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ARTICLE



Industrial policy and structural transformation: Insights from Ethiopian manufacturing

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Abstract

Motivation: The question of industrial policy has gained prominence in the policy agenda over the last decade, despite its persistently ambiguous and incomplete definition. The lack of a firm definition is problematic because it prevents scholars and policy-makers from comparing and monitoring the impact of industrial policy across developing countries. This vague definition also fails to account for issues that are relevant to the impact and usefulness of industrial policy in the process of economic development.

Research Question: What is the effect of an inadequate definition and implementation of industrial policy for structural transformation in underdeveloped economies?

Methods: We undertake both a critical literature review of industrial policy and a policy review, and use insights from 86 structured interviews with manufacturing businesses and government officials in Ethiopia, to illustrate how industrial policy could be more effective.

Findings: The article finds that there is no clear and exhaustive understanding of what the definition of industrial policy entails. In part this is also a result of a limited and incoherent use of the concept of structural transformation in the definition and policy formulation of industrial policy. **Conclusions:** Using a case study of Ethiopia, we show how an inadequate and incoherent definition and implementation of industrial policy can lead to limited upgrading, learning and innovation in an underdeveloped economy.

Policy Implications: For Ethiopia, and for other underdeveloped economies, the findings imply a reconfiguration of industrial policy, rather than more industrial policy.

KEYWORDS

economic transformation, Ethiopia, global value chains, industrial policy, structural transformation

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1 | INTRODUCTION

African countries have been developing significantly since 2010. Annual growth rates of real output rose from on average 1.8% between 1980 and 1989 to 5.3% between 2000 and 2010 (UNCTAD, 2014a). At the same time, consumption rates have increased (Young, 2012), as has foreign direct investment (FDI) (UNCTAD, 2014b). Africa is also gradually and increasingly tapping into "global production networks", including in more advanced manufacturing goods (AfDB, OECD et al., 2014).

But the narrative on Africa is less rosy in other respects. The majority of exports and per capita growth have been largely based on natural resource extraction or agricultural production. This expansion is largely driven by increases in global demand, resulting in a rise of commodity prices (Baffes & Haniotis, 2010). Export and production also remain problematic in terms of diversification and generally depend on only a few commodities (NEPAD & OECD, 2010). Despite overall good prospects for African countries' economic expansion, the growth rates of manufacturing in particular have, with the exception of South Africa, been insignificant in most African economies over the last decade (Bénétrix et al., 2012). In fact, the share of manufacturing in total output has remained around 10% since the 1980s (Austin et al., 2015). Transformation, in terms of shifting employment from agriculture to manufacturing, has been limited, much of the economic activity resorting to the (less productive) service sector or informal sector (De Vries et al., 2015; McMillan & Rodrik, 2012). In terms of technological change as transformation, "instead of progressive, incremental technical change, we find almost predictable productivity decline; instead of dynamic industrial growth, we find stalled projects, project delays, and, in many cases, abandoned technological efforts" (Ogbu et al., 1995, p. 8). Foreign direct investment has largely been directed towards activities that are perceived as Africa's current comparative advantage (e.g. labour-intensive or natural resource-intensive), although an increasing share of FDI is flowing towards the services sector (UNCTAD, 2014b). The rate of employment generation, and in particular of "good jobs" (e.g. higher wages, better working conditions), has also remained limited (Page & Shimeles, 2014). Moreover, despite increased growth and investment, poverty rates have not significantly declined: between 1990 and 2010 the share of the population living on less than USD 1.25 a day in Southern, East, Central and West Africa declined from 56.6% to 48.5%, considerably above the target of 50% reduction (AfDB, UNECA, et al., 2014).

In part because of the limited transformation of African economies, government interventionism seems to have re-emerged as a potential and widely acceptable means to direct domestic production structures towards more productive, higher value-added and advanced goods and services (Cimoli et al., 2009; Hausmann et al., 2007; Naudé, 2010; Rodrik, 2004). In the past, the idea of governments "picking winners" was regarded with suspicion as it could foster corruption and motivate rent-seeking (Rodrik, 2008). In recent years, however, international organizations have increasingly focused attention on the notion of transformation and industrial policy, albeit in various ways (UNCTAD & ILO, 2014; UNECA, 2014), and African governments have slowly adapted to such a perspective and ideology in national policies, although not always coherently and effectively (ACET, 2014).

The re-introduction of industrial policy is taking place, however, in a new economic environment, which is characterized by a greater integration with, and dependence on, world markets, in stark contrast to earlier contexts in which development took place (Gereffi & Memedovic, 2003; Kaplinsky & Morris, 2001). Development opportunities rely more on the degree and way in which such countries can connect with and benefit from increasingly powerful transnational corporations (TNCs) (AfDB et al., 2014). Furthermore, increasingly stringent World Trade Organization (WTO) rules prevent developing countries from adopting the very protection measures that other countries had previously used significantly. The emergence of China and other strong economies has also changed the opportunities and pitfalls facing developing countries in transforming their economy.

