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Making Sense of the state-Industrialization Nexus: Some Lessons from the Historical Role of the State for 4IR in East Africa

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Correspondence
Author: Ashiraf Mugalula

Ashiraf Mugalula

- Research Fellow, Makerere University |Al-Mustafa Islamic College

***Related declarations are provided in the final section of this article.*

Abstract

This paper examines the historical relationship between the state and industrialisation and draws lessons for understanding the prospects of the Fourth Industrial Revolution (4IR) in East Africa. It argues that successful late industrialisation has historically depended on an active, capable, and autonomous state rather than reliance on market forces alone. By revisiting earlier industrial revolutions and comparative experiences from Europe, East Asia, and Latin America, the study demonstrates that state leadership, institutional capacity, and politically guided industrial policies have been central to technological transformation and economic development. The paper contends that the 4IR—characterised by artificial intelligence, digitalisation, robotics, and the integration of physical, digital, and biological systems—offers significant opportunities for developing countries, but these opportunities can only be realised through deliberate state intervention, strategic regulation, and investment in human capital development. Particular emphasis is placed on education reform, technological learning, infrastructure development, and selective industrial policy as key drivers for participation in the knowledge-based global economy. The study further highlights risks associated with neoliberal policy prescriptions, weak institutional capacity, and unequal access to technology, including gender and class inequalities that may reproduce exclusion in the digital age. It concludes that East African countries must reform state structures, depoliticise industrial policy, and cultivate visionary political and bureaucratic leadership capable of aligning technological transformation with long-term national industrialisation goals.

Keywords : Fourth Industrial Revolution (4IR); State-led industrialisation; Developmental state; East Africa; Industrial policy; Human capital development.

Introduction

The world has experienced numerous industrial revolutions across time and space. Yet, on the off chance that we are to make industrialisation conceivable particularly for countries in the developing world, we need to understand the role played by the state in this process. This paper is about the connection between the state and late industrialisation. It tries to comprehend the extent to which the significance of the state promotes industrialisation. The paper argues for appreciating the role of the state in shaping the process of late industrialisation if we are to make sense of the potentials offered by the fourth industrial revolution especially for countries of the developing world. What lies ahead of the 4IR prospective countries is to ensure that the state is reformed—its orientation, composition, nature and form—in order to allow political and bureaucratic leadership to think beyond individual/group interests and interests of capital [especially international capital] to focusing on the broader goal and vision of industrialisation. I suggest this because the policies and decision taken by the state are shaped by the interests of the political elites. Through drawing lessons from the previous industrial experiences and revolutions, the paper tries to make sense of the opportunities offered by the fourth industrial revolution for East African countries and how the state can facilitate tapping into them. The paper argues that we need not be blind to history and so to the previous industrial revolutions for they influence the recent and current ones a great deal. The strategies used may be so much relevant in trying to study the fourth industrial revolutions and offering lessons on how best to go about it for the various contexts both geographical, political, economic, technological and social.

Conceptualizing the fourth industrial revolution: A snap shot.

The fourth industrial revolution is on the door steps of countries of the world, with numerous potentials for "promoting growth and development" if the opportunities it comes along with are tapped into in ways that benefit the industrial process of particular countries and regions. The first person to declare the 4IR, Prof. Schwab (2016), tried to theorise what the fourth industrial revolution is and ought to be and what has to be done. He reveals the revolution at our hands and depicts the ways in which the world is undergoing a transformation that is impacting on the ways people live, work, interact and experience the world. Lee et al. (2018) has argued that the current revolution refers to the "development, deployment, and exploitation of holistic smart systems that integrate technology, humanity, and biology" to deal with challenges affecting the world both new and old, socio-economic, environmental and political. To this end, it becomes clear that the fourth industrial revolution is different from the previous three revolutions but it builds on them most especially the third industrial revolution technologies. In fact, if the second industrial revolution was to the first, then it is fair to conclude that the fourth is to the third. Schwab (2016) notes that in this revolution, what we are facing is a triple dimension of the physical, digital and biological world which will only work to the effect of disciplines, economics and industries.

All industrial revolutions have had some drivers which aided their success. If the first industrial revolution materialised through the use of water and steam power as a means of production, then the second was aided by the use of new sources of energy, gas and oil as a

basis for production. The article by Delloite Global and Global Business Coalition (2018) show that if the first put emphasis on manufacturing then the second put emphasis on mass production with the former relying on steam power putting emphasis on industrialisation and urbanisation then the latter on widespread adoption of the early technology [including telegraphs, transportation and communication] together with assembly lines (2018: 8). The third industrial revolution came with electronics and information technology together with automation production while the fourth is said to be building on this very development. Delloite Global and Global Business Coalition (2018) state that the third saw the development of internet technology, renewable energy and information and communication technology. However, the fourth is said to be constituted of robotics, artificial intelligence, internet of things, digitalisation and automation (Ibid.: 8). It is argued that the fourth industrial revolution is going to change the way of life of society and people through the aid of internet, virtual reality, artificial intelligence and robotics. For Lee et al., the revolution represents "a paradigm shift with a new wave of innovations characterized by the digitization of business, society, and our lives" (Lee et al.: 4). There is huge potential of transforming how organisations and institutions conduct business, operate their productions, affect society, make ecological footprints and how people live their lives (Ibid.). This I suppose is evident given the way people are over obsessed with the internet and together with its penetration. Schwab makes it very clear that some people in the academic sphere consider what is happening as still being part of the third industrial revolution but he has three reasons to characterise it as the fourth industrial revolution i.e. Velocity/speed, breadth/scope and depth/penetration/complexity, and systems impact. The explanation he gives to show how the fourth industrial revolution isn't actually the third is that:

> contrary to the previous industrial revolutions, this one is evolving at an exponential rather than linear pace. This is the result of the multifaceted, deeply interconnected world we live in and the fact that new technology begets newer and ever more capable technology…*secondly,* it builds on the digital revolution and combines multiple technologies that are leading to unprecedented paradigm shifts in the economy, business, society, and individually. It is not only changing the "what" and the "how" of doing things but also "who" we are… *and finally* it involves the transformation of entire systems, across (and within) countries, companies, industries and society as a whole (Schwab, 2016: 8)

With these technologies, irrespective of one's geographical location in the world, it becomes clear that all people will be able to participate in the revolution provided they have the infrastructure and the necessary skills thus pointing to the highest level of global interconnection.

The emergency of the fourth industrial revolution is claimed to come with opportunities which can be harnessed to the benefit of countries which can engage. However, for the case of developing countries, these may turn out to be disruptions, it has been argued (see e.g. Schwab, 2016). As is typical of technological breakpoint moment and developmental paradigm shifts, the 4IR could bring in risks. Schwab is concerned with the possibility of organisations and institutions being unable and unwilling to adjust to the new technologies.

