

Succeeding with Industrialization: The Experience of Germany and Japan as late Industrializers

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Abstract: This paper reviews industrialization, its foundations, importance and benefits in Germany and Japan. It focuses on industrialization and deindustrialization as a consequent outcome of deliberate efforts towards development. Our objective is to review the industrialization account of these leading economies to highlight an amalgam of approaches to successful industrialization, which can be domesticated to local conditions in less developed economies. We observe industrialization requires a critical mass of factors that work independently and simultaneously within the complex interaction between effective policies, adequate funding as well as the elimination of inimical cultural practices. Industrialization can be attained by economies across a range of circumstances. Succeeding with industrialization is a multifaceted and dynamic process that is dependent on appropriate policies with respect to local conditions. The somewhat elastic nature of industrialization demands for coherent economic management within the context of an economy's structure, trading partners and role in the global economy. Anti-cultural limiting policies enable industrialization through the reallocation of national and global resources at the frontier. As demonstrated by Germany and Japan, historically effective political systems as well as citizen centric inclination stand out as requirements of successful industrialization. Active participation in the international economy through the industrial sector coupled with the domestic advantage low tariffs and external advantage of international linkages are associated with the benefits of trade. The role of entrepreneurship in industrialization depends on the scales, persistence and support for the private sector.

Keywords: industrialization, Japan, Germany, Development, economy, deindustrialization.

1. INTRODUCTION

1.1. Industrialization

Industrialization is a process through which economies can be transformed from traditional to modern societies and experience higher income levels, a change in production technology as well as socioeconomic improvement. This section provides an overview of industrialization, its foundations, importance and benefits as well as the concept of deindustrialization. According to [1], industrialization as an economic development process involves generally similar trajectory through which an economy simultaneously experiences a decreasing share of employment in agriculture and a corresponding rise in manufacturing employment. Industrialization is also marked by continuous search for higher levels of equilibrium in national manufacturing aimed at higher resource allocation efficiency [2]. Industrialization denotes a stage of economic improvement in which countries attain a measure of self-sustenance such that the essential socioeconomic and political stability required for development is enabled [3]. Industrialization implies the combination of socioeconomic activities related to the discovery of more resourceful methods of producing goods and delivering services, which result from accumulated efforts over the medium to long run through substantial aggregation of production activities. As country experiences have demonstrated, industrialization can be attained through capitalist or socialist production systems [4].

1.2. Foundation and importance of industrialization

A foundational cause of industrialization is structural change propelled by technological change, which occurs at very different rates across sectors in any economy. Furthermore, technological capability often delineates the frontier of industrialization through the adoption capability of countries [5]. Additionally, structural change performs the function of resource allocation by improving the composition of labour between primary and secondary sectors, which lead to the production of higher value products and services [6]. With regard to developing through industrialization, there are **mixed outcomes of industrialization** across developed and developing economies, as well as differing role of particular sectors, which change over time. Nevertheless, an important proposition is that industrialization is the basis for development in less developed economies. However, in contrast, **critics of industrialization** as an engine of economic growth posit that in the modern world, the dynamic service sector can accelerate economic development without necessarily undergoing the heavy manufacturing growth stage [4]. Nevertheless, it is widely viewed that by raising productivity and employment levels, industrialization drives economic growth in part through increased national demand [6]. The importance of industrialization is also demonstrated through its propensity to promote inclusiveness and broader participation of a larger number of people and groups [7].

1.3. Benefits of industrialization

In principle, adopting the tenets of industrialization precedes economic modernization and consequently development. However, from empirical accounts, industrialization has not always resulted in economic development in all economies. This is more so when the industrial focus is on producing consumer rather on capital goods production [8]. A key function of industrialization is that it facilitates international competitiveness by positioning a country's output in the global economy [3]. From another perspective, industrialization plays an important role in weakening feudal economic systems in the agrarian sector, through its effect on trade and restructuring of the agricultural sector [9].

1.4. De-industrialization

As a dynamic process, deindustrialization, which succeeds industrialization, represents a decline in the relative share of manufacturing employment to the services sector. From another **outlook**, it connotes an increase in the output of the primary and secondary sectors using less labour [1]. The transitory process of deindustrialization is necessitated by the fact that countries cannot sustain accelerated manufacturing growth perpetually. Deindustrialization is further typified by a lower price of manufactured products as a result of labour efficiency, which raises demand arising from a lower portion of income spent on finished products [10]. Deindustrialization can be classified as mature or premature, where the mature stage involves an expected pattern of rising comparative growth of the service sector accompanied by higher income level. On the contrary, premature or early deindustrialization, entails declining relative manufacturing output accompanied by constrained structural change [4], as in the case of Latin America [11].