Notwithstanding the enthusiasm for a stronger role of the state in economic development, the concept of industrial policy has remained somewhat vague. This article attempts to further unpack industrial policy and reveals that little consideration is given to the notions of structural transformation. In other words, the concept of industrial policy pays considerable attention to *static* notions of economic development (e.g. growth in production, exports, employment) but little to *dynamic* notions of upgrading, learning and innovation. This exclusion is not limited only to conceptual matters and is also found in the industrial policy strategies of underdeveloped African economies.

The article is organized as follows. First, it discusses the re-emergence of industrial policy in scholarship and development narratives. Second, it investigates various definitions of industrial policy and incorporates contributions from the literature on structural transformation to outline how industrial policy can be more effective. Third, using data from 86 structured interviews held with manufacturing businesses and government officials, the article presents a case study on Ethiopia to show how a limited and incoherent definition and implementation of industrial policy can result in the limited upgrading, learning and innovation in underdeveloped economies. The article concludes with a summary of the findings.

2 | A RESURGENCE OF INDUSTRIAL POLICY

The concept of industrial policy has re-emerged in the development agenda in the last decade, although various developed economies never stopped pursuing a range of selective industrial policies to co-ordinate economic activity, provide essential finance, and undertake public research (Mazzucato, 2013; Wade, 2014). Development economists and policy institutions have increasingly raised the idea of—and advocated for—increased state intervention beyond market facilitation for underdeveloped countries, particularly because African economies have experienced little to no economic transformation in the last decades (OECD, 2013; UNCTAD & ILO, 2014). While much of the discussion on Africa's economic development previously revolved around the "African dummy" (Jerven, 2011) and other structural factors such as geography, limited or abundance of resources, history, culture and demographics (Acemoglu et al., 2000; Collier & Gunning, 1999; Sachs & Warner, 1997), economists and policy institutions have increasingly come to believe in the role of industrial policy to shape structural transformation.

The 2008 financial crisis in particular provided a rationale for the use of industrial policy, showing the limits and consequences of a global and integrated financial system. One consequence for developing countries included the massive withdrawal of FDI. Capital controls, which were until recently prohibited but had previously been very effective, are useful policy tools to curb inflow and outflow of capital (Gallagher, 2011; Thrasher & Gallagher, 2008). Another effect of the financial crisis also included a fall in remittances from the diaspora in wealthy economies, which usually represent a considerable contribution to a country's cash flow (Griffith-Jones & Ocampo, 2009). Developing countries suffered most significantly from the crisis with the fall in commodity demand and in the price of agricultural goods, resulting in trade and balance of payment problems (UNCTAD, 2012). The effects of such dependence on commodity exports in particular showed the limited transformation that has taken place in African economies in recent decades.

In this context, industrial policy can play a significant role in shaping and directing economic transformation away from commodity dependence, as examples from history have shown. Arguably, all developed countries used industrial policy to develop, adopting "targeted government interventions in trade and industry during their catching-up process" (Di Miao, 2009, p. 107). In the eighteenth and nineteenth centuries, the United Kingdom (UK) and the United States (US) used extensive industrial policy tools, such as policies to transfer and adapt technologies, "carrot-and-stick" mechanisms to

effectively direct resources to innovative firms and sectors, and tariffs to shield firms from international competition. France and Germany later also applied policy on technology to train the workforce, increase the inflow of knowledge, and prevent knowledge from leaving the economy. Several other tools were used (e.g. patent systems, regional investments, applied research, public procurement) to support domestic sectors and catch up with the UK, the frontier country at that time (Di Maio, 2009; Lin & Monga, 2011). In East Asia, Japan used state-owned enterprises to build domestic capabilities and established an advanced education and innovation network (Freeman, 2004; Lin & Monga, 2011); South Korea and Singapore adopted similar industrial policy tools, albeit differently, to attract investment. Various Latin American countries also applied industrial policies from the 1940s, primarily characterized by the establishment of public research institutes that provided general and sector-spe-

cific research (Di Maio, 2009; ECLAC, 2004).