Similarly, he is concerned with the possibility of governments being unable to offer appropriate regulations over these technologies in a necessary way coupled with the levels of insecurities and growing inequalities. In other words, much as opportunities are envisaged, these technologies are said to propagate a lot of threats, challenges and disruption in equal measure, especially in countries that will not have "adequately prepared for it". His illustration is that the increase in automation say, computers and machines, can possibly lead to replacement of workers across a range of industries. I find this interesting but if we read from history of the previous revolutions, we can see that almost if not all revolutions have started with generating massive inequalities but also political, socio-economic and institutional vicissitudes.

Putting the state into perspective: Historical significance to the process of late industrialization

When you read the work of Alexander Gerschenkron, it becomes clear that states have the potential to push industrialisation forward in countries which are considered "backward" (Gerschenkron, 1962). This is based on the experiences of countries like Russia where there were less entrepreneurs and less banks to offer capital to start off and/or run industrial growth and the state had to step in. In Russia for instance, the state stepped in as the chief investor in industry simply because the financial system was weak thus playing a triple role i.e. as the state, entrepreneur and banker (1962: 19*ff*). Industrialisation I will argue can be and has been promoted by a strong, visionary and committed state. Industrial development across the vast majority of the industrialised world in the industrial revolution thrived basically by the massive reliance on state intervention. The engine to industrial growth i.e. domestic supplies and technological change were facilitated by a strong state (See For example Neumann, 2013; Amsden, 1989; Baer, 2008; Rodrick, 1995; etc.). This was common across industrialisations in Europe, America, Asia and some parts of Africa. When we think of the state, we need to think of what shapes it decision when it comes to industrial policy. Robinson (2009) shows that industrial policies are actually determined by the underlying power structures within a state and such power structures can be attributed to the historical processes which can be traced back to the colonial period. For Robinson, the effectiveness of any policy is predestined to be in the interests of the power elites who man the state and its bureaucratic institutions. Therefore, to understand the process of industrialisation and how it can be effective, then one needs to pay attention to the political economy factors and more precisely the political equilibrium which work to determine the outcomes of the policies. Simply put, policy choices and strategies of development and so industrialisation are determined by the political interests within the state. The strategies which are pursued and the way in which these are implemented by the state rely mostly on the choices made by the state elites determined and motivated politically.

We do not have to consider the state just as an actor but also as a set of institutions that exhibit continuity over time and so understanding why some states pursue the policies they undertake calls for understanding the institutional variations. This points to the institutional context in trying to foster success of industrialisation (Neumann, 2013: 11-12). With such a strong state, it can be easy to deal with the broader injustices in the international, system.

Such a state needs to have autonomy from the other power blockers and party interests that may limit the possibility of the state to operate (Kim, 1993: 230-1). Neumann argues that in order to achieve effective policy, the state needs to have the power, authority and capacity to formulate industrialization goals independently without putting into consideration other hierarchies like class which may frustrate the project (2013: 12). It's clear across the numerous industrial experiences that the most important industrial input is state leadership broadly put and particularly political leadership because it's the apex of human resource (See Baer, 2008).

The Latin American experience is said to have relied so much on patronage politics in appointing the members in the bureaucracy and so it became a politicized process (Neumann, 2013: 32) where members were appointed not on merit and competence but based on patronage (Ibid.). The Brazilian officials in government are said to have been prone to rent seeking despite being in charge of issuing import licenses, with many inexperienced staff in administration with barely any skills to ensure effective implementation of programs and plans (Ibid.: 33). Therefore, one can easily say that the interests which were being served by the state were not for the sake of promoting industrialization but individual and group interests. Such tendencies I argue can be harmful especially if we look at the current knowledge-based industrial revolution we are faced with today which calls for more skilled workers. The lesson is that such mistakes need to be avoided. Jenkins (1991) has written that successful industrialization is largely dependent on degree to which state intervention is effective. He refers to four key factors that constituted the development of south Korea i.e. flexibility, selectivity, coherence and less regulation. And with flexibility, there can be a possibility for adjustment of policy programmed when the circumstances necessitate. Jenkins argues that continued political commitment by the state is critical to successful industrialization. What explains the success of industrialization and failure in others lies not in the policies and strategies deployed but in the effectiveness of these policies. To him, it is in the power and ability of states to discipline and guide that industrialization can be successful. East Asian states are strong because they are autonomous from classes and groups, and relatively sophisticated government bureaucracies were in place when industrialization began (Neumann, 2013). This is because the strength of the state is hinged on its autonomy and capacity where autonomy means officials being able to free themselves from dominant economic classes and social groups hence effective implementation of policies and programmes. The degree of selectivity must be geared to the capabilities of the bureaucracy and the pace at which it can be improved. "Note that strong administrative capabilities are…just as important for market friendly policies to provide education, manage competition policy, collect and allocate revenues and so on. Government skills are not given in perpetuity" (Lall, 1991: 99)

Neumann, (2013) has written that as a matter of fact, developing countries embrace distinct tools in a bid to protect their economies. Key among such tools is tariffs, which are aimed at limiting imports through collection of taxes. He offers to distinguish between nominal and effective tariffs with the former showing the difference "between the price level of protected and intermediate goods and the latter showing value added for domestic producers as a

result of protectionism (Ibid.: 36). I think many countries have used those tariffs with majority in the developing world say in Africa and Latin America failing to materialise and industrialise. Here Neumann needs to note that the logic is not in the tariffs them-selves, the issue lies in the quality of the tariffs. One needs to question the purpose for the which the tariff is being imposed. Some countries impose tariffs to get revenue while others with a goal of promoting industrialisation. In other words, it has nothing to do with how strong the tariff is or how big it could be, it is in the purpose for which the tariff is imposed. Tariffs aimed at industrialisation need to focus on reducing costs of production and investment, if it's for revenue, then the reason why they fail in some places becomes very clear like the many cases in Africa. The south Korean experience portrays the industrialisation focused tariff. Amsden shows that the industrialization of South Korea from light manufacturing to heavy and high-tech industries would have been impossible without deliberately "getting prices wrong," through tariffs and subsidies. What however needs to be made clear in this paper is that not all countries may embrace the getting prices wrong approach though some may do depending on what they find good. The reason for this argument is that wrong prices depend on who considers them to be wrong or right, it is not a homogenous categorisation that can be regurgitated everywhere. We need to put into consideration the possibility that getting prices wrong may actually be in the interests of the market forces [capital]. In South Korea, the state has played the role of an entrepreneur—directing, disciplining, and financing profitable economic activities (Amsden, 1989). Revenue focused tariffs can result into nothing but generation of revenue and that's all. South Korea having used this approach towards its industrial process does not mean all countries including the late industrialiser of today can use the same directly though they can learn some lessons from the experience to inform their own path. This is because, not all the industrialisations in the world are not just having infant industries which may need such an approach to offset them, others are actually but stunted while some are just absent. Therefore, "right prices for setting off industry, for starting industries, may not be the same for nurturing industries, not the same for stunted industries and not the same for adult functioning industries". Determining the purpose of a tariff, I argue, depends on the quality of the political leadership a country has, if they are revenue focused leaders who aim at getting resources to spend on projects whose goal is not promoting industrial growth say state tours like some Ugandan bureaucrats and politicians, then it becomes hard to impose a development focused tariff. The purpose determines whether the policies or industrialisation as a whole has to be selective or not and so calling for selective intervention or full intervention.

