of *new rules* such as multilateral agreements on trade, services and intellectual property backed by strong enforcement mechanisms; (v) Proliferation of new technological tools, such as biotechnologies, information and communication technologies that co-ordinate market operations; (vi) The rise of a *network society* marked by structural changes in social morphology of regions connected by the new tools and markets; (vii) The rise of resistance movements, such as NGOs through better articulation of civil society norms; and, (viii) The exclusion of large areas of the world (such as Africa) from the benefits of trade and technological innovation.<sup>5</sup>

There has been a progressive dematerialization and denaturalization of the economy from material-based commodities of industrial and traditional societies to non-material-based commodities in the value chain of informational capitalism (Coyne, 1997; Quah, 1997). While the prices of agricultural and industrial commodities and raw materials have plummeted worldwide, the value of information-based commodities have been rising steadily. Although agricultural products of rich countries (such as the EU bloc nations and United States) are artificially propped by their governments through subsidies and tariff barriers, primary producers in poor countries have lost their livelihoods as the price of their products have crashed after the integration of global markets. While Guatemalan and Columbian coffee farmers get pittance for their coffee beans, the rich countries profit from their toil as evidenced by the proliferation of swank coffee chains like Starbucks all over the rich world. Why is the value chain for the poor producers of the developing world different from the value chain of the multinational companies and their consumers? Why does globalization redefine the value chain of primary producers in modern capitalist modes of production based on their location? Why is that their productive work is not treated as knowledge work while those who are connected to the network of informational capitalism are treated as knowledge-based producers? Unlike the iteration of the capitalist logic in previous instances of technological change, the introduction of ICTs and other modern technological innovations have caused a profound rupture. It is precisely this rupture that makes digital divide such an intractable problem.

The crucial issue facing developing nations, vis-à-vis industrialized nations, is not they are 'up or down', but 'in or out' as Alain Touraine (1991) puts it rightly. The globalization of innovation has made all national economies to face rapid creative

destruction. While untold wealth was created for those connected to globalization, it also spawned the most iniquitous distribution of income and wealth in human history. The average income differential between peasants and manual workers and those we band under the category of ‘intellectual’ workers (teachers, estate managers, physicians, priests) in feudal societies was about 1:100. It was an extremely unequal society with a weak vassal state with real power vested in the hands of the landed feudal lords and the aristocracy. When these feudal societies were transformed by capitalism into industrial societies, the income inequality between the industrial workers involved in manufacturing and those involved in ‘intellectual’ work (the elite professional class comprising managers, physicians, engineers, university teachers) declined considerably. Despite the inequities of the hard times faced by the working class of industrial societies, the Industrial Revolution had a leveling effect on socio-economic and political differences compared to its much more iniquitous agrarian/feudal predecessor. The income differential between the industrial workers and the elite groups was about 1:10.

As industrial societies began to enter the post-industrial stage with the onset of the so-called knowledge-based economy that is being constantly challenged by the creative destructive forces of Schumpeterian innovators, the income differential between those who do physical (‘unskilled’ ) work and those who do mental (‘intellectual’) work became worse than that of feudal societies. We can reasonably argue that the income differential between unskilled and manual workers and the knowledge and symbolic analysts have widened to an astonishing 0:1 ratio, an improbable mathematical ratio. This is precisely what is meant by the claim of either you are ‘in or out’ in the so-called knowledge economy. Although the real number of the wage earned by the unskilled workforce is not exactly zero, one can imagine the income differential between those in the knowledge economy and those who are left out of it to be extremely high. What I content is that the knowledge elites take disproportionate share of the wealth of the global economy of the digital age. This is a clear example of the income inequality bred by the ‘winner-take-all’ (Frank and Cook, 1995) markets of globalization.

| Mode of Production        | Nature of the economy             | Wage for manual/ physical work | Wage for mental/ symbolic work |
|---------------------------|-----------------------------------|--------------------------------|--------------------------------|
| Agrarian/Feudal Economy   | Primary/ extractive               | 1                              | 100                            |
| Industrial Economy        | Secondary/ manufacture            | 1                              | 10                             |
| Knowledge/Service Economy | Tertiary/service/ symbol analysis | 0                              | 1                              |

Table 1. Income differential between ordinary (manual) workers and the elite owner/manager class (mental/symbolic work).

The income differential in the knowledge (digital) economy ironically follows the digital logic of Boolean algebra. This is the prospect that digital divide leaves for those people and nations that are out of the game. While Marx and Engels spoke of the technological innovations of industrial capitalism knocking down the Chinese Walls of 'barbarian' and feudal societies, the information, communications and other technologies of post-industrialism is compelling under the threat of 'extinction' all poor and developing nations to join the bandwagon of globalization. But the result of this forced inclusion is being further marginalization. In order to develop and grow countries need to innovate and creatively use knowledge and technology. But the game has already been won! So how can they enter the knowledge gain and hope to survive?