The way in which industrial policy can be exercised in recent years has, however, changed. The push for free-trade policies by international policy institutions (e.g. the International Monetary Fund (IIMF), WTO, World Bank) and the decreasing costs of communication and transportation allowed firms to locate some parts of production and service activities in countries that could undertake them more cheaply (e.g. lower wages). Such fragmentation into *global value chains* provides both opportunities and difficulties for developing countries (Gereffi & Memedovic, 2003; Kaplinsky, 2000; Kaplinsky & Morris, 2001). Opportunities arise because countries do not have to build up sectors from scratch (e.g. from designing to marketing shirts), but can now participate in one activity in a particular value chain (e.g. shirt manufacturing), pursue gradual upgrading, and move into activities which more developed economies have gradually moved out of (Lin, 2010). At the same time, governments in developing countries have to deal with TNCs' interests, balancing attractiveness to investments with their long-term beneficial impacts on the economy as a whole. Empirical evidence suggests that TNCs have the power to move production between countries that offer investment incentives, in a "race to the bottom". Such mobility of international firms may not improve workers' conditions and opportunities (Singh & Zammit, 2004), and may make it difficult to transfer and adapt foreign technology (Lall & Narula, 2004).

At the same time, international financial institutions (IFIs), such as the World Bank and IMF, still have considerable influence to shape national policies, especially in developing countries, towards liberalization and privatization, although the emergence of new donors in recent years (e.g. China) has relaxed IFIs' loan conditions (Hernandez, 2017). An emerging group of new lenders, particularly China, have placed considerably fewer conditions on domestic policy, preferring concessional loans for firms and government to shape economic activity; loans are provided on the condition that Chinese goods (at least 50%) and Chinese services (that is, Chinese contractors) are procured (Brautigam, 2011, p. 205).

Despite the need for a coherent conceptualization of industrial policy, we show in the next section that the concept in the current development narrative is largely inadequate. This is because the notion of industrial policy is applied inconsistently by different scholars, and because it incorporates only certain issues of structural transformation (e.g. shifting resources to sectors) while largely omitting others (e.g. upgrading, learning and innovation). The latter is important to incorporate as it has been shown to be a key driver of long-term growth (Freeman, 1990).

3 | INCORPORATING TRANSFORMATION IN INDUSTRIAL POLICY

From a review of the literature we find that industrial policy is a somewhat ambiguous and blurry concept, which effectively relates to all the policies a government pursues. Corden (1980, pp. 182–3), for instance, provides a wide definition of industrial policy:

... the best industrial policy may be to provide an adequate infrastructure, some limits on the powers of monopolies and cartels, an education system that helps to generate the human capital for industrial success, indicative guidance about industrial prospects (without compulsion or subsidies), stability and simplicity in the system of taxation, a free and flexible capital market and a steady movement towards zero sectional protection, whether direct or indirect.

One possible reason why the concept of industrial policy encompasses a broad range of economic policies is that successful targeted industrial policies *require* a favourable macroeconomic environment in which micro-interventions can be efficient (Johnson, 1984). In other words, macro policies determine the extent to which targeted industrial policy interventions are successful, which means that macro policies have to be compatible (Cimoli et al., 2009).

Other authors have provided a narrower definition of industrial policy, giving importance to the idea that particular sectors with long-term benefits should be preferred to other sectors that do not. This definition is closely related to the concept of *selective industrial policy* (Lindbeck, 1981). Reich (1982), for example, defines industrial policy as "the set of governmental actions designed to support industries that have major export potential and job-creation capacity, as well as the potential to directly support the production of information". This is related to the argument from economic geography that industrial policy should focus on sectors that exhibit *Marshallian externalities*, i.e. localized labour pooling, efficient supply of goods and services, and intensified circulation of knowledge and ideas (Harrison & Rodríguez-Clare, 2010). In selecting some activities over others, it is then "implicit in industrial policy formulation and execution [that there are] always trade-offs between different groups, regions, industries, etc." (Landesmann, 1992, p. 245), which in turn create opportunity costs of choosing between economic activities. Ultimately, optimal industrial policy is about the broader trade-off between the economic benefits and costs of government intervention.

The view of selective industrial policy also points towards the notion of *infant industry protection* as an essential component of industrial policy. It refers to the temporary protection and support of specific sectors to overcome initial constraints to economies of scale and productivity. The governments of Germany and the UK, for example, provided both support for technology (e.g. Germany sent officials abroad in order to absorb tacit knowledge and performed reversed-engineering on technology imports with subsequent dissemination of that knowledge to local industry) and protection (e.g. the UK maintained a degree of secrecy in designing machinery, and also banned export of machinery tools, imposing a considerable fine for contravention) (Freeman, 1995, p. 7). Infant industry policies are generally perceived to be necessary for commodity-dependent developing countries because of "asymmetric trade" and the potential for lock-in due to decreasing terms of trade (Reinert, 2009, p. 91). Infant industry was, as part of an *import substitution* strategy, applied by countries in Latin America and Asia to protect and build up domestic sectors. Often such industrial policy came in the shape of "public ownership, public R&D, and subsidized credit" to generate rents among domestic entrepreneurs (Rodrik, 2004, p. 15).