While engaging in a theoretical debate on government intervention specifically on technological learning, Lall (1991: 75) draws on the examples of the recent industrialised countries of east Asia including Taiwan and south Korea, to argues that selective industrial policy actually works both economically and politically contrary to the neoliberal propositions. Arriving at such a conclusion was a result of comparative reading of functional intervention and selective intervention—with the former being considered market friendly while the latter not good for industrialisation, and the former economic with the view that government cannot improve on the information processing capabilities of even "imperfect markets" to mount selective policies, though they cannot mount functional ones while the

latter is political and considers government to be corrupt and so commanding less trust if any when it comes to selectivity (Ibid.: 76). Such selective intervention may include protection of infant industries which is historical. Given that protection can be a bit disastrous and discourage investment in capability building, then the best way to go would be limit the protection, impose performance requirements or enforce early entry into exports while maintaining domestic protection (Ibid.: 78). His suggestion sounds good but imposing performance requirements is not just sufficient, there is need for performance requirements to be accompanied with incentives—in form of rewards to those who meet the requirements and penalties to those who fail to meet the performance requirements. Taiwan and Singapore had limited influence of MNC s and domestic industries became essential. The governments of the two countries embraced infant industry protection (offsetting its harmful effects by strong export incentives), offered credit subsidise and credit allocations, FDI restricted, skills and technology support which motivated them to venture into risky and challenging activities

> "Taiwan intervened less directly in the industrial structure, though it used public enterprises to enter several heavy industries. It supported its small and medium enterprise dominated structure with an array of technology, training, finance and export marketing policies and institutions" (Ibid.: 79)

These countries had different visions and so different strategies which informed their industrialisation. Despite having almost similar problems and addressing them almost the same way, they had different visions and goals to achieve. This means that, there can be no single vision for industrialisation for all countries, each country needs to have its own vision and its own goal, and it's this vision which can determine the strategies to deploy (Ibid.: 80). For Lall (1993), we cannot assume that countries will have uniform durations and degree of protection because the technologies have different learning costs and so periods. This points to the fact that industrial policy has to be selective. To quote, "the experience of the most dynamic industrializers in the developing world suggests that their selective interventions determined the nature and success of their industrial development, and that such interventions were well implemented" (Ibid: 745). If we are to think of any lessons one can draw from south Korea, then this has to be that costs of protectionism can be dealt with by instituting safeguards (Ibid.: 748).

The neoclassical writers about the internet have tended to want to promote the liberalisation of the internet without any state protection, censorship or regulations. In fact, they have criticised china for strict monitoring of the internet by arguing that "the Internet in China has 'profound statist regulation and content surveillance' and is 'monitored by the Propaganda Department, which bans all original content online" (Fuchs, 2016: 30). It has been argued that such claims tend to present the western internet as being free of regulations and the Chinese internet as being fully regulated. Fuchs argues that:

Their arguments idealise the West in a highly ideological and cultural imperialist manner. Their arguments imply that the West is not operating Internet filtering, does not control the Internet, does not have ICT-enhanced police states, does not have authoritarian control

regimes and does not have restrictive Internet policies. Such arguments present the Chinese Internet as unfree and controlled and the Western Internet as free (Fuchs, 2016: 30)

The intention of such scholars Fuchs argues is not only to castigate the state protection but also to promote market forces and market control of internet, which is of course provided by a capitalist class and deprive others of such resources. To the contrary, he cites sources which indicate how the west including the united states has on several occasions used the very protection on their internet (Ibid.: 30). This went as far as using surveillance against political activists. The paragraph below speaks to it:

> The state' s surveillance capacities have also in the West been used against political activists; A report has shown that US counter-terrorist agencies have infiltrated and monitored the Occupy movement, including their Internet and social media profiles. It is quite likely that they have for this purpose used surveillance technologies such as Prism and XKeyScore were used. They equated left-wing activists with terrorists and attempted to crush the Occupy movement. In the UK, a video documented in 2013 how the police tried to hire an activist to spy on Cambridge student activists. Other revelations showed the Metropolitan Police Service operated a Special Demonstration Squad that in the years 1968– 1980 monitored hundreds of political groups such as the anti-Vietnam war movement, black justice campaigns, the families of people killed by the British police, Youth Against Racism in Europe (YRE), Militant tendency in the British Labour Party, Greenpeace London, the Socialist Workers Party and many others (Fuchs, 2016)

This can be read in a language very common in the neoliberal project where the state has to offer a limited oversight role in the operations of the market and leave the market forces of demand and supply to determine the operations. The evidence Fuchs offers to me can be compared to the very logic of industrialisation during the first, second and third industrial revolutions which shows that the state even in the west was so central in fostering industrialisation through protecting and controlling production and investment. The late comer industrialising countries have a huge task ahead of them given the fact that most of them embraced the neoliberal politics including liberalisation of their economies and markets. The limiting of the state's role advocated for by the neoliberals I will argue is an attempt to satisfy the interests of capital especially multinational capital. Chang (2002) will argue that countries and institutions trying to promote policies they never used while industrialising are trying to kick away the ladder which they used to climb up so that industrialising countries cannot reach their level—including state intervention and protectionism. So, to tap into the potentials offered by industrialisation means dealing with some of the logics of (neo)liberalism. This is because neither china [which the west and western media has portrayed to be so authoritarian by controlling the media and curtailing the freedom of internet] nor the USA which is considered to be internet free fully embraced free market, but rather used, have survived on and have been shaped by the logic of state intervention, and so of surveillance making them be categorised as surveillance-industrial complexes with both capitalist and state control. This has been accompanied by the low tax or no tax regimes considered to be the neoliberal mode of regulation. But a question that

comes to my mind is, were these protection measures in a way trying to serve the interests of the users besides trying to censor activities on the internet and other than serving capitalist interests? If so then how did they differently serve such interests for the two countries? I think it's not just about regulation and surveillance but such surveillance has to be in the interest of promoting industrialisation in the country. Otherwise it may end up serving interest of individuals say the capitalists and the self-centred politicians. However, this is a very compelling argument because in Uganda, the government recently—in 2018—introduced a social media tax which kind of tries to limit and has actually reduced the use of social media for some sections of the population. Social media is tool for mobilisation, doing business and so on, yet it is very clear that the fourth industrial revolution can only rely on cheap, affordable, accessible and reliable internet where everyone can afford, can easily access and feel secure. The purpose of social media tax was less to do with promoting development than serving political interest.

