

# Interface between Globalization and Technology

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**Abstract** - Globalization and technology are two sides of the same coin (Qadri, Bhat & Jamal, 2018). They are complementary and a good interface between the two is sine-qua-non for growth and development in the contemporary global village. For Domar (1957, as cited by Solow, 2000) investment has a dual role. On the one hand, it generates income and on the other hand, it increases the productive capacity in an economy. In the same manner, the modern economy has a dual role. On the one hand, it promotes globalization and on the other hand, it promotes the technology. Globalization and technology are not devils at all. There is no good or bad globalization. In the same manner, there is no good or bad technology. Good or bad discourse arises due to good or bad interface between the two. The present paper argues that the good interface between globalization and technology will generate the 'globalization of novelty' which is nothing but the 'globalization of technological innovations' (Archibugi&Iammarino, 2002) and it will definitely be the connecting link between 'globalization' and 'economics of knowledge' (Archibugi&Iammarino, 2002). Further, the present paper argues that there is a two-way causal relationship or bi-way causality between globalization and technology (Chareonwongsak, 2002). Technology is both strength as well as the weakness of globalization. If it is not in tune with globalization then it becomes its weakness instead of strength and vice versa. Since globalization is beyond what we are seen and observed (Chareonwongsak, 2002, Bhattacharya, Bürkner and Bijapurkar, 2016) the present paper argues that 'globalization of novelty' (author's own term) or 'globalization of technological innovations' is achieved only and only if we understand the reality of economics of knowledge and ideas. That is to say that a good interface between globalization and technology is a matter of sound understanding of the economics of knowledge and ideas. The need of the hour is to understand the economics of knowledge and ideas so as to understand the interface between globalization and technology. The economic inequalities we realize today is a result of how we manage globalization and technology (Reeves and Harnoss, 2016). For reducing economic inequalities and achieving a fair distribution of income, output, and employment in an economy it is essential to realize a good interface between globalization and technology. Therefore, in order to realize a good interface or interaction, the present paper suggests some ways and means which has a policy and future implication.

**Keywords:** Globalization, Technology, Liaison, Globalization of Novelty, The Law of Diminishing Returns

## I. INTRODUCTION

Globalization is an unending process and not in retreat at all (Roy MacLaren, 1998; Bhattacharya, Bürkner and Bijapurkar, 2016; Samuelson, 2013; Greg, 2008). Both

globalization and technology (Solow, 1956; Arrow, 1962) are drivers to growth and development (Dahlman, 2006; Lee and Vivarelli, 2006). The good liaison (connection) between the two fosters growth and development of an economy but the bad liaison hampers the growth and development process. The combined backwash effects of globalization and technology outnumber their combined spread effects only when there are a bad interaction and mismanagement between globalization and technology. The spillover effects of the technology and the sedentary backwash effects of globalization maintain the proper interaction between the globalization and technology at the global level (Qadri, Bhat& Jamal, 2018).

As technology expands globalization also expands which can be reflected well in greater diffusion at a domestic and international level on one hand and at a social level on the other hand as both globalization and technology shape society, lead towards rapid progress, diversification, and standardization at large scale (Chareonwongsak, 2002).

Globalization is highly correlated with technology. It encompasses a sequence of technological development works and innovations in the form of physical, human, and social capital services, including Information and Communication Technology services so as to bring positive changes in the economy, improve standard of living, quality of life and skills of its citizens, and develop the knowledge base of the economy. The role of globalization and technology cannot be neglected as far as growth and development of a nation is concerned. In the entire process of growth and development of globalization and technology, the state plays the main role.

Good infrastructure is essential for development, and that comprehensive and rigorous e-resources responsive to the needs of the people are the basis for quality Research and Development (R &D). Poor connection between globalization and technology on the one hand and economy and technology on other hand is the common characteristic of an underdeveloped economy and it misleads the path of growth and development and has an inconsistent bearing on the economy in general and the knowledge of the society in particular. Hence, under-developed nations must develop strategies and policies to develop the good connection between globalization and technology so as to build the knowledge base of the society and improve income, employment, and output levels.