The prevailing argument in economic theory for these and other industrial policies is that some market imperfections or "market failures" are inhibiting otherwise efficient market mechanisms in allocating resources towards activities with the highest economic return. In this view, the process of transformation is perceived as capital and labour resources that shift from one sector to another, provided the market is brought into optimal efficiency. The sector to which the resources flow is considered to benefit the economy more than other sectors. This view of transformation relates to the definition of shifting from employment in traditional sectors (e.g. agriculture) to modern sectors (e.g. manufacturing) (Lewis, 1954). It is based on the perception that the manufacturing sector is

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an important driver for economic growth as it provides productivity growth, increased value added, spillovers, economies of scale and the ability to absorb surplus labour compared to other sectors (Abramovitz, 1986; Baumol et al., 1994; Hirschman, 1958; Kaldor, 1960, 1966; Young, 1928). The service sector has traditionally been given a limited role in the narrative of economic development, but services tend be increasingly tradable and show higher wages relative to the manufacturing sector (Jensen, et al., 2005). In fact, the service sector can facilitate or drive productivity in the manufacturing sector (Nordås & Kim, 2013).

In a model of perfect competition and free flow of labour and capital, "structural change" is then perceived as a self-sustaining process that occurs without state intervention (Syrquin, 1988). The simple process of reallocating resources is considered a determinant for—and caused by—economic growth, which subsequently contributes to increases in productivity (De Vries et al., 2015, p. 3). Structural change can generate economic growth, but to some degree insufficient growth may also hamper structural change (Timmer & Akkus, 2008). However, such "structural change" might be considered to be significantly different from "economic transformation", which refers to the "interrelated processes of structural change that accompany economic development" (Breisinger & Diao, 2008, p. 3). For some, "structural change" is seen as occurring in a wider range of economic spheres (such as production, trade, and domestic demand), over and above resource shifts between sectors (Kim, 1979; Pasinetti, 1993).

Transformation is, however, not only about reshuffling resources among sectors and changes in broader economic dynamics, but also about changes within sectors and firms, and an increasing integration of economic activities through production, market and technology linkages. The process of transformation is, according to Structuralists, characterized by fundamental shifts in the distribution of the labour force, institutional settings and the political economy (Chenery, 1960; Chenery et al., 1986; Ocampo et al., 2009; Reinert, 2009; Rodrik, 2011; Thirlwall, 2003, 2011). This process requires the government to step in to re-allocate resources (e.g. labour, capital) to sectors that offer economic benefits (e.g. productivity growth, spillovers, linkages) in the long run. The government may also allocate resources for the discovery of "new" products. From the Schumpeterian perspective, the process of structural transformation entails a process of "creative destruction" or "creative accumulation", in which increases in productivity are generated by introducing new goods or types of production, focusing on new markets, incorporating new types of inputs, or pursuing new types of firm organization (Schumpeter, 1934). Alternatively, Evolutionists perceive the process of structural transformation as a long-term process in which the accumulation of knowledge and capabilities are essential (Bell & Pavitt, 1993). The accumulation of knowledge and capabilities is not easily quantifiable but can be partly observed in terms of diversification and specialization (Imbs & Wacziarg, 2003), the level of sophistication (Lall, et al., 2006), and the level of quality of exports (Hausmann et al., 2007). As countries develop, they tend first to diversify and then to specialize again, and to gradually increase the sophistication and quality of production and exports. Crucial in structural transformation from the Evolutionists' viewpoint is the dynamic nature of change, that is, the ability to change the accumulation and processing of knowledge as countries develop (Landes, 1969). This notion results in a strong emphasis on "institutional engineering", which stresses that both the right mix of institutions and the ability of institutions to be dynamic throughout the structural transformation process are essential. In other words, "given whatever incentives, learning how to seize technological and organizational opportunities is a fundamental driver of industrialization" (Cimoli et al., 2009).

Existing definitions of industrial policy in scholarship and policy largely lack such dynamic effects of industrial policy, that is, generally considering static notions such as production, export and employment growth but fail to identify the notions of upgrading, learning and spillovers. Johnson (1984, p. 8) includes these notions to some extent and defines industrial policy as "the initiation and

coordination of government activities to leverage upward the productivity and competitiveness of the whole economy and of particular industries in it". In a similar fashion, UNCTAD (2011) describes industrial policy as "[g]overnment measures aimed at improving the competitiveness and capabilities of domestic firms and promoting structural transformation", which includes a "combination of strategic or selective interventions aimed at propelling specific activities or sectors, functional interventions intended at improving the workings of markets, and horizontal interventions directed at promoting specific activities across sectors". Ocampo et al. offer a partial solution by defining industrial policy as the "restructuring of production and trade towards activities with higher technological content" and to "promote innovative activities that generate domestic spill over" (2009, p. 152). Even so, these definitions still fail to acknowledge a dynamic state that is able to adapt to circumstances as the economy moves into other development stages (Amsden & Chu, 2003). They also neglect the importance within structural transformation to have co-ordinated effort and dialogue between the state and the private sector, which Evans (1995) termed "embedded autonomy".