2. INDUSTRIALIZATION IN GERMANY AND JAPAN

With the outlook of industrialization as prerequisite to economic growth and development, a number of historical case studies abound. This section reviews the industrialization process in Germany and Japan, as leading economies within their continents, with a view to providing a theoretical framework for nascent-late industrializers of the twenty first century. The focus on Germany pertains to its political system and role of government; socio-cultural system; trade orientation; entrepreneurship; research and development; deindustrialization; healthcare system. While, the emphasis on Japan relates to its political system and role of government; economic **structure**; industrial structure; trade orientation; entrepreneurship; post-secondary education; deindustrialization; financial system; research and development.

2.1 INDUSTRIALIZATION IN GERMANY

2.1.1 Political System and the Role of Government in Germany

Germany's multiple party system which was framed in the nineteenth century has contributed immensely to a fairly united government with respect to its proportional representation and a restricted incidence of majority control [12]. As a consequence of this and other related factors, the multi-party system has contributed positively to state's role in creating a citizen-centric focus in the early industrialization of Germany [13].

2.1.2 Socio-cultural System in Germany

A positive cultural disposition in Germany acted as an intangible asset exemplified by a complex system of habits, which informed the emergence of effective institutions. This had profound positive effect on the transition from a subjective to an objective society based on logic, which preceded appropriate personal inner qualities required to adopt technologies within the field of applied science. In addition, the transformation of habit of thought, which manifested through appropriate individual and collective agency enhanced the political structure of Germany [13]. With a view of even industrialization across the country, early administrations in Germany conceived a national urbanization process with a focus on geographic distribution of industrialization. Through which target industrial areas were delineated by their level of socioeconomic development, with distinctive grouping as normal-developing or lagging-regions based on the national average. Specific industrial and related growth facilities were set up to accelerate their catch-up with the rest of the economy [14].

2.1.3 Trade Orientation in Germany

With substantial growth of the industrial sector and a trade outlook, international competitiveness along with increasing international linkages accounted for Germany's export led growth. In which manufactures constituted a large composition of its exports, with key sectors such as chemicals, machinery, pharmaceuticals and automobiles, all of which accounted for 42.7% of all exports from Germany in 2000 [15].

2.1.4 Entrepreneurship in Germany

The historically high inclination towards entrepreneurship and start-up activity was a key factor for Germany's contemporary industrialization status. This was buttressed by a strong posture of long run entrepreneurial persistence arising from peer effect and intergenerational transmission of entrepreneurship role models. In addition, the social acceptance and the existence of entrepreneurial support services from the government such as the provision of funds further contributed to early industrialization in Germany [16].

2.1.5 Research and Development in Germany

Research and development has been a key factor of industrialization in Germany. As in the case of its energy sector, prevailing supply interruptions arising from grid overload and increasing electricity costs informed a shift from conventional energy sources to photovoltaic (PV) systems. Germany's research and development in PV systems in 1960 was supported by adequate funding for many years and by 1979 attempts at inducing demand for alternative energy sources began. With the provision of incentives, grid connected PV system on rooftop installations had reached 100 in 1991, 2000 by 1995 and 100, 000 in 2004 [17].

2.1.6 Deindustrialization in Germany

The sturdy expansion of the service sector with the resulting reduction in manufacturing employment and output is reminiscent of structural change along Germany's industrialization path. Furthermore, technological change played a key role in its transition to a higher share of services in total output, while on the manufacturing front, structural change enhanced industrial productivity and output. Nevertheless, the growing service and declining manufacturing output is an imprecise description of deindustrialization (in Germany), as the service sector has been closely associated with changes in manufacturing. The emerging service sectors in Germany's deindustrialization include information communication technology, financial services as well as research and development [15].

2.1.7 Healthcare system in Germany

Social inclusion, decentralization and non-state operations are among the historical hallmarks of Germany's effective healthcare system. Which has been premised on a political mandate on effective oversight of health insurance, determination of the role of government and the impact of national health insurance for effective healthcare delivery? Access to healthcare in Germany was based on political economy considerations aimed at balancing industrialization with urbanization as well as the effective management of healthcare funds. Germany has also played a leading role in research in medical science and public health as well as created the first national health insurance program, which strengthened healthcare as a key ingredient of a healthy workforce required for rapid and sustained industrialization. The state, however, retained several responsibilities within national health insurance, by functioning as a supervisor, facilitator, enabler and monitor. This was in addition to the national professional and management standards which were enforced. Also, the benefits of the health insurance are highlighted by the fact that during the hyperinflation of 1923 and financial crash of 1929, healthcare financing remained stable [12].