## II. METHODOLOGY

Many decades of hard work have been deployed in the attempt to quantify the importance of globalization and technology connection. Sadly, no consensus has been reached so far because hardly any researcher tried to investigate the real forces which promote and maintain an efficacious globalization and technology relationship. The present paper tries to identify these forces from the existing literature and quantifies them in the subjective terms. In this way, the present paper proposes a conceptual framework integrating globalization and technology, and tries to access the intended beneficial impacts which can be obtained through the effective implementation of globalization and technology. An important limitation of the subsequent analysis is that it ignores the actual evaluation of globalization and technology interface and simply concentrate on the appraisal of globalization and technology interface. The actual evaluation of globalization and technology interface is very difficult to assess in a theoretical paper like ours.

## III. LITERATURE REVIEW

In order to fulfill the objectives of our study, the literature review is divided into two parts. The first part is examining the definitions of globalization and technology in order to understand it comprehensively so as to get insights into the interface between the two while the second part of the literature review is examining the existing literature which deals with the debate whether globalization and technology are drivers of growth and development or not? Furthermore, it investigates the prevailing literature on the interface between globalization and technology so as to suggest ways and means to improve such interface.

### A. Understanding Globalization and Technology

Although globalization term was coined in 1980 (Kar& Roy, 2015) but as a process, it made an entry in the English linguistics in 1959 and came in dictionary two years later (Schreiter, 1997; Webster, 1961) and globalization maxims began to flow in the 1980s (Robertson, 1983). For Albrow and King (1990) Globalisation include all such processes by which the folks of the world are assimilated into a single global society. According to Giddens (1990), globalization is the strengthening of all-inclusive social relations that connect distant vicinities in such a manner that local accomplishments are moulded by global accomplishments. Cox (1994) defines globalization in terms of internationalization, of production, of the division of labour, South-North migration, a new race that breeds such processes, and the international relations, making states active players of the global world. Globalisation simultaneously has two expressions. In the former varied cultures get assimilated and integrated into a dominant culture which in the long run shelters the whole world. The latter highlights the compression of cultures (Featherstone, 1995) which Appadurai (1996) calls the process of cultural mixing or hybridization across locations and individualities.

Currie and Newson (1998) define globalization as a material set of practices drawn from the commercial world mixed with a neo-liberal market thought.

On the other hand, the usage of the term “technology” has undergone drastic change over 2 centuries. Prior to 20th century, the term was unusual in English which either meant the study of the art & skill (Henry George & Robert, 1980) that is useful in some manner or education which is technical, as in the Massachusetts Institute of Technology (Loretta & Adams, 2005). The term “technology” gained momentum in the 20th century in connexion with the Industrial Revolution-II and the meaning of term technology changed in the first quarter of the 20<sup>th</sup> century. The efforts of American social scientists including Thorstein Veblen (Technological determinism, as cited by Bruce, 1990) culminated in translations of the German notion of Technik into “technology”. By the 1930s, “technology” was recognized as an art in itself and not just portrayal of art.

“Technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them”, (Bain, 1937). For Franklin (1999) it is “practice, the way we do things around here.” In the very recent past, the concept of technology was further extended to various facets of instrumental reason (Foucault’s ‘technologies of the self’ as cited by Schrift, 2006). Stiegler (1998) outlines technology in two ways: as “the pursuit of life by means other than life,” and as “organized inorganic matter.” Technology can be seen as an activity that formulates or changes the culture (Albert, 2006).

### B. Interface between Globalization and Technology

Moore’s (1965) Law, “computer power doubles every 18 to 24 months” depicts the truth that the slope of technology is increasing at an increasing rate. The globalization outcome is that technology will revolve around a few big businesses houses and many small businesses houses that will compete by recognizing and quickly adjusting themselves to niche markets and developing specialized technologies. The good tuning of globalization and technology can produce good results while as bad tuning can produce catastrophic results to the society. All this depends upon the ability and way we handle technological changes and advancements (Chareonwongsak, 2002).