We find that the exclusion of notions of structural transformation is not confined to the definition of industrial policy. A similar tendency is found in the industrial policy strategies of underdeveloped African economies. In the next section we present a critical policy review for Ethiopia, and use insights from 86 structured interviews held with manufacturing businesses and government officials, to illustrate how a deficient and incoherent definition and implementation of industrial policy can lead to limited upgrading, learning and innovation in an underdeveloped economy.

4 | INDUSTRIAL POLICY FOR TRANSFORMATION IN ETHIOPIA

In 1994, the government of the Ethiopian People's Revolutionary Democratic Front (EPRDF) introduced the Agriculture Development-Led Industrialization (ADLI) strategy as the country's main development strategy, which functioned as the backbone of subsequent industrial development plans. The Export Promotion Strategy (EPS) was introduced in 1998 and extended the incentives for investors (e.g. access to credit, land) beyond the 1992 Trade Reform Strategy, which entailed a "reduction in import duties and other charges, [and] the elimination of quantitative restriction and export taxes" (Terfassa, 2008, p. 283). From the ADLI emerged the 2002 Industrial Policy Strategy (IPS), which encapsulated an extensive development strategy focusing on agriculture-led industrialization, exportled development, and expansion of labour-intensive industries. In 2004, the Ethiopian Industrial Development Strategy (EIDS) was introduced, combining pro-government and pro-market development strategies, emphasizing public-private partnerships (PPPs), and supporting domestic and foreign investors with incentives. The strategy focused on improvement of the "business environment" and for a set of key sectors (textile and clothing, leather, meat, construction, and agro-processing) provided support in research, human capital development, and access to credit (Zerihun, 2008, p. 280). In reality, however, the policy was largely ineffective as there was "not any deliberately drawn and explicitly specified industrial policy" (EEA, 2005, p. ix).

In subsequent years, the Ethiopian government introduced the Sustainable Development and Poverty Reduction Program (SDPRP, in 2002), the Plan of Action for Sustainable Development and Eradication of Poverty (PASDEP, in 2005), and the Growth and Transformation Plans (GTP 1 and 2, respectively in 2010 and 2015). The latter programme is of particular interest here because it is the most recent articulation of a structural transformation strategy. The GTP is subdivided into various sections (with a division between the macroeconomic framework and the sector-development strategy) and is heavily underpinned by the key sectors that were introduced in the IDS, with some key

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sectors added later (e.g. cut-flower industry and metal, chemical and pharmaceutical industries as import substitution) (Gebreeyesus, 2013). GTP1 was implemented at both the federal and regional level, managed respectively by the Ministry of Finance and Economic Development (MOFED) and the Bureau of Finance and Economic Development (BOFED). The aim of GTP1 was to structurally transform the Ethiopian economy, but despite achieving one of the highest growth rates in sub-Saharan Africa, it resulted in limited transformation. The industrial sector increased its share in the Gross Domestic Product (GDP) between 2010 and 2013 from 10.3% to 12.4%, but so did the service sector from 44.1% to 45.2% of GDP, with a large share of GDP (42.9% in 2013) still held by the agriculture sector (MOFED, 2014, p. 6).

The GTP1 provided a range of incentives for domestic and foreign firms, including the ability to import machinery and spare parts tax free, with duty drawback, etc. Original data collected in Ethiopia reveal that firms find these general incentives helpful, particularly because it helps them to remain competitive (i.e. without these incentives firms are not able to compete on world markets, interviewees argued). Of the firms that were interviewed for this research, many acknowledged that such incentive packages were not always implemented comprehensively and effectively. For example, customs were not fully aware of the policy on tax-free import of machinery and spare parts. As a consequence, firms had to invest time (often at the level of the general manager) to resolve such cases, often also requesting the Ministry of Industry for guidance and direct intervention.