Leaving everything to the market forces of demand and supply would be misleading given the experiences of both USA and China regarding internet but also the entire industrial history. The literature by Fuchs in other words postulates the relevance of policing and regulation of the internet because the internet has to not only reap benefits without contributing but also has to pay taxes which the state can use to offer, subsidise and improve the infrastructure. Ensuring such regulation and policing calls for a shrewd state mechanism if it is to monitor the internet effectively. Therefore, the talk has to move beyond just mere instilling of discipline in the capitalists and consumers through the invisible hand of the market to thinking of "invisible hand of the state". The states have to depoliticise the policies on internet if they are to reap the benefits offered by the I4R. This means that it should focus on the bigger issue—the vision—and work on it more unswervingly with full commitment of both the political and bureaucratic leadership. With such a committed and disciplined quality leadership, there can be an assurance of offering incentives to both individuals and companies which strive to promote the industrial projects. O'Malley writes:

> The reliance on market forces which is also recommended would allow, at most, state intervention in the f generalised, automatic incentives, such as tax concessions or investment grants. But it would not allow more active, selective intervention, such as the use of state enterprises to develop targeted industries or measures to encourage private firms to pursue objectives set by the state (1985: 142),

The fourth industrial revolution and some prospective drivers to consider.

When you read the work of Lall (1993), the key to industrial development is building local capacity in order to master and familiarise with the new technologies. To him, these competences constitute the firm-specific skills not only technical but also managerial and institutional. This would allow the efficient and composite utilisation of the equipment and the technical information more resourcefully. But building such local capacity calls for massive investment in terms of resources, time and commitment. This paper will argue that this needs to be a political decision on whether to invest in the sector or not, if the political

which is a policy body fails to appreciate the need for investment then there can be a high likelihood that it will not survive.

Lee et al (2018) state that the revolution we are faced with is fundamentally and heavily knowledge based and the implication of this would be that new competence need to overwhelmingly developed. In trying to theorise how youth could be prepared for the future—meaning fourth industrial revolution and beyond—the young people need to be equipped with long life skills (Delloite Global and Global Business Coalition: 16). These skills are not just one but a set of them i.e. workforce readiness skills, technical skills and entrepreneur skills (Ibid.). Is equipping youth with such skills sufficient? Those are not, because the article argues that much as they can ably participate in ever changing land scape of work due to the learned skills, challenges including "lack of motivation, time, and inadequate resources—as well as resistance to change, lack of awareness of knowledge deficit, and group mentality—can interfere with youths' success in developing as independent, lifelong learners" (Ibid: 16). Lee et al. adds that policies in education become most relevant and the education systems need to react "quickly on developments in the knowledge space, they need to be redesigned to allow for lifelong learning" (Lee et al., 2018: 9-10). This means that there is not only need to give them skills but also change their attitudes, their commitment and their discipline towards work and learning. This approach to industrialisation is aimed at industrialising the human beings which ought to be the ultimate goal of any industrialisation project. In fact Lee et al. have argued that new expansion of human labour resources is required as a way of preparing for the 4IR. They state that:

> In 20th-century business management, it was believed that the cost in human labour should be reduced. However, this is the story of the past. In the 21st century characterized by globalization, the human labour resource is the key to success, and future management must have a clear understanding of members' strengths, interests, and knowledge. Thus, in the Fourth Industrial Revolution where we will face a plethora of new technologies and products, education must be reformed to improve sensitivity, creativity and communication (Lee et al., 2018: 12).

The above quote points not only investment in human capital development per se but the nature, form and content of human capital development. The human capital developed they argues needs to be reformed in order to enable sensitivity, creativity and communication. As we may all be aware, the biggest industrialisation resource is the human resource not only in regards to the current revolution but also across all the previous revolutions. This implies that there is enormous need to invest in the population for the fact that it's a raw material which needs to be transformed into human resource. Failure to invest in the population especially with this knowledge-based industrial revolution means that the population is going to become more of a liability through deterioration and the potentials offered by the fourth industrial revolution may not be tapped into. But this investment is largely the state's role because capitalists can only and are only willing to invest where they make short term profits for the present but not the future yet the revolution to me requires that we invest in the future thus mandating the state. Take examples of south Korea and Taiwan in the previous industrial experiences, they invested in education during their industrial journey

(Rodrick, 1995). For the two countries, what they considered well educated labour force was much more than just higher education as they had also very high literacy rates historically. Therefore, if the fourth industrial revolution is to benefit the countries especially in the global south, the states need to prepare the population in order to tap into it, otherwise, it may come to pass just like the previous revolutions did. Whatever happened in these east Asian tigers, the common ground for Lall is that they build a strong base of building human capacity both technical and managerial (Lall, 1991: 81). Thompson argues that "the developmental state of the Third World must ensure, particularly through education, an adequate supply of skilled workers and industrial engineers. It also tries to keep wages low through market mechanisms (such as a surplus of labour) and/or the repression of trade unions" (Thompson, 1996: 629).

Lall shows that technological capacity is another important resourceful input that firms need which industrialisers demand the states to ensure their provision despite the difficulty and complexity of the demand. These skills can be in management, technical or organisational. These capabilities are firm specific technological effort not similar to innovation—tech effort involves a wide range of efforts including access, implement, absorb and build upon it the knowledge required in production. This is critical especially if you are adopting a new technology to the firm or country. It is not simply "about tech transfer to developing countries as a physical product", for it to be effective, there has to be capacity building (Lall, 1991 :78). Upgrading into technologies which are more complex and demanding becomes difficult when there is no intervention aimed at dealing with costs. The interventions he talks about are not functional but selective—reason being, technologies differ in their needs and so call for selective policy intervention (Ibid.: 78).

Schwab advises that governments must adapt to the fact that state power is now shared with non-state actors and institutional influence is now also shared with lose networks:

> It would take a book dedicated to this subject alone to explore all the multifaceted impacts of the fourth Industrial revolution on governments but the key point is this: Technology will increasingly enable citizens, providing a new way to voice their opinions coordinates of your efforts and possibly circumvent government supervision I see possibly because the opposite might just as well be true with new surveillance technology has given rise to all-too-powerful public authorities (Schwab, 2016).

In this case, Schwab is positing that we must accommodate modernity but value regional and domestic structures, especially with respect to how the 4IR as a theory will be utilized by labour-led ecosystems (Ibid.: 92) and with the middle-class as an indicator for "communicating" empowerment. According to Schwab, "individuals, civil society groups, social movements and local communities" should never be stripped of their relevance (Ibid.: 95).

I find a couple of questions un answered and these could be detrimental if ignored as basis for exploiting the potentials offered by the fourth industrial revolution. The gender question

and the class question are not theorised in the literature on the 4IR, let alone in most of the literature on the third industrial revolution. These questions are given piecemeal treatment as if they are not fundamental questions both by the capitalists and the states. Gender inequality in terms of access to education, resources, opportunities and even work has been a historical question across geographical spaces. Gender inequality does not just happen, they are historical both socially and politically (Mies, 2014). Maria Mies argues that bourgeoisie women are domesticated nature under capitalism and sexual division of labour domesticated them rendering them dependent on their husbands'/men's income. Logically, the process that matured into proletarianisation of men was accompanied by a similar process of housewifization of women (Ibid.: 69). Capitalism through the housewifization of women made men the bread winners (Ibid.: 53). To Engels, capitalism set in male dominance over women with which gender inequality turns out to be seen as a result of change in economic system (Engels, 2004: 11). In most parts in Africa, especially the country-side, gender inequality is still prevalent. Notable is the fact that many women in the rural setting are full time housewives whose survival is on the mercy of their husbands. Even some who work sometimes have their financial decisions dictated by husbands. So, majority don't own smart phones nor do they own computers yet the fourth industrial revolution relies basically on such existing technologies. So, won't the revolution and its benefits be gendered? I think when planning any interventions, this has to be put into consideration by the state.