In case of realizing the cause and effect relation between globalization and technology, some say technology is a cause and globalization being the effect (Kar& Roy, 2015) while as some say that technology is the effect and globalization being the cause (globalization and technology, internationalrelations.org). However, the present paper argues that there is a by-way relationship between the two or a two-way causation between the two (Chareonwongsak, 2002). Technology plays a vital role in bringing globalization. The innovations made the transmission and dispersion of technology possible, thereby making the

economics of knowledge possible with a multiplier effect on ideas, skills, and knowledge as they increase at an unprecedented rate thus, making the world shrink and pinging globalization.

In the recent past, the debate over whether technology and globalization increase inequality or not has caught the eye of researchers and to understand it Dervis&Chandy (2016) made three distinctions which are very useful. Firstly, we need to distinguish global inequality and its two offshoots- within the country inequality and between the country inequalities. Secondly, we need to distinguish between North-South inequality (inequality between developed and developing countries). Thirdly, we need to distinguish between market income and disposable income ( $Y_D=Y-T$ ). The economic inequalities we see today results from the way we are able to manage the globalization and technology (Reeves and Harnoss, 2016). The present paper also supports the same argument. If we fail to coordinate globalization and technology in a better manner, inequalities at all levels and of all types are likely to increase and vice versa.

### C. Research Gap

No doubt, the distinctions in inequalities set by Dervis&Chandy (2016) are essential to understanding the globalization- technology liaison (connection). But this is not the end in itself for the higher end being understanding the actual dynamics of inter-relationship between globalization and technology. The understanding of this relationship between the two will help us to ascertain whether globalization and technology can be held responsible for creating inequalities or not. The present study attempts to analyze the arguments against (i.e. increasing inequalities) or arguments in favour (decreasing inequalities) of global-techno-global (novel relationship) relationship through the respective backwash and spread effects of globalization and technology. Due to spread and backwash effects<sup>1</sup> and management of globalization and technology (bad or good management), 'globalization of novelty' at times may be subject to diminishing returns or increasing returns to scale as the case may be. Even though the existing literature talks about inequalities generated by globalization and technology (Reeves and Harnoss, 2016, World Bank, 2000) but no study, as such, till date relates the interface between globalization and technology or globalization or technology with returns to scale the way present study did. Moreover, the existing literature finds very limited mention of spread and backwash effects with regard to globalization and technology link (Qadri, Bhat& Jamal, 2018).

## IV. GLOBALIZATION AND TECHNOLOGY LIAISON

Both technology and globalization are inter-linked. The growth of one escalates the growth of other (Reeves and Harnoss, 2016; Bhattacharya, Bürkner and Bijapurkar, 2016; World Bank, 2000; Samuelson, 2013; Jaumotte *et al.*,

2008; Lee, 2014; Singh and Dhumale, 2000). This inter-relationship between technology and globalization is timeworn and threadbare. However, this inter-relationship with the passage of time took a U-turn. Initially, globalization was dominant and widespread as compared to the technology transfer. In other words, initially, technology transfer was globalization driven, implying that technology spread as and when globalization used to take place. Because in the past, the decision of importing the technology was largely determined by the waves of globalization. This initial phase of inter-relationship between technology and globalization may be rightly called as a global-techno phase as only globalization was causing technology and not vice-versa (one-way causality). But in modern times, technology transfer and globalization are equally dominant (Qadri, Bhat& Jamal, 2018) and widespread. In other words, in the contemporary times, globalization is technology driven and technology transfer is globalization driven, implying that globalization spreads as and when technology transfer takes place and technology spreads as and when globalization takes place (new phase of globalization/the new globalization-going beyond the rhetoric as cited by Bhattacharya, Bürkner and Bijapurkar, 2016). "The rise in the digital interconnectedness of consumers, devices, and machines is creating market segments that transcend country boundaries" (Bhattacharya, Bürkner and Bijapurkar, 2016). Because in modern times, the decision of importing the technology is not only determined by the waves of globalization but equally by innovations in technology (Chareonwongsak, 2002). This current phase of inter-relationship between globalization and technology may rightly be called as 'global-techno-global' or 'techno-global-techno' phase of inter-relationship or simply 'globalization of novelty' as globalization is causing technology and innovations in technology are causing globalization (by-way causality). This present phase of novelty has generated a wave of consumerism and as a result has become dynamic as well as multi-dimensional process (Grebosz&Hak, 2015).