2.2 INDUSTRIALIZATION IN JAPAN

2.2.1 Political System and Role of the Government in Japan

The political system of 1600 to 1868 in Japan was characterized by approximately 150 feudal lords who oversaw their respective areas, collected taxes and remitted to the military. As a counter political plan aimed at maintaining control, the government required the lords to spend months each year in Tokyo in addition to keeping their family members hostage with the aim of minimizing collusion and to ensure loyalty. The political system in Japan was also defined by the institution of the “Meiji” typified by the principles of enlightenment, civilization and human rights. The Meiji was a socioeconomic and political renaissance that took responsibility of creating a modern Japan faced with the challenge of economic backwardness. Which as achieved by ensuring better funding of education, employment of foreign skilled labour, acquisition of western technology, modernizing of factories as well as investment in research and development. [18]. It also focused on a social approach to finance, capital and humanity in its industrialization thrust. With these, Japan had established a colonial empire including Korea and Taiwan with such an economic base large enough to support wars by 1940 [19].

2.2.2 Economic Structure in Japan

Three key features of Japan’s economic structure towards effective industrialization include – macroeconomic stability, elimination of bottlenecks and effective utilization of global resources. The macroeconomic stability involved strengthening the currency and balance of payment management, which aggregated sufficient domestic savings that raised her investment potential. Bottlenecks were eliminated through policies aimed at bridging human capital gaps as well as improvement of socioeconomic conditions, while emphasis was also focused on purchase of foreign technology and advanced industrial machines which necessitated the adoption of free trade policies that accelerated private sector competitiveness. This disposition resulted in the private sector’s dynamism superseding the government’s prior intention [20]. As a result of these, Japan achieved remarkable economic growth from 1955 to 1973, which propelled the economy to full scaled industrialization and attained the status of the second largest economy in the western world. In retrospect, Japan’s industrialization path has been somewhat consistent with established theory [20]. The economic structure of today’s Japan evolved from government’s funding of oversea education, employment of foreign skilled labour, construction of roads to integrate the economy, investment in telegraphs, utilities as well as subsidized strategic sectors such as construction, armaments, mining and shipping, all of which enhanced the ‘zaibatsu’ considering their operation and international exposure [21].

2.2.3 Industrial Structure in Japan

The four fundamentals of industrial development in Japan in the later part of the 19th century include the establishment of a national banking system; development of transportation and communication network; creation and subsequent sale of public sector factories as well as the availability of private loans. This economic framework ensured rapid manufacturing growth, with the labour input as the key production factor. In addition, these led to protracted industrialization through the interfacing effects of manufacturing growth and a reconfigured trade structure. The economic restructuring of Japan focused on building a rich country and a strong military, facilitated industrialization through compulsory education, conscription, inward knowledge and technology transfer [19]. Closely correlated with a strong military was the development of large-scale industry in banking, trade, arms, chemicals, communication, transportation and metallurgy. Most of which were the cornerstone of many conglomerates in these sectors [19]. Textile production from raw silk was a key component of early industrialization, as it contributed to the mechanization of agriculture. However, textile production did not optimize profitability until it was privatized in 1893 after which Japan became the largest silk-textiles exporter [18].

2.2.4 Trade Orientation in Japan

Japan opened up its economy to free trade at the outset of its industrialization, which was enhanced by a low tariff in heavy industry, in line with the tariff treaty as a feature of an import substitution strategy [22]. Two benefits of the open economy disposition include the cultural exchange undertakings after over two centuries of seclusion from the rest of the world and exposure to industrial achievements of the west which intrigued the Japanese. In addition to positive changes to Japan’s trade composition, there was a shift in trading partners to Western Europe [19]. While trade provided a foreign source of financial manufacturing growth, well designed policies and effective institutions sustained industrialization in Japan [18].

2.2.5 Entrepreneurship

By the end of the Second World War, Japan already had a large number of small and medium enterprises (SMEs), albeit with marked managerial and technology inequality compared with large firms. Existing entrepreneurial gaps were bridged through composite policies that provided support with managerial practice, cooperative organizations, better technologies, concession of taxes and modernization through advisory services. Entrepreneurship activities were reinforced through an emergent subcontracting system among upstream SMEs and downstream large firms as a form of vertical integration aimed at bringing managerial gaps between these two categories of enterprises. These resulted in SMEs contributing to international industrial competitiveness in the 1970s and the institution of production networks in East Asia from the 1990s onwards [20].