Other investment incentives were only partially pursued. One manager of a food-processing firm explained that the government had been helpful in providing land, credit, and electricity within an industrial zone. The infrastructure in the industrial zone, which was mainly tailored to domestic firms, had not been provided, although the government had said it would provide such a "full package". Lack of infrastructure increased the time spent bringing in raw materials and transporting final product to export hubs (e.g. airport in Addis Ababa, port in Djibouti). In another and more recently built industrial park for foreign firms, some components of the investment package were provided (e.g. buildings, infrastructure, electricity), whereas other essentials were not (e.g. staff housing, transport between housing and production plants, health and education facilities). The lack of facilities in the industrial park resulted in costs for foreign firms because they had to provide additional wages to cover housing, transport and food, one interviewee suggested.

A majority of the interviewees also argued that GTP1 incentive packages did not support the process of technological innovation at firm level. Firms in the leather and garment sector, and to a lesser degree in the food-processing sector, expressed this opinion. Generally, those firms that were part of a global subsidiary received knowledge and skills from the international head office and therefore faced fewer (or no) constraints from limited R&D incentives provided by the Ethiopian government. Domestic firms, however, had no access to such skills and knowledge, and relied largely on self-sustained efforts to attain skills and knowledge by attending national and international conferences, by insourcing foreign experts, and piecemeal organizational innovation in production processes. When reviewing the main GTP1 document (MOFED, 2010a) we observe a strong articulation of structural transformation and dynamic notions of upgrading, innovation and learning, but the GTP1 objectives document (MOFED, 2010b), which operationalizes the policy, focuses solely on *static* notions of output and employment, and includes no objectives that relate to *dynamic* notions of learning, upgrading and innovation.

To some extent the Growth and Transformation Plan 2 (GTP2), which was introduced in September 2015 and runs until 2020, aims to address notions of technological innovation. The overall objectives relate to various topics, including sustaining the high growth that Ethiopia experienced between 2010 and 2015, improving productivity and competitiveness of the agricultural and manufacturing sectors, transforming the domestic private sector, and accelerating human development and technological

capacity building. Sustained growth is aimed for by "creating decent job opportunities" and structural transformation, which is understood as "enhancing productivity, quality, and competitiveness" (MOFED, 2015, p. 17). Development of the private sector is perceived as key in this process and to take place through "job creation, export promotion and technology transfer" (idem.). The GTP2 pays particular attention to "the linkages between local and foreign enterprises to facilitate knowledge and technology transfer to ensure sustainability of growth" (idem.). But findings from this research suggest that institutions, and bureaucrats within them, struggle to structure and quantify notions of technology, let alone to subsequently implement mechanisms that allow for such knowledge transfer to take place. It suggests that the path to properly and effectively facilitating technology transfer is complex and requires specialized knowledge and skills to understand and support such knowledge flows. Particularly for Ethiopia, which starts off from a knowledge base in which insufficient experience and knowledge on technology transfer has been accumulated, it may take considerable time to build up an understanding of the best approaches and policy mechanisms.

From the GTP2 emerges a perspective on transformation that is also observed in development strategies in many other African countries, to encourage "enterprises to invest in the manufacturing sector for sustained growth and economic structural transformation" (p. 18). It essentially assumes that the process of transformation is automatic as long as firms (both domestic and foreign) invest sufficiently and consistently. We find, however, that technology transfer is not automatically taking place in Ethiopia's manufacturing sector, in part because international firms are not always incentivized to transfer skills and technology, and in part because government does not follow a coherent and rigorous approach to incentivize, regulate, monitor and evaluate technology-transfer processes. For example, interviews revealed that although there are technology-transfer agreements for international investors, these have not been used actively; and support programmes to bring foreign experts into domestic manufacturing firms have been pursued only sporadically and randomly.

A key objective in the GTP2 is to promote "educated and skilled human capital", which "will enhance absorptive technological capabilities" (MOFED, 2015, p. 19). The support of technological capabilities will be provided through policies for "technological advancement and innovations of sciences and technology", including financing, research promotion in public and private institutions, and networking among "research institutes, manufacturing industry and service providing institutes". Findings from this research show that activities of promotion, financing and networking have been very limited in Ethiopia, with little funding available for technological issues in the private (e.g. R&D funds) and public sectors (e.g. funding for university research projects). At the same time, networking is limited because it faces problems of trust and transparency between public and private stakeholders, which in turn inhibits co-ordination and information flow between institutions. Interviews conducted at Agriculture Research Centres (ARCs), for example, suggest that they are underfunded and underdeveloped, although they play a significant role in the rate of expansion and innovation of the food-processing industry. The range of instruments available at the ARCs tend to be simple, limited, and primarily traditional, focusing mainly on research that benefited subsistence farming.