Rational expectations (Sargent and Wallace, 1975) of the countries play a significant role in establishing the present phase of the novel relationship between technology and globalization. Rational expectations on the part of countries were largely absent in the past global-techno relationship (old globalization as cited by Qadri, Bhat& Jamal, 2018). The incorporation of rational expectations on the part of countries has changed the context of globalization as well as of technology transfer (new globalization, as cited by Qadri, Bhat& Jamal, 2018).

In modern times, both technology and globalization are creating the supply and demand for goods and services as well as supply and demand for labour and accordingly the globalization of novelty and technology (Kar& Roy, 2015) is an essential phenomenon of present times. But the present gauged globalization (Qadri, Bhat& Jamal, 2018) and the improved and intensive use of technology has changed their role and significance in the development process. Nowadays

novelty between globalization and technology is also subject to 'increasing returns' or 'decreasing returns to scale' (Marshall, 1890) like agriculture, industry etc. except the service sector. Complementarity is a situation where increased production of one good or service builds up demand for the second good or service. The service sector is perhaps the only sector of the economy where the employment of technology creates complementarity of resources (Big push theory as cited by Myint, 1969; unbalanced growth strategy, Hirschman, 1969) itself needed for development i.e. the employment of technology in this sector always displays increasing returns to scale. In present times technology imported by way of globalization is intensively applied in manufacturing and agriculture sector which fail to create complementarity of resources, as a result, they are subjected to diminishing returns to scale. Furthermore, this intensive application of technology in manufacturing and agriculture sector and that too in an unorganized way has led to the mismanagement between technology and globalization or bad interface between the two. Technology suitable for one sector is applied to another sector and remains confined in that sector for a long period of time. This has accelerated the bad interface and mismanagement between the two. To illustrate let us suppose that country X imports technology from country Y by way of globalization and suppose that this imported technology is suitable for many activities and many regions depending upon the availability of resources. Both globalization and technology have their respective backwash and spread effects (Qadri, Bhat& Jamal, 2018). The operation of their respective backwash and spread effects depend largely upon the management of globalization and technology (globalization-technology liaison). If the importing country X uses this imported technology in a few selected activities and regions and in addition fails to develop its prototypes with the passage of time, then the combined backwash effects of both globalization and technology outweigh their combined spread effects and the result increases in inequalities, both within the country inequality and between the countries inequality. This fact highlights that novelty relationship between technology and globalization is subject to diminishing returns to scale, by their mismanagement, as it involves the development of some fields and regions at the cost of others and final outcome in actual practice tends to zero. When this lop-sided development takes place, the lagged regions lack the motivation to proceed forward and "if the motivation of any region to develop is already zero, multiplying zero by anything still equals zero". On the other hand, if the importing country X uses this imported technology in all fields and regions in which it is suitable, depending upon the availability of resources and in addition succeeds in developing its better prototypes with the passage of time, then the combined spread effects of both globalization and technology outweigh their combined backwash effects and the outcome is decreased inequalities, both within the country inequality and between the countries inequality. This fact highlights that novelty relationship between technology and globalization is subject

to increasing returns to scale, by their proper management as it involves the development of all regions at par with each other and therefore, by this proper management, the final outcome never tends to zero in actual practice. When all regions proceed at the same rate, then regions show great zeal and motivation to proceed and "if the motivation of all regions to develop is already high, adding zero to anything (except zero itself) never equals zero". The whole assertion shows that effective and proper management between globalization and technology (good interface between the two) can serve as an effective guideline for nations to proceed on the path of productive growth and development.

