Geoforum 74 (2016) 74–87

Contents lists available at ScienceDirect

Geoforum

journal homepage: www.elsevier.com/locate/geoforum

The evolution of the electronics industry in Johor (Malaysia): Strategic coupling, adaptiveness, adaptation, and the role of agency

Leo van Grunsven [a], Francis E. Hutchinson [b,*]

[a] Section Economic Geography, Department of Human Geography and Planning, Faculty of Geosciences, Utrecht University, Utrecht, The Netherlands
[b] Regional Economic Studies Programme, Institute of Southeast Asian Studies, Singapore

ARTICLE INFO

Article history:
Received 24 July 2015
Received in revised form 5 April 2016
Accepted 31 May 2016

Keywords:
Electronics
Strategic coupling
Robustness
Adaptiveness
Adaptation
Human agency

ABSTRACT

Bringing together concepts from the global production networks and evolutionary economic geography literature, this article empirically examines the trajectory of the electrical and electronics industry in Johor (Malaysia). Based on trends in firm entries and exit as well as interviews with companies, we find limited robustness in the industry's trajectory. While there is evidence of the role of 'structure' in this outcome, we argue that human agency – particularly the actions of subnational policy-makers – is key. This is manifest in a preference for fostering regional 'adaptiveness' through the often uncritical promotion of a diversity of economic sectors. This compromises the meaningful pursuit of regional 'adaptation' in the form of new and more complex branches emerging from existing industries. This arrested development, in turn, hinders an effective strategic coupling between the regional economy and multinational corporations, thus undermining regional resilience.

1. Introduction

In past decades, a number of sub-national regions in Southeast Asia have grown through pursuing export-oriented industrialization. This 'model' has been enabled and shaped by connections to global and regional production networks led by Western and Asian multi-national corporations (MNCs).

In the production networks literature, these connections have led to the concept of 'strategic coupling' to denote the active and intentional linking of, on one hand, firms that have sought to improve cost competitiveness and, on the other, regions that have sought to boost growth by diversifying their economies (Coe and Yeung, 2015; Yeung, 2009, 2015).

In many of these regions, investments were in the electrical and electronics (E&E) sector which – due to its employment and output – became the dominant economic activity. Indeed, over past decades, a number of E&E industry 'spaces' have developed in Southeast Asia. Reflecting the collective weight of decisions taken by MNC headquarters over time, these various 'spaces' have acquired varying levels of sophistication.

Beyond earlier questions of the 'dark sides' of strategic coupling to production networks (MacKinnon, 2012; Yeung, 2015), the debate on regional economic development in Southeast Asia has started to focus more on resilience, due to the effects of periodic economic crises and new forms of territorial competition. Of late, scrutiny has focussed on three aspects. First, the resilience of production networks (Obashi, 2009; Ando, 2013). Second, the robustness of the E&E industry in regional production complexes (Edgington and Hayter, 2013; Rasiah, 2009; Rasiah et al., 2014). Third, after an initial spate of interest in the early 2000s (Ernst, 2002), there is a renewed interest in the opportunities for and experiences with advancing in production networks. This specifically relates to the matter of technological catch-up and upgrading – or rather the absence of it – in GPN-linked industries in a number of locations (Aldaba, 2015; Edgington and Hayter, 2013; Intarakumnerd et al., 2015; Rasiah, 2010, 2012). With the exception of Edgington and Hayter (2013), this analysis has been macro-level and cross-sectoral.

Recently, thinking on strategic coupling has evolved in several ways. First, towards recognizing there are multiple ways that regions can couple to globalizing or regionalizing industries and firms. Second, coupling does not necessarily have to be strategic and can be unintentional or inadvertent. Furthermore, it can also be dynamic (Yeung, 2015). An understanding of coupling as dynamic acknowledges a range of scenarios, including decoupling and recoupling. The conceptualization and understanding of these scenarios has been enriched by attempts to forge a dialogue between a GPN or strategic coupling conceptualization of regional-industrial development and evolutionary economic

* Corresponding author.
E-mail address: fhutchinson@iseas.edu.sg (F.E. Hutchinson).

http://dx.doi.org/10.1016/j.geoforum.2016.05.011
0016-7185/

geography approaches and concepts (for example MacKinnon, 2012). These have diversified both 'structure' and 'agency' perspectives regarding the mechanisms of regional-industrial evolution. That said, attempts to 'map' and interpret the post-creation trajectory of GPN-linked industries in Southeast Asia such as E&E from a micro-perspective are scant.

In this article, we consider the export industrialization path of Malaysia's southern state of Johor, with a focus on the evolution of the electrical and electronics (E&E) sector over a twenty-year period. This was well-covered in the literature in the 1990s, due in part to interest in the 'SiJoRi' Growth Triangle. The latter concept was used by the national governments of Singapore, Malaysia and Indonesia to market the Singapore, southern Johor, and Riau Archipelago cross-border region as a single investment destination. Little attention has been given to the longer term 'robustness' of the path itself, especially in terms of the evolutionary trajectory of the dominant industry in micro-perspective. Here, robustness refers to durability and positive path adaptation by actors in response to, or in anticipation of, adverse events.