The GTP2 also urges the "upgrade of knowledge and skill of technology absorption and utilization capacity" (MOFED, 2015, p. 19), but our data suggest that firms do not necessarily fail to innovate or expand because they are unable to absorb or use technologies. Our observations also contrast with suggestions from existing literature that technology absorption is problematic (Lall et al., 2010) and possibly reflects a change in how technology dynamics take place in a more globalized economy. In reality, firms receive extensive help from foreign technology providers in adapting and using technology. International buyers (e.g. a Chinese firm outsourcing garment cutting-making-trimming (CMT) to an Ethiopian firm) also tend to share part of their technologies (e.g. production techniques, designs), but only to the extent necessary for operations to run efficiently. For some firms this means

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sending experts to Ethiopia for several months to oversee the set-up and overall productivity of the production process. All firms interviewed for this research stated that the purchase of new foreign machinery comes with extensive training, and that the providers also provide help in case of occasional problems, although we observed that the intensity of training, support and aftercare are considerably more intensive for sectors where machinery and overall technology is more complex and specialized (e.g. in the food-processing sector).

The Ethiopian government furthermore perceives the process of technological innovation to revolve around identifying, compiling and analysing "the relevant value adding technology information and databases in order to provide them for science and technology development, and support and follow-up the technology duplication and adaptation processes" (MOFED, 2015, p. 43). The interviews undertaken for this research reveal the increasing efforts of government institutions to identify and catalogue technologies for transfer, but we also find that firms in the manufacturing sector are already fully aware of where to acquire technology, in part because "technology sellers" have incentives to inform and support firms on a continuing basis (both through direct contact and trade fairs held in Ethiopia), and in part because the majority of the firms actively and regularly search the Internet to find out about technology characteristics and developments. Insights from our interviews suggest that it would be more effective when "medium and large manufacturing industries [are] supported and encouraged to set up their own research units" (MOFED, 2015, p. 43), rather than to pursue efforts to map international sources of technology. This is not to argue that firms will perform better by supporting R&D rather than the adoption of existing technology, but that government resources are better spent on promoting R&D, or at least not on cataloguing existing technologies, because they are already effectively identified and transferred by the "market".

In the GTP2 there is a stronger focus on technological learning than in the GTP1, which is envisaged to take place through FDI, implementing the Kaizen management system, and upgrading institutional capacity. With an Investment Expansion Program, for example, the Ethiopian government aims to attract "new" foreign and domestic investment, and at the same time, another programme will stimulate the development of new industries by "creating industrial linkages, expanding both domestic and foreign trade and improving labour and capital productivity" (MOFED, 2015, p. 30). Interviews suggest that there may be some linkages between firms, although those between domestic and foreign firms are not necessarily conducive to knowledge transfer. The interview data furthermore indicate that firms use linkages to provide benefits in a variety of ways (e.g. sharing production and technology in times of high demand), although the intensification of linkages does not necessarily result in the creation of new industries. In addition, labour and capital productivity do not seem to be immediately pressing issues; firms suggested that ease in training non-skilled and skilled employees, and being able to scan for and acquire capital are more important—although technical personnel, particularly with practical experience, are in limited supply. Nevertheless, our interviews gave little indication that government policy achieved significant learning between domestic and foreign companies, despite policy tools such as technology-transfer agreements. The firms with sufficient capabilities and financial capacity pursued learning by actively engaging with foreign buyers and by using design suggestions, international certifications and expert insourcing to achieve gradual technological learning.

In terms of the industrial sector, the government aims with GTP2 to focus on "light manufacturing industries", which are "labour intensive", but at the same time to "establish the foundation which enables to create an industrialized country moving into the development of strategic heavy industries" (MOFED, 2015, p. 28). Particular focus is given to clusters and industrial parks as the means to attract investment; for example, "four pilot agro industry parks" will be linked with "millions of smallholders" for quality supply inputs. Our firm interviews suggest, however, that labour-intensive industries show limited rate and depth of upgrading, which in turn may not provide the basis for Ethiopia to

move from light to heavy (and more technology-intensive) manufacturing. We find that industrial clusters and parks are a helpful way of attracting foreign investment in labour-intensive sectors, but the neglect of technology transfer and foreign–local linkages embedded in policies to guide such clusters and parks inhibits learning, upgrading and innovation among Ethiopian firms in the long run. This is not because of unwillingness on the side of policy-makers, but rather—and this is a main finding of the research—that policy-makers themselves need to go through a process of gradual capability accumulation to learn how to effectively apply policies for capability accumulation in the private sector.