In order to understand the dilemma of the invisibility of real human relations in the natural world, Hartsock identifies five epistemological and political claims i.e. that "vision of rulers is bound to be dominant and passionate but not the complete vision; those who have written the history of labour have tended to be dominant; the vision available to the oppressed group must be struggled for; takings a stand point exposes the real relations among human beings as inhuman; material life which is class position, not only structures but sets limits on the understanding of social relations" (Hartsock, 1983: 285). These claims challenge those intending to theorise industrialisation to ensure they struggle for the less privileged but not again burying their potentials. The gender question therefore becomes a dilemma which needs to be addressed by the state in attempts to industrialise are to bare. However, we need not think of inequalities to do with gender in terms of men as the oppressors and women as the oppressed since the result can be reproduction of more subjectivities and marginalisation but we need to think of the structures which promote this violence, inequality, and marginalisation (Peterson, 2005). This then can allow for proper streamlining of the strategies for industrial development specifically 4IR.

We cannot think of gender and ignore the question of class when trying to theorise any development or industrialisation project. These two influences, affect and/or are affected by each other. We happen to have three classes of people in the world let alone in the developing world, i.e. the lower class, middle class and upper class. The lower class has limited if any access to high technology, they have worst internet experiences and face affordability challenges for those who could. They don't only have less access to education but even the education they access is of poor quality. The middle class can have some basic access but the high class is privileged to have all the best quality access to the infrastructure

and internet technology and good quality education which can match the demands of the internet based technology. I find it strange that there is no theorisation of gender and class questions given such divides. These classes are found in the market and home but also the state. Like the state, the family comes about in the interest of "a small ruling class seeking to maintain control over their property". Women were now pushed to the private/domestic sphere (Engels. 2004: 11) and with the rise of class society came the rise of inequality--between those who accumulated wealth and those who did not, and also between men and women. To deal with inequality, Engels suggested that we need to deal with capitalist exploitation (Ibid.: 14; Brown, 2013: 166). Surprisingly, even Delloite global and Global Business Coalition which purported to be theorising how to prepare the workforce for the future, do not attempt to theorise how the question of class will be affected and/or will affect the fourth industrial revolution. Failure to address the question of class becomes problematic because there is a very high likelihood that it can upset the law of technology becoming more affordable and accessible to everyone over time. I argue that this has a possibility of transferring the class statuses [income and social] from the real life to virtual life which may dismantle online equality and transfer the real-world class associated problems to the internet. Wont the revolution be of benefit to only those who can afford it? This needs to be looked into as a big policy question which needs streamlining and perhaps breaking the structures that perpetuate such unequal power relations. Such question should not be thought of for the sake of 4IR only, these divides are found in other sectors like education, health etc. Consider the quality of education the females can easily access and the quality of health services alongside the discrimination and marginalisation they meet in accessing the services. Those who have access to UPE and USE just get an education but not necessarily quality skills. Such ends up propagating the questions of class which classes become more gendered with many lower-class women than men.

Articulating the nature of the state in relation to 4IR

One may wonder whether such can be achieved with states in the neoliberal context. Does the state need to be necessarily a developmental state in order to ensure the effective leadership of the industrial process? One may be at liberty to argue so based on the industrial experiences of some east Asian countries like south Korea and Japan which materialised through a developmental state model. However, this shouldn't be taken as universal truth even if it's for countries that took a developmental model. Some countries that were developmental in nature did not manage to achieve industrial growth despite having embraced a similar model. Take the example of some Latin America countries like Brazil and some African countries in their early independence periods which undertook a purported "developmental model" but couldn't industrialise through it. Penelope Franks (1992) has shown that Japan industrialised through a developmental model, just like Evans postulate the case of South Korea (Evans, 1995). Francks argues that despite Japan embracing a developmentalist state model and succeeded in registering celebratable gains, it wasn't typically a monopoly of the Japanese or east Asians, it was used elsewhere but there was something unique with the Japanese case and in order to come to grips with this uniqueness, one needs to compare it with other cases in the developing world. He notes that

"Meiji Japan followed the Second Reich in Germany in its strategy of industrial catch-up with England, in which the state invested heavily in industrial infrastructure and installed tariff barriers against imports of manufactured commodities, according to Friedrich List's thesis of infant industry protection. In a sense, the United States preceded Germany in the use of the developmental state model" (Francks, 1992: 51). She shows that developmental state model can be taken as one for late comers in the industrialisation process. If developmental state model wasn't a new invention for japan, what then was unique about it? The socio-cultural heritage of Meiji Japan partly explains the success of its model. Francks argues that modern Japan inherited relatively well-trained manpower for the administration of industrial development. Japan development was guided by Confucius ideology where everyone had their own duties and responsibilities and were accountable to those below and above them. She argues that this was seen in the emergency of class hierarchies where both Workers and rulers had to account to the peasantry who was responsible for cultivation (1992: 21). Such a strategy served to reduce rent-seeking behaviour of samurai-turned-Meiji-bureaucrats. For countries where it failed, one can be tempted to think that local culture was side-lined, important virtues as individual and collective accountability, loyalty and hard-work were not valued.

Evans (1995) seems to allege that the Africa equally had a developmental state model, which statement I made earlier but not conclusively by saying it was "alleged". His characterisation of a developmental state is that it has rational and meritocratic bureaucracies by way of being autonomous from the demands of sections of community. They also have external networks which work to connect the private and the state. The collaboration of the state and private alongside the internal coherence of the rational and meritocratic bureaucracy are core in forming the necessary conditions of the "embeddedness" of state autonomy. For him, "embeddedness implies a concrete set of connections that link the state intimately and aggressively to particular social groups with whom the state shared a joint project of transformation" (Evans, 1995). If such embeddedness lacks in any society then it becomes clear that interventionist state can turn out to be a predatory state—one in which "the preoccupation of the political class with rent-seeking has turned society into its prey" (Evans, 1995). Such conditions were very common in south Korea with state bureaucracy elected on merit using the meritocratic national examination. Evans to the contrary shows that some African countries that assumed taking a developmentalist model ended up being predatory like Zaire given its weak internal coherence within and among the political elites coupled with the external ties that only benefited individuals and not the economy. For him, we can categorise Brazil and India not as fully developmental states but also not as predatory states since they used it differently and industrialised. What then explains the Brazilian failure? For Evans, the institutional capacities served interests of both capital and political elites in an alliance. Equally important to note is that successful developmental states of east Asia and predatory states of Africa are differentiated by the interests served, with the former serving the general interest while the latter serving rent seeking individuals and politicians.