### **Technology, Knowledge Economy and Digital Divide**

Economic development is not merely a material transformation of communities and nations, but rather a transformation of our state of mind through the efficient creation and use of knowledge. Development is not just an expansion of economic activities and wealth creation; it is a social transformation wrought about through knowledge so as to encourage and urge humans to live in harmony with each other, and most importantly, with their ecosystems. Communities and societies that innovate and respond to changes dictated by market forces of modern capitalism from within and without are best prepared to become part of a global network society where knowledge networking is the axial principle of the morphology of societal formation as well as economic production and consumption activities. This is the harsh reality of globalization that all nations have to contend with in order to survive.

How do nations develop and individuals acquire wealth in capitalist mode of production and exchange? Economists from classical period to modern times, of all ideological persuasions, have struggled to understand how productivity growth (key to income generation and wealth) actually happened. Smith, Ricardo, Marx and others provided the classical explanation on economic growth and wealth accumulation. The basic assumption was that output (Q) is a function of capital (K), labour (L), and natural resources (N), especially land.<sup>6</sup> All economists put a caveat, that is, factors of production are subject to diminishing returns to scale and thus a limit to growth based on their Newtonian view of the world seen through the prism of the entropy law (second law of thermodynamics). The dismal science also forecast an eventual leveling of growth due to the depletion of natural resources and the expansion of human populations. This neo-Malthusian scenario was what gave impetus to such famous studies as the 'Limits to Growth' project sponsored by the Club of Rome (Meadows, et al. 1972).

The most efficient way of combination of factors of production (inputs) is also subject to the level of technological change achievable based on advances in science and technology. However, economists' interest in productivity growth waned until the mid-twentieth century when neoclassical economists Robert Solow, Moses Abramovitz, Edward Denison, John Kendrick and others began to propose empirically based explanations. Solow's production function model, by far, provided the most striking explanation of productivity growth. The old notion that it was the deepening of capital

and labour in the production function that increased productivity increase a thorny issue because of diminishing returns to scale, among other realities of economics. Solow found out that more than three-quarters of increase in productivity increase per labour-hour was due to an unknown factor, a 'residual', which he aptly called technical change. Abramovitz called this residual a 'measure of ignorance' on the part of economists. We now know that this 'residual' is nothing other than technological progress and new forms of knowledge derived through innovation. In short, innovation accounts for most of the productivity growth that could not be accounted for by increases in capital and labour.

Long before these neoclassical economists empirically explained the hidden logic of productivity growth and wealth creation, Joseph Schumpeter had challenged the classical economists' notion that economic development occurs when existing factors of production are optimized within a stable environment. The idea that external intrusion in the economy should be avoided by all means was shattered when Schumpeter argued that it was the innovating entrepreneurs who disrupted the economic equilibrium through technological innovation that actually brought about economic growth and development. Schumpeter's idea of 'business cycles' and Kondratieff's idea of 'long waves' of economic activity leading to clustering of innovations, and subsequently, the various models of innovation propounded by others, have enriched the study of how the application of science and technology could alleviate poverty.

It has now become axiomatic that the ability to innovate recursively and recurrently are the key to technological growth and the expansion of economic opportunities for individuals and communities. Innovation has become the new mantra of development experts and nations. S&T analysts and policy makers are united on the point that creating a proper environment for successful innovation is central to policies for alleviating poverty through the expansion of economic opportunities. But what constitutes innovation and how to create the environment conducive to innovate? It is more or less agreed that knowledge is crucial to successful innovation, because technology is driven by knowledge—both science-based as well as traditional technologies. Knowledge is a cumulative resource that does not diminish when others use it. In fact, it increases as we use it more efficiently and effectively. Discovery of new ideas and ways of doing things to solve problems enhance the capability of a community or nation to grow economically and socially. This self-reinforcing capacity of a society to create, disseminate and share knowledge as a public good reaches a critical mass to propel it from being a subsistence economy to a self-sufficient modern economy that is capable of generating and exporting knowledge-based products and services. Thus all poor countries need massive support from within and more so from without to achieve the capacity to innovate and create the technological knowledge for sustainable development.

Knowledge is critical for alleviating poverty because it is the basis for capacity building to establish innovation as a basic facet all societies. Innovation could be the creation of radically new or better products and processes. It could be the substitution of a cheaper material in an existing product, a cheaper way of producing it, better marketing or supporting the product or service. It could simply be a value adding process.

Nonetheless, innovation is not imitation. It is adaptation of an idea or inventive activities into new and more efficient products or processes. Innovation is about creating knowledge systems. Although creativity plays an important role in promoting innovative activities, the easy availability of information, in essence, knowledge, is the critical factor. Since knowledge creation or transfer involves costs, availability of proprietary knowledge as almost all useful knowledge is being enclosed through intellectual property rights statutes is ostensibly the most difficult issue for poor countries to deal with in order to develop.