The GTP2 also emphasizes the importance of small and micro enterprise development and the government's aim to "enhance productivity, technology learning and growth" (p. 30). In light of empirical evidence that there is disproportionately greater inventive activity as firm size increases (Soete, 1979), it is questionable to what extent such structural changes can take place in these particular types of firms as both institutional capacity for technology development and capacity at firm level are limited. Empirical studies also suggest that R&D expenditure increases as firm size increases, although many of the available studies provide evidence from developed countries, e.g. Israel, USA, or Taiwan (see for example Shefer & Frenkel, 2005; Tsai & Wang, 2005). The limited research on African countries suggests, in contrast, structurally consistent and low rates of innovation, irrespective of firm size (Amin & Islam, 2015). Our findings from Ethiopia indicate that R&D intensity is higher in larger firms, not necessarily because they are larger but because these concern either Ethiopian firms that have accumulated a significant (international) stock of knowledge over time and have subsequently developed, diversified and specialized, or alternatively because these concern larger foreign firms that are part of foreign entities and receive R&D skills and knowledge from the international office at which such activities take place. Moreover, the difference in structure and dynamics between sectors determines the extent to which firms benefit from being "large"; in the food-processing sector we observe large-scale production to achieve high efficiency, while in the leather and garment sector, such returns on scale are not immediately evident. R&D does take place in the food-processing sector, but not because of scale but rather because of the technology characteristics (i.e. complex, large-scale, precision machinery and procedures). These observations are in line with research that suggests that high technological opportunity and "appropriability" (such as in the more capital-intensive sectors) is associated with increased technological innovation as firm size increases, and that such characteristics differ considerably between sectors (Dasgupta & Stiglitz, 1980; Nelson & Winter, 1982; Pavitt et al., 1987).

Furthermore, the GTP2 suggests that sectoral institutions should be able, as they already are to some extent, to "assess appropriate technologies and organize information, adopt and transfer technologies to the private sector through improving their research and extension capacity" (p. 29). Findings from this research suggest that at present the rate of research depends on the maturity of the sectoral institutions, with more established institutions (e.g. Leather Industry Development Institute) having accumulated more research capability in terms of activity, expertise and employees, than younger institutions (e.g. Food, Beverage and Pharmaceuticals Industry Development Institute). We also observe that the research that is undertaken in sectoral institutions is not sufficiently taken up by firms in the private sector, possibly because (as one interviewee at a foreign firm argued) these institutions still have relatively limited research capacity compared to similar institutions in other countries (e.g. in R&D facilities, design and certification services), or possibly because the institutes do not always undertake the research that meets private-sector needs (as another interviewee at one of the sectoral institutes argued), and potentially because there is insufficient supply of, and demand for, communication between firms and institutions.

The above discussion shows that the GTP2 insufficiently addresses issues of technological innovation in the Ethiopian economy. Significant economic transformation does not call for more industrial

policy, however, but rather for a reconfiguration of industrial policy that appropriately incorporates technology-transfer processes in firms in the context of global value chains and markets.

5 | CONCLUSIONS

With the resurgence of industrial policy on the development agenda it is important to discuss the extent to which the definition and policy formulation of industrial policy is clear and exhaustive. This article argues that the definition of industrial policy is in itself a vague and ambiguous concept that is insufficiently narrow in focus and incoherent. The lack of clearly defined principles makes the use of industrial policy (in defining, implementing and monitoring) problematic. We find that the concept of industrial policy lacks significant consideration in notions of structural transformation such as learning, upgrading and innovation, both in definition and policy formulation. As an exercise, this article reviewed Ethiopia's development strategies and shows that there is some discussion of structural transformation in policy, but also an inherent assumption that learning, upgrading and innovation are processes that happen automatically as domestic firms interact with international firms and enter global value chains. In reality, this process is far more complex and demanding.

The article reaches two broader conclusions. If industrial policy is seen as relevant only in addressing market imperfections to achieve optimal resource allocation, and this conceptualization is widely pursued in underdeveloped economies, policy-makers might have difficulty enacting long-term structural transformation. For Ethiopia we show that technological innovation and linkages, which are often assumed to take place automatically, might in that case become unproductive and so not provide firms with the required productivity growth. We find that industrial policy in Ethiopia is not aligned with what firms need, government provides support that is not necessarily required (e.g. cataloguing available machinery), while at the same time omitting essential, cost-effective and more valuable support (e.g. regulating technology transfer, systematizing and funding foreign expertise into domestic firms).

Another important finding is that policy-makers themselves need to undergo capability development to effectively implement policies in support of capability development in the private sector. We find that policy-makers in Ethiopia still have limited knowledge and skills to effectively conceptualize, monitor and evaluate technology transfer and development, although there are the means to address those constraints. It suggests that 'government failures' traditionally described in economic terms as government having insufficient and asymmetric information, are partially repairable if only policy-makers could gradually learn and gather best practices, either from domestic practice or learning from earlier international experiences. Government-to-government learning, as already happens to some degree between sectoral institutions in Ethiopia and India and China, might be a key avenue to improve capability accumulation among policy-makers.

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