What I can say is that successful developmental states spread the idea of developmentalism

to the population which then they used to take their countries to a desired destination and direction by people being availed with information filled with ingredient of industrialisation and not pomposity. For this case, one cannot conclude that developmental states are one and the same in all countries, they have differences thus explaining the different results in different countries. For this case, the east Asian model can be said not to have the potential to work in Africa if it is not revisited to meet the internal conditions and environment. This also goes to developmental states of different periods but similar contexts. Does using developmentalism mean a country is deploying a developmental state model? I will argue that it is not always so. Africa deployed developmentalism but can hardly be categorised to have been fully developmental states and this ideology continues to exist even today and continue to guide the development paths in many economies. This ideology is actually used to meet ends, as Evans points, of political elites. This makes developmental state to be different from developmentalism. It is argued that "the developmental role of the state is declared dead and buried" (Shivji, 2007). Therefore, I can argue that a developmental state model has the potential to promote industrialisation in the late comer industrialisers only if the state is reformed, with motives of serving the general populations, putting national interest first than being promoters and supervisors of international capitalist projects. I also argue that African and east African countries need to embrace their own developmental state models if they have to and not just copy and paste from east Asian because they registered success because it may not work out. This can be done through being true to themselves and drop develomentalism driven by rhetoric which serves selective interests. However, this is not to suggest that countries must embrace developmental state model, they can take different routes and direction provided the nature they embrace can formulate a goal and commit to implementing it. But predatory practices are not options and have to be dropped. The same applies to neoliberal state which privileges market over state.

Some Lessons for East Africa.

The biggest challenge that lies ahead of the east African countries is to reform the state—its orientation, composition, nature and form. The African state is a postcolonial state which carries with it a colonial legacy that privileges the comprador elite interests and those of international capital than national development programmes. The argument Mamdani makes is that the nature of the contemporary African state together with the politics in post-independence Africa is just a result of the institutional legacy that colonialism left behind (Mamdani, 2017). Mamdani argues that in trying to understand the bifurcated state as the legacy of colonialism, "political analysis cannot extrapolate the nature of power from an analysis of political economy" but instead must focus on "the organization and reorganization of power," (Mamdani, 2017: 23). In fact, Fanon in his insightful book *The Wretched of the Earth* argued that the African nationalist that took over power from the colonialists just wanted to change guards, not to change the status quo of the colonial regime but to replace and take over their position and privileges (Fanon, 1961). Fanon's evocation suggests that focus was not on changing the colonial mode of rule nor doing away with it completely for that sake but becoming new colonisers and beneficiaries. This kind of leadership cannot front a vision of industrialisation and

commit to it but can only focus on sharing benefit of the national cake. Njoku (2005) in trying to understand the source of Africa's modern state of corruption especially in the public service in Africa today argued that the leaders are colonial elites whose mode of rule is borrowed from the colonial period. The colonial state he argues had socio-political practices which were malicious and such bred the habits of corruption in the public service in contemporary Africa (Njoku, 2005: 99).

Rethinking the state will amount to rethinking the political, which imagines the future of industrial development through formulating goals and strategies, streamlining policies and institutions. I therefore argue that, as far as industrialisation is concerned and as far as east Africa is to exploit the possibilities offered by the fourth industrial revolution, the state needs to reform first forward and become an "entrepreneur state"—meaning not necessarily and directly coming up with tech innovations and industrial projects but with measures to ensure formulation of a clear vision and goal for industrialisation and champion the effective implementation of the same. Failure to rethink the state itself means the problems that Lall (1991) talks about of corruption, nepotism etc. will cripple any efforts aimed at promoting industrialisation and tapping into the fourth industrial revolution possibilities. The problems that some Latin American countries faced of patronage—which are the very problems in Africa and east Africa in particular will continue to exist (thanks to colonialism) which may not be good for the 4IR.

When the state is reformed and strengthened, then the political has to make 4IR the first priority on the agenda of industrialisation. Government has to take a decision and make 4IR a political chant and order of the day. In addition, they should sensitize and convince the public to buy into the project but that can only happen if the goal is made clear and the vision is made promising. Leaders need to be trained and equipped with the necessary skills about 4IR in order to plan from an informed point of view probably through some trainings aimed at making them appreciate the potentials of the revolution and offer strategic leadership, guidance, policy and programming.

Leaders with a "western-centric" thinking can hardly afford to promote industrialisation because it is meant to be a "nationalist" project. Such leaders are the comprador elites that postcolonial and anticolonial thinkers like Fanon talked about. An article on the inauguration of a "task force" on 4th industrial revolution in Uganda shows that the Ugandan president, Museveni, argued that "as the world pushes for the fourth industrial revolution, there are gaps of the second and third revolutions in places like Africa that '***MUST'*** be plugged for proper development to happen" (Xinhua, 2019). This to me means that he is equally pushing for dealing with the previous industrialisation stages before putting much emphasis on the current one. I agree there are gaps and fixing those gaps would be okay but I don't think to promote the fourth industrial revolution we need to focus efforts exhaustively on the previous revolutions. Does successful industrialisation require considering the previous ones before new ones can develop? I think the president of Uganda seems to buy into the linear development model provided by the neoclassical scholars and the neoliberal project especially propagated by W.W Rostow in his stages of economic growth that skipping some stages of industrialisation will not allow for proper development to occur (Rostow, 1960).

Rostow offers a more generalised understanding of modern history by defining development in form of stages of growth. The stages he offers include traditional stage, pre-conditions to take off, take off, drive to maturity and age of high mass consumption. Rostow presents these stages as a model through which all countries must undergo in order to become developed—and for that case industrialised. He argued that all societies lie somewhere in these stages (Rostow, 1960: 4). The level of stages signifies the rate of development or underdevelopment of a country/society and a country "cannot skip any of them" for it can lead to inappropriate development. This model is more of a homogenised paradigm which seems linear as if all countries have similar conditions. This is the sense in which I read such a statement which was quoted from the president [Museveni]. Alexander Gerschenkron (1962) has argued that actually there is no reason as to why one needs to follow a linear development model of industrialisation a critique which is similar to that raised by the dependentsia scholars of the 1970s. Since contexts can change and conditions may be different, east Africa may not necessarily need to fully go through all the previous industrial revolutions which they either failed to catch up with or bypassed them in order to benefit from the current one. I can argue that, contrary to the president's claim, east Africa can leverage on the existing opportunities offered by the current revolution and develop capacity to make good use of it and how to do this is the right question to ask. The argument evokes an understanding that the political leadership has to change its thinking and begin rethinking beyond western centric assumptions. This can be through a shift in statecraft. Without changing the ideological orientation of the leaders, it may turn out to be that the leaders are not leaders in the real sense of the word but followers of other's developed models which they regurgitate and reproduce in their own economies which may not actually account to promoting industrialisation in their own countries given the differences. What I mean here is that, such copied assumptions may be misleading, making the leaders themselves to be considered followers but also most importantly "misleaders of the industrial process". This is because, if you embark on the process of leading using only other people's methods, assumptions and tools you may turn out to be international followers.