Now that knowledge has become the critical factor of production, surpassing the other three factors, land, labour and capital, knowledge should be treated as the key to well-being and alleviation of poverty. Rich nations create most of the knowledge and hence are the repository of almost all innovative activities. They have the resources to invest in S&T education, R&D activities, and the infrastructure to create more knowledge, while the poor nations are falling behind at an appalling pace as they lack these resources that are critical for creating knowledge. As the rich nations create more income from new waves of innovation, they are creating more jobs and opportunities and, consequently, more wealth. As innovations yield increased returns to scale, the gap between those nations and regions that are able to innovate and those that are not able to innovate is widening at an alarming pace. This is the grim reality of the real digital divide.

The critical development problem facing poor nations is to bridge the knowledge gap between the rich and poor nations. This knowledge gap was the critical factor that divided the industrialized and poor nations. The knowledge divide that was there in the first place facilitated the 'unequal exchange' between the advanced capitalist nations and the developing countries. The knowledge gap could be in various forms—information gap, digital divide, social exclusion, technological exclusion and cultural exclusion as the process of globalization has accelerated in recent times. According to Jeffrey Sachs, today's world is divided not by ideology, but by technology—a world of technology haves and have-nots. A small part of the globe, perhaps some 15 percent of the global population, accounts for nearly all of the world's technology innovations. A large part of the globe is technologically backward or excluded, neither being able to innovate nor able to adopt and adapt new technologies.

If they had the knowledge and technological wherewithal to innovate, they could add value to their commodities and earn that instead of depending on exporting these unprocessed. In order to be able to innovate they need to invest in human capital as well as physical capital. But being trapped in the widening technology and knowledge chasm, how poor nations can ever hope to catch up with the rich nations as they move forward at ever-increasing pace? This is the conundrum that digital divide poses.

## **Conclusions**

The neo-liberal view that modern capitalism and western liberal democracy have triumphed over other competing ideologies marking the end of history as the conflictive

record of modern humans is often characterized as economic globalization—the endgame of this purported dialectical confrontation. Whatever the ideological genesis of globalization, advances in ICTs have made possible an unprecedented degree of financial, economic and cultural integration and economic wealth creation for the winners of globalization. No doubt ICTs are transforming modes of economic production and societal structures into what Castells calls network societies. One's very identity is defined with respect to information society by being either one is part of the Net (on-line) or not, or whether one is in or out of the globalization game. The claim that the coming knowledge-based economies creates only win-win situation for all is not borne out by the realities of income and wealth distribution in the world.

Digital divide cannot be understood and analyzed without a proper accounting of the context within which ICTs evolve. The profound transformation of industrial economies as a result of technological change wrought about by ICTs and the rise of informational capitalism has to be taken as the context within which digital divide evolved. Digital divide should be looked at as a qualitatively and quantitatively different form of technological exclusion or divide that afflicted nations and social groups than characterizing the issue unreflexively as unequal accessibility to the Internet.

Peter Drahos (1995) draws an uneasy parallel between pre-industrial feudal economies (and societies of which they are part) and the post-industrial information age (digital) economies. Drahos draws the conclusion based on the speed with which knowledge has become private property in the information age. The ability of large corporations to enclose knowledge commons as private property is reminiscent of feudal societies. With forced deregulation of almost all sectors of the economy, most states have been coerced to cede their sovereignty to the private sector players such as multinational corporations. As a result, the capacity of the state to provide welfare measures to its citizens has severely eroded, a situation similar to feudalism where a weak state did not or could not alleviate the woes of feudal serfs. The rise of the private sphere, whether it is made up of MNCs, politicians, elites and their private networks, has severely eroded the public sphere in the information age, a situation detrimental to participative democracy, equity, and social welfare. These concepts had a powerful meaning in industrial democracies. The privatized economy and polity in the knowledge-based economy of globalization attempt to jettison these social democratic norms that were fought hard to establish earlier. Neo-liberal globalization is evolving based on Margaret Thatcher's famous (or notorious) declaration that 'there is no such thing as society; there are only individual men and women and their families'.<sup>7</sup> Digital divide as a socio-technologically complex issue gains special significance because of the transformation of the political economic context within which the digital economy has been evolving.

**Endnotes:**

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<sup>1</sup> This meta-model of modernization and the ensuing universalist narrative of progress is under attack from postcolonial and postmodern theorists of development and change. For a discursive excursus of the modernization project of 'development' as an excuse for normalizing the Third World, see Arturo Escobar (1995).

<sup>2</sup> Of course capital, labour, and natural resource were the predominant factors in classical economics. Neoclassical economics dismissed natural resource (land) because of its perceived lack of marginal value in the production function.

<sup>3</sup> Other analysts characterize the age as post-Marxist, or post-capitalist, or post-modern, or post-Fordist.

<sup>4</sup> The neo-liberal position on globalization professes the free movement of all factors of production. But the free movement of labour is, ironically, not a reality yet for obvious reasons.

<sup>5</sup> More detailed exposition of these characteristics of contemporary globalization can be found in UNDP (1999), Castells (1996), and Held, et al. (1999).

<sup>6</sup>  $Q = f(K,L,N)$ . Output is determined by the efficiently combining the inputs.

<sup>7</sup> Quoted in Urry (1999: 5).