The goal of this article is to offer insights into the evolution of the export-oriented industrialization path – in particular the development trajectory of the regional E&E industry in a specific Southeast Asian region. Through this analysis, the article contributes to the evolving thinking on resilience, which has so far concentrated on Western production 'spaces'. Beyond this, our case contributes to debates regarding regional-industrial development and resilience in several ways. First, understanding the region as a node in global and regional production networks, it examines industry evolutionary trajectories and distinct coupling processes. Second, also considering the region as a complex adaptive system, we examine mechanisms underlying coupling processes that go beyond GPN frameworks by drawing on evolutionary economic geography (EEG) theory. We extend the dialogue and link between GPN and EEG perspectives – advocated by MacKinnon (2012) and others – by using recently-developed concepts in the evolutionary approach to regional resilience. These enrich the conception of the role of human agency in relation to the institutional environment within which a given industry evolves.

We demonstrate that the trajectory of the E&E industry in the Johor region raises questions about its robustness. We argue that – beyond structural dynamics in the industry – exploring agency in the form of decisions taken by policy-makers particularly at the sub-national level helps understand the present situation. We contend that in pursuing 'adaptiveness' through rather uncritically promoting a diversity of economic sectors, policy-makers have not paid sufficient attention to 'adaptation' in the form of deepening capabilities within the E&E sector. We also argue that this behaviour is due to local incentives set within a specific institutional environment that shape the behaviour of agents. We conclude that, without interventions towards positive adaptation (involving technological deepening), path maintenance will be jeopardized and the quality of growth will remain mediocre at best.

The article proceeds as follows. In the next section, we frame our industry and regional analysis conceptually with reference to recent insights into industry evolutionary trajectories and the 'state of the art' GPN and regional resilience literature. The following section introduces the region and – after a brief methodological discussion – the E&E industry and its development in Johor. The fourth section advances an interpretation of the industry's trajectory. The last section concludes.

2. Theoretical framework

There are several ways a new industry can emerge in a region's economy. Martin and Sunley (2006) identify the following: indigenous creation; technologically-related diversification; upgrading of an existing industry; and transplantation from elsewhere. In Southeast Asia, the latter has been the dominant source, as investments by MNCs have been the main driver (Felker, 2009). While attractive for regions seeking to rapidly develop their industrial base, this method also exposes them to evolving corporate strategies and locational 'preferences', as companies respond to changing circumstances and the differing development of local environments (Edgington and Hayter, 2013).

Martin (2010) sets out four phases in the evolution of an industry in a given region (Fig. 1). In the first, pre-formation stage, the stimuli for a new industry form. However, there is a 'window of opportunity' as alternative locations for the industry are still possible. Fundamentals and other regional environmental factors, in relation to corporate objectives, determine whether the opportunity can be grasped. If it succeeds, the industry enters the second or 'creation' phase with the establishment of a sufficient number of firms. With the increase of mass due to the arrival of other firms, the industry is established and enters the third or 'positive lock-in' phase. Subsequently, the industry can follow one of several trajectories. It may continue to exhibit vigorous growth as firms evolve positively through deepening or renewing operations, and the industry mutates by developing new branches (Martin, 2010). Alternatively, due to external competition or rigidification, the industry may lose momentum and decay with key firms downsizing, moving out of the region, or closing. Or, after a difficult stage, 'reinvention' may occur if the region is dynamic enough to remain appealing to firms. The trajectory and size of an industry can be measured along the 'Y' axis by indicators such as: the number of firms; total number of workers; output; or value added.

In the preformation stage, the groundwork for strategic coupling can be laid that deepens in the second and third stages as a production platform role is firmly established. The first ensuing scenario is one of maintaining strategic coupling whereby the mode may change from an initial production platform (structural coupling) to international partnership (functional coupling). This augurs well for the industry's upgrading and advancement in production networks. The 'loss-of-momentum' trajectory signifies either: decoupling as a production platform role is lost; or prolonged low level coupling in structural form with a loss of dynamism. The 'reinvention' or 'rejuvenation' scenario equals a strategic coupling-initial decoupling-subsequent recoupling sequence whereby structural coupling may give way to indigenous innovation (organic coupling) or partnership (functional coupling) (MacKinnon, 2012; Yeung, 2015).

An industry trajectory is robust if it maintains strategic coupling for an extended period, and internal change reveals positive renewal as well as deepening through mutation. An industry's trajectory contributes to regional resilience if it shows features of robustness. For regions, while opportunities for the creation of new industries are important, so are structures that promote positive trajectories of existing industries.

The latter brings us to consider the underlying mechanisms of coupling processes. One line of thought focusses on structural factors. GPN frameworks refer to the mode of coupling and regional assets, in the forms of human capital, infrastructure, technology and innovation system, and industrial organization (Yeung, 2015). In evolutionary economic geographic literature, reference is made to a broader set of elements. In addition to source, these include: (initial) structure; fundamentals; relatedness; external conditioning factors; externalities; absorptive capacity; local technological system; and distance (proximity) to other regions with other endowments (Boschma, 2015; Martin and Sunley, 2006, 2015; Martin and Simmie, 2008; Martin, 2010; Simmie et al., 2008; Simmie and Martin, 2010; Yeung, 2015).