The state needs to take up the initiative of promoting entrepreneurship either through sponsoring entrepreneur programmes or through investing in capacity building and broadly building on the initiatives of the fourth industrial revolution already started in the countries to draw lessons and leverage on them, to revolutionaries them across the countries and across sectors of the economies. I will still use an example of Uganda where some signs of 4IR have started exhibiting. Talk of cases like in the transport industry and online business i.e. Safe boda, taxify, Uber etc., and Jumia, Bubu, etc., respectively. In Uganda, the move to develop some mobile apps is argued to be "spawning a new generation of technopreneurs, searching for innovative ways to connect various sectors with their respective clientele. Numerous applications are being created to help bridge the infrastructure deficits, while helping to meet the aspirations of an increasingly tech-savvy Ugandan population" (Tumwesigye, 2019). The mobile app developers in Uganda are just a handful of the so called technopreneuers, there is need for broadening the level of entrepreneurship to ensure that many people can enjoy their products. This of course calls for state support to ensure that many people with raw skills can be horned before the fourth industrial revolution passes

without being utilised effectively. I suggest massive entrepreneur promotion because 4IR relies so much on technology and knowledge and such gadgets and applications are not only needed by the urban elites but also the rural poor at a subsidised price of which there is still a deficit. So, if the state invests in cost reduction through massive production but also reduced costs and taxes, then even the rural poor will become beneficiaries than victims of the 4IR. This of course is a policy issue and so the political and policy experts need to intervene. It is very clear that the policy environment in Uganda—which is almost the case with most of the east African countries—does favour such but to a very less extent presently. It is historically clear that the country's level of technology and the enabling policy environment has to be corresponding. Given the level of technology currently and the revolution at hand, such an observation becomes more critical. But if we scrutinise the existing policies in east Africa today, it has disapprovingly limited capacity to shape the technological trajectories that the 4IR requires yet improving on such would allow for better positioning of developing countries to fruitfully participate, contribute and benefit.

The mode of taxation has to change in order to allow government not to cripple the provision of needed services like human resource development. Lee et al. have argued that given the rate at which disruptions occur—very evident in the labour market—today, there is ardent need for reforming the fiscal policy (Lee et al., 2018: 9). They state that,

> with the massively increasing unemployment due to the increasing employment of robots and artificial intelligence, tax bases are eroded, and this hinders the adaptation of the required (knowledge) infrastructure for the Fourth Industrial Revolution. Therefore, productivity has to become the basis for taxes (e.g., machine taxes, profit taxes, etc.) to avoid further growth of income inequality and social unrest. Social resilience and creativity could be spurred by the introduction of an unconditional basic income. (Ibid.: 9).

This shows that east African countries need to rethink their industrial policies especially on tariff and others which reflect their industrialisation goal and vision if they are to escape being marginalised by the 4IR. If they are to institute any taxes, they shouldn't aim at generating revenues just, the ultimate goal should be promoting industrialisation.

Just like Lall (1991) showed, we can see that both Africa and east Asia have considerably high enrolment levels in primary levels of education both having embraced universal primary education and now with some east African countries embracing universal secondary education. However, Lall states that what explains the difference in industrialisation levels between African and East Asian countries is the quality of their human capital development (Lall 1991: 90). I suggest that what Lall needed to add is that the education programme of universal primary education and of course now universal secondary education in some (East) African countries are not development driven—with the intention of promoting human capital development like in East Asia but politically driven, whose intentions are aimed at serving political interests than development nation-wide interests. I argue this because, universal education is made as political promises in some countries especially during campaign periods for presidential elections say in Uganda to score political points.

"UPE became an increasingly important issue during the election campaign and eventually became one of Museveni's election promises" (Kjaer and Therkilden, 2011: 597). Kjaer and Muwanga note that:

> the political dividends of the UPE initiative were clear; any service improvement, such as expanding access to education to those previously disadvantaged, would be credited to the NRM government, whose popularity would increase as a result. The introduction of UPE and the abolishment of school fees also coincided with the country's first elections under the new constitution, and UPE became an important campaign pledge for the government… Although the country was still operating under a no party system, the President used UPE as part of his election pledge in the 1996 elections, making it very much part of his political agenda (Muwanga, 1999; Stasavage, 2004). Implementing the UPE programme was about making good on that election pledge that had struck a chord with voters. The abolition of the PTA's financial contributions in schools effectively signalled a fundamental change in the power relations between the government, school management and parents; the NRM and President Museveni specifically could take credit for broadening access and the inclusive delivery of education services (Muwanga, 1999)" (Kjaer and Muwanga, 2016: 15)

Another literature by Kjaer and Therkilden (2011) shows that less focus on studying policies in Africa has been given to elections. They state that:

> Much of the relevant literature on Africa downplays the salience of elections for policy-making and implementation. Instead, the importance of factors such as clientelism, ethnicity, organized interest groups, and donor influence, is emphasized. We argue that, in addition, elections now motivate political elites to focus on policies they perceive to be able to gain votes. This is based on analyses of six landmark decisions made during the last 15 years in the social, productive, and public finance sectors in Tanzania and Uganda. Such policies share a number of key characteristics: they are clearly identifiable with the party in power; citizens are targeted countrywide; and policy implementation aims at immediate, visible results…Political elites pursue a range of strategies in striving to remain in office. Among them is the use of policies and implementation arrangements to help expand and strengthen the coalitions that support them…both countries tried to push for Universal Primary Education (UPE) –Tanzania under Nyerere in the 1970s and Uganda under Obote in the early 1980s. As already discussed this illustrates the well-known observation that authoritarian regimes too seek to legitimize their power through popular polices. However, in countries in which competitive elections are becoming institutionalized, there is accordingly a more institutionalized pressure for popular policies than in the previous regimes. What is central to our argument is to show that elections, although not always free and fair nor with a high degree of competition, significantly motivate political elites to pursue policies that they perceive will help them to win elections. In Tanzania, the 2001 UPE policy decisions led to two million additional children being enrolled over five years. The enrolment

> rate increased from 53% in 2000 to more than 90% at the time of writing.31 In Uganda, UPE was introduced in 1996. Three years later, primary enrolment rates had gone up from 62% to 84%. This happened during a period when education was widely considered by many people as one of the most pressing policy challenges.33 It was also an issue of central concern for politicians in the two countries…Primary education has also been central to Ugandan politics for decades as shown by the fact that Milton Obote included UPE in his 1980 election manifesto. The re-introduction of UPE must, however, be seen in the light of the first elections under the new National Resistance Movement (NRM) regime in 1996.38 Stasavage39 shows that even if the Ugandan political system cannot be characterized as genuinely democratic, the elections had a clear effect upon educational policies. Although there had been early programmes to increase enrolment in primary schools, the decision to remove school fees represented a sharp break with prior policy. It also represented a turnaround for the president. Prior to the 1996 elections Museveni had rejected to prioritize education over infrastructure, referring to education as a 'non-productive sector of the economy' (592-597)