If the technology transfer is supposed to remain fixed by supposing that no globalization is taking place, then supporting of large growth will depend upon the rate at which the resources of the country are increasing and demand for labour is increasing. And if the resources of the country are supposed to remain fixed in the sense that they are scarce (Robbins, 1935) and suppose that globalization is taking place, then the comforts of the country and its regions depend upon the rate at which technology is effectively used. So, we are recognizing the fact of changing growth either due to a change in resources (but not followed by globalization) or due to change in technology (followed by globalization). But this recognition of the fact of changing growth due to change in technology and globalization is the ultimate result of proper coordination and cooperation between globalization and technology in modern competitive world as this proper coordination and management of globalization and technology ultimately leads to effective utilization of widespread resources and hence in all-round development (Reeves and Harnoss, 2016).

Technology innovations and technology transfer pervade the entire globalization, that is, technology innovations and transfers are made at all levels of globalization. Globalization is a structure of technological innovations and transfers. Globalization can be equated with technological innovations and transfers as every aspect of globalization revolves around technological innovations and transfers and vice-versa. Besides, backwash and spread effects of globalization and technology, 'maximizing principle' and 'incrementalism principle' are two other factors which determine the manner of the relationship between technology and globalization. In practice, at the global level countries display both the rational behaviour (i.e. apply maximizing principle) and incrementalism principle (i.e. virtual continuation of previous activities with minor modifications) to integrate globalization and technology and to get greater benefits from them. But the maximizing principle gets a greater share of attention of countries than the incrementalism principle. This phenomenon may be called "Gresham's law of maximization". It implies that at the global level maximizing principle drives out incrementalism principle in the management of globalization and technology. As a result, countries get higher benefits from globalization and technology and

hence there is a decrease in inequalities between the countries. At the national level, countries apply “Gresham’s law of maximization” in the case of developed regions and as a result, they get greater benefits from globalization and technology. But in the case of underdeveloped regions, countries devote a greater share of attention to incrementalism than maximizing principle. This phenomenon may be called as “Gresham’s law of incrementalism”. It implies that in the case of backward regions, at the national level, incrementalism principle drives out maximizing principle in the management of globalization and technology. As a result, these backward regions of the countries get lower benefits from globalization and technology and hence there is an increase in the inequalities within the country.

## V. RECOMMENDATIONS

1. The globalization and technology liaison (connection) demand such policies that integrate science, technology, research & development (R&D) and innovation into socially suitable economic schemes & strategies.
2. Globalization and technology supplement as well as aids the growth and development process of the country as it adds to the country’s scarce and fixed resources. But, the need of the hour is that globalization and the resultant technology transfer should not remain confined to a particular sector and resource abundant regions rather should spread across all sectors and the whole country. This will result in better management and coordination between globalization and technology and will make benefits and costs of globalization and technology quite visible.
3. Proper management of globalization and technology is like managing a mouse in the herd of elephants. However, employment of technology in those sectors which are able to create complementary of resources might help in proper management of the two.
4. The poor interface of globalization and technology in the world has led to an unequal competition- a competition between giant countries/regions, where resources are properly managed, and dwarf countries/regions, where resources are not properly managed. Therefore, proper management of globalization and technology leads to the cohesiveness of the country. And the creation of this cohesiveness requires the creation of deliberate structural economic disparities (i.e. deliberately selecting some places in the backward regions for the development) as this will be of worth for the development of these places in the backward regions will send impulses of economic and industrial growth throughout the country by trickle-down effect.
5. The planners need to create conditions that will enable developing countries to make full use of the global fund of knowledge to address different developmental challenges.
6. The creation of this cohesiveness requires multi-level planning and management of globalization and

technology. No doubt, the government plays a dominant role in the multi-level planning and management of globalization and technology in particular and society in general, but more viable management between globalization and technology need is of the hour.

7. Both at international and national levels, the principle of maximization and principle of incrementalism should be employed and integrated in an effective manner.
8. Globalization and Technology construction/link is important not only for economic growth, the creation of knowledge-based societies and technological innovations in important sectors of the economy but also for increasing labour (Y/L) and capital productivity(Y/K), human capital formation and reducing income disparities. What assets, technology, human capital, social capital, ideas, values and social duties can we support within the framework of globalization? What standards and designs can we generate within its walls? Once we explore such questions and try to find answers to them we can create good link between globalization and technology.

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