2.2.6 Post-Secondary Education system

The post-secondary education system in Japan was a heterogeneous structure comprising universities, colleges of technology, professional training colleges, graduate schools and professional graduate schools. In the post Second World War period, Japan swiftly transitioned from an elite to mass system of higher education as well as an inclination to more vocational degree courses. Government reforms were essential in laying the foundation for robust and sustained economic growth in Japan with the tertiary education system at the heart of these transformations. Japan deepened participation in tertiary education to sustain its global economic competitiveness. This was especially important considering the popular notion in Organization for Economic Development and cooperation (OECD) countries that tertiary education is a propeller of a knowledge based and driven economy. By 1949, higher education was widely distributed across its regions, with institutions required to fulfill University standards defined by the school education law, coupled with frequent accreditation. Japan also adopted education quality control measures as observed in Europe, in which certified agencies were responsible for assessing educational practices, which were publicized. With an inclination towards graduates determining the own careers, firms sought potential employees with work relevant skill, while the labour market interface incrementally aligned with on-going restructuring of the Japanese economy. This was important because a highly skilled employee base sustains globally competitive research base and enhancement of knowledge transfer mechanisms mostly between universities and industry [23].

2.2.7 Deindustrialization in Japan

The **economic** situation in Japan of the 1990s emerged from the substantial change in the **economic** structure than from **economic** stasis. Where structural change entailed a reconfiguration among firms as well as a national shift towards the service sector. As a result, a tangible portion of manufacturing capacity was reallocated from Japan to lower wage economies. This necessitated the need for labour force modification with an emerging outcome of flexible recruitment patterns, leading to a decline in the number of lifetime jobs [23]. The proliferating service inclination originated from the traditional service delivery that Japanese had been previously engaged in such as domestic servitude, retail sales, entertainment and small commercial proprietorship [19].

2.2.8 Financial System in Japan

The financial system in Japan's early industrialization era took a protectionist approach through the provision of financial assistance in starting and developing new industries. With increased access to finance, manufacturing concerns in Japan had less finance based risk [22]. In addition, the Japan Development Bank (JDB) was established in 1951 to provide long term loans for development, with substantial loans given to sea transport and the energy sector in the 1950s and 1960s, highlighting the priority on economic infrastructure development [20]. While in the Meiji period, new monetary and national banking systems evolved, which served as the foundation of modern industry formation [19].

2.2.9 Research and Development Approach

Government owned research institutions were at the core of Japan's ability to adopt new industrial techniques as well as training of and supply of engineers for employment in firms [22]. Japan adopted a research and development approach in setting up experimental textile plants, which were taken over and commercialized by private enterprises, after the successful experimental development phase [18]. This approach was also employed in other sectors with huge industrial potential such as the metals, chemical and machinery sectors

3. CONCLUSION

One paper is inadequate to outline the full spectrum of factors for succeeding with the multifaceted and dynamic process of industrialization. Nevertheless, a large number of researchers and policy makers support the notion that industrialization is among others dependent on policies associated with the local conditions in any industrialization-aspiring economy. In addition, successful industrialization requires a number of factors to work independently and simultaneously, this is more so as there is no single mix of policies that can assure industrialization and economic growth for all economies. This section highlights some requisite factors for successful industrialization in late industrializing economies. Successful industrialization requires the acknowledgement of the fact that it is a complex process that requires specific inputs processing to achieve target outcomes. This is important for aspiring economies as the economic development process is facilitated by industrialization through an increased source of public revenue from sources such as higher personal income tax and company taxes. Policies with potential of eradicating the limiting local and cultural practices which are inimical to industrialization should be devised, as industrialization requires the facilitation of certain endogenous and exogenous factors towards push or pull induced industrialization. Furthermore, countries should adopt the economy leading-sector approach in which a few viable industries drive the industrial process so as to generate spillovers to other initially less vibrant industries. In addition, industrialization should be viewed as such a dynamic process that economies plan for and make the necessary transitions through the industrialization-deindustrialization continuum in such a way that national resource utilization is optimized at its production possibility frontier. More effective political systems are key inputs of successful industrialization, such as the less diverse political system in Germany and a largely distributed system in Japan. Considering entrepreneurship as an engine of industrialization, policies should be devised to enable the maximization of this pervasive resource. The entrepreneurial inclination and persistence in Germany as well as pro-entrepreneurship policies in Japan are case studies. The complexities of economic improvement also necessitate an articulate research and development facet of industrialization. Such as the case of rising electricity in costs in Germany, led to the development and diffusion of photovoltaic systems, which served as an alternative source of energy as well as subsequently reduced electricity consumption expenditure. While part of efforts Japan's research and development efforts was marked by basic research undertaken by the state, which was subsequently transferred to firms once they had reached applied and experimental research stages. Additionally, the social systems improvement as a qualitative factor is also an essential component of industrialization. This was exemplified in Germany by a proactive social system and in Japan through cultural reorientation following its integration with the global economy through international trade.

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