For the case of Uganda, it did not end with UPE, history holds that the pronouncement for Universal Secondary Education (USE) was made in 2016, which year was a political year with general elections but also made during presidential campaigns. This orientation needs to be buried from leaders. The state needs to separate policy issues from individual politics by changing rationales and intentions/objectives—with a focus on changing the state logic. For that case, focus shouldn't just be in offering formal education where people are not benefiting because the education helps someone score political points for wining an election, to one where education aims at promoting industrialisation and development where learners acquire a skill, discipline, right attitude etc. The state's attention has to be paid on improving the quality of education first of all with also focus on balancing between lower levels and higher levels of education based on the demand when it comes to fulfilling the industrial goal and vision. Therefore, if east Africa is to benefit from the fourth industrial revolution, then it has to rethink its education and focus on building human capital. Using knowledge more effectively requires higher levels of human resources within enterprises and elsewhere. Building human resources involves two distinct processes — skill development and capability formation. 'Skill development' means formal education and training (including that in firms). "Capability formation' means the development of skills and knowledge derived from technological and managerial effort (both formal, in the form of R&D, and informal)" (Lall, 1991: 86). There has to be skilling and reskilling of the population, and building a strong and healthy work force. Human capital development calls for massive investment in transforming the population into labour force. It is no longer about counting enrolment levels and having paper qualifications which can't be used to do anything, what should be focused on is a mix of formal schooling, skills development, creativity, discipline, emotional and attitude change among others. This can be through reviewing the education curriculums and institutions by the state. Since east Africa has a very big young population, this can be a potential that can be leveraged and providing them with the right intellectual and innovative capacity would offer a big boost to the countries when it comes to 4IR and

its constituent components like block chains, big data, internet of things among others. Investment in education, training and generally skills development may not necessarily be for the sake of building a national labour force, it actually works also to attract meaningful (unconditional) foreign investment. This is actually what the state in Singapore did. "It developed an efficient, industrially oriented, higher education structure, along with one of the best systems in the world for specialised worker training" (Lall, 1991: 83)

The 4IR technologies are going to be dependent especially on Internet and electric power. The states in East Africa need to be investing in putting in place big capacity and infrastructure for internet and also investing in ensuring technology is appropriate by making it fit the local standards and environment. The vitality of internet calls for state intervention without which the potentials of the country to reap from internet based fourth industrial revolution technologies may be rendered futile. This is the same case with the necessity of electric power whose inadequacy can prove an obstacle to the 4IR project. These infrastructures need to be affordable, accessible, reliable. The reason I suggest the question of availability being accompanied with affordability and accessibility is that in some African states, the question of electricity availability is not actually a problem with majority of them generating their own power from numerous sources like solar, hydro, wind energy, etc. but the cost of such power is very high to be afforded by the lower sections of community but also its reliability is not guaranteed. This is where the state can become relevant in ensuring that infrastructures are made to match the demands of the 4IR. Despite the state making some investments already, they are insufficient and not very effective. Therefore, more needs to be done and the east African states must commit more resources with a particular focus on redirection to the 4IR. Based on the industrial experiences of the previous revolutions, it is believed that only the state has the capacity to mobilise resources to put up such required infrastructures as capitalists can hardly invest in such infrastructures given its cost and inability to easily generate profits. State's investment in such infrastructures serves to reduce private investment costs. Neoliberal logics of pushing the state on the margins cannot resolves these questions, the state needs to work outside confines of the neoliberal market especially on issues of power generation, pricing and regulation.

This leads me to the pursuit of the efficiency of state subsidies which are critical in the establishment of industry among industrial late comers in this century and new revolution. The state in east Africa need to institute incentives for those involved in promoting the fourth industrial revolution. This approach was used in majority of the industrialised and the industrialising countries as a way of motivating investors and workers to the achievement of the desired goal. Amsden (1989) has shown that south Korea offered such incentives to stimulate industrial growth. The state did not only subsidize but also set performance criteria in exchange with the incentives. It was as important to ensure government discipline over business, and this dual policy of support and discipline constitutes the core component of a Japanese or Korean style industrial policy. This mix of incentives and discipline would work to eliminate tendencies of rent seeking and counter productivity of the incentivisation project. Rodrick (1995) shows that in a bid to overcome the coordination failure which had

crippled industrial take-off and rapid export growth in Korea and Taiwan, the state had to come in and offer a strategic role and such resulted into an investment boom. He argues that in the early 1960s and thereafter the Korean and Taiwanese governments managed to engineer a significant increase in the private return to capital. They did so not only by removing a number of impediments to investment and establishing a sound investment climate, but more importantly by alleviating a coordination failure which had blocked economic take-off. The latter required a range of strategic interventions say for instance investment subsidies, administrative guidance and the use of public enterprise. Therefore, in instances where the state has to offer incentives to the benefit of the 4IR project, then it has to be followed with a disciplining mechanism. Thompson summarises this in a beautiful paragraph:

> Financial favours can be politicised and can lead to the creation of new inefficiencies rather than greater productivity. Here my (surely too cryptic) contention is that Asia-Pacific states made subsidies more dependent on performance criteria than developmental states elsewhere in the world. Korea, Taiwan and Singapore, as well as to a lesser extent Malaysia, have penalised poorly performing firms while rewarding those that performed well. Firms that became money losers in expanding industrial sectors were often not bailed out. But when bail-outs did occur, tight strings were attached by state regulators (1996: 630).

Streamline the gender and class questions in preparation of the 4IR. If class questions, gender questions, among other are not resolved, the 4IR project cannot deliver any positive development results, even if results are there, the question of inequality will continue to persist in terms of gender and class. The end result will be a gendered industrialisation. Most importantly, these can all be worked out if the constitution, form, nature and character of the state is reformed—from neoliberal and colonial nation state to a meaningful state which isn't dictated by the limits of the modern nation state.

Conclusion

Industrialisation is not a homogenous and universal process that requires countries and regions to undertake a similar approach. They are different experiences most of which come from learning and unlearning. One thing that becomes clear throughout all the industrial revolutions and industrial experiences across the globe is that the state has always been at the centre-stage of propagating their success and failure where they have failed. Now that we are in the period where the fourth industrial revolution seems to be testing the willingness and preparedness of countries to exploiting the potentials it offers; the paper theorises how the state can encourage taking advantage of the opportunities offered.

Just like I argued, the biggest challenge for African countries is the postcolonial state with a colonial legacy and its elites whose orientation is serving the self and international capital. The paper argues that the state needs to be reformed and become a state which is focused on a broader objective of development and industrialisation, one that sets out goals and

strategies for ensuring achievement of such objectives and commits resources to the benefit of the wider community. The nature of the current state has to be dropped because it becomes hard to champion protection against interests of capital and individual politicians/comprador elites. Perhaps this suggests that the industrial failures in east Africa and may be other parts of the late comer industrialisers is the state itself and rethinking/reforming it should be the first step if meaningful industrialisation—particularly fourth industrial revolution—is to be realised.

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