The spatial configuration of private investments by economic actors in Perak

A consideration of centricity of the regional urban system of Southern Perak (Peninsular Malaysia)



Luka Raaijmakers (6314554) Under supervision of dr Leo van Grunsven

Faculty of Geosciences Department of Human Geography and Planning

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List of abbreviations

DOSM	Department of Statistics Malaysia : Governmental institution that gathers statistical information about Malaysia.
IDR	<i>Institut Darul Ridzuan</i> : is a think-tank body for the Perak State Government that undertakes research on socio-economic and public policy recommendations, strategies and facilitation.
GDP	<i>Gross Domestic Product</i> : The monetary value of all finished goods and services made within a country during a specific period.
FIZ	<i>Free Industrial Zone</i> : An industrial zone that offers export-oriented foreign firms tax benefits. Mostly used as a regional manufacturing or distribution base.
MIDA	<i>Malaysian Investment Development Authority</i> : Governmental institution to oversee and drive investment into the manufacturing and services sectors in Malaysia.
MR	Malaysian Ringgit: The national currency of Malaysia.
NCER	Northern Corridor Economic Region : A development plan encompassing the four northwestern states of Malaysia with an aim to transform the region into a sustainable and socio-economically balanced region by 2025.
NCIA	<i>Northern Corridor Implementation Authority</i> : The statutory body responsible to establishing the NCER's direction, policies and strategies.
PKNP	Perbadanan Kemajuan Negeri Perak : Perak State Development Corporation. The key state agency entrusted to spearhead the economic development and socio-economic growth in the State of Perak.
UPEN	Unit Perancang Ekonomi Negeri : State Economic Planning Unit. State agency that develops, plans and coordinates economic policies and strategies to improve the economic sector of Perak.

1. Introduction

As Malaysia aspires to become a developed and high-income nation and national levels of urbanization are rising, urban centres gain importance in delivering substantial economic growth and helping to reduce poverty. The acknowledgement that urban regions play a key role in economic performance and productivity has implications for urban structure and regional urban systems in the realms of the economy, society, business environment, governance and spatial structures.

1.1 Peninsular Malaysia's urban system configuration

It has been increasingly recognized that Peninsular Malaysia's urban system and its main cities hereof face several issues and challenges in respect of spatial structure (Van Grunsven, 2019). As a matter of fact, several research documents and policy reports, including the World Bank (2015), the National Urbanization Policy (NUP1 and NUP2, 2016-2026), as well as the third National Physical Plan (2015-2020), address issues in urban performance at the city and conurbation level. In line with the mainstream approach, so far, the urban system has been conceived as hierarchical (Federal Department of Town and Country Planning Peninsular Malaysia, 2010; 2016). However, shortcomings to the hierarchical approach emerge mainly at the regional and scale levels of those below the regional level. Concerning spatial structure, insights are advancing of the relevance to performance of dimensions beyond city size (Ferreyra & Roberts, 2018). At the regional and subregional scale this refers to urban configuration reflecting internal spatial structure, and, respectively, to functioning and inter-settlement structure. At both levels, characteristics related to density and mass are associated with economies and productivity. Specifically, at the lower level this includes land-use, integration and connectivity, emphasizing the role of morphological and functional features against a hierarchical inter-settlement structure mostly holding back productivity. One of the ways the mid-level cities could assume a larger role and develop more mass is by enhancing regional urban structures by steering the development of the urban system (World Bank Group, Khazanah Nasional & and Economic Planning Unit, 2015). Currently, the mainstream approach has a tendency to privilege higher order centres augmenting monocentric development. Alternatively, the idea of networking is the view of assemblages of proximate urban centres displaying high connectivity, constituting polycentric urban regions, thus 'producing' agglomeration economies through 'combined' size (Van Grunsven, 2019).

1.2 Polycentric urban development

Polycentric spatial urban structure has attracted increasing interest from economists, urban geographers and planners who believe it has the potential to function as a strategic instrument to enhance the economic performance and productivity of cities and regions as well as delivering more balanced and sustainable patterns of development (Dobbs et al., 2011; Burgalassi, 2010). On the assumption of spatially integrated urban centres that have a high degree of interactions between economic agents, urban centres within the polycentric urban region should be able to combine their (economic) mass in such a way that urban centres can economically perform better than by operating in isolation, and so increase their overall competitiveness, after which the whole is greater than the sum of its parts. In other words, the polycentric urban region in its entirety would benefit from defragmentation through connectedness and interaction.

As to network conceptualisation, Fundacion Metropoli and Think City have written a joint report on Malaysia's urban future proposing several urban "diamonds" which are situated in between "supercities" (2018). This vision entails the 'in-between' regions of the western coastline of Peninsular Malaysia to be structured by means of interconnected urban regions conceptualised by territorial "diamonds". Practically, this vision argues that the "Kedah - Perlis Diamond" north of Greater Penang, the "Perak Diamond" in between Greater Penang and Greater Kuala Lumpur and the "Melaka-Muar Diamond" in between Greater Kuala Lumpur and Greater Iskandar are shaped to be spatially integrated and connected urban configurations (Figure 1.1). The Malacca Straits Diagonal report argues that the Perak region is predominantly led by its largest city, Ipoh, whereas the urban region would in this case represent a strategic node articulating the connection between Penang and Kuala Lumpur, filling a void in the settlement system of the Malacca Straits Diagonal.



Figure 1.1: The "diamonds" and supercities of the western coastline of Peninsular Malaysia (Fundacion Metropoli & Think City, 2018).

1.3 Main theme of the joint research and focus of this thesis

In practical terms, this research targets regional urban system development and functioning in Perak, aiming at unravelling the configuration and functioning of regional urban settlement systems, including current presence of polycentricism, as evidenced by inter alia functional areas of centres, interaction patterns, distribution of investments and economic function, overall urban mass and performances. Consequently, the potential to develop or augment mass through urban polycentricism at regional level is investigated (van Grunsven, 2019). Considering the need for indepth analysis to appraise development and performance of regional and sub-regional urban systems, as well as the focus on the potential of polycentric spatial structure at regional level, the research approach opts for a case study. Perak's urban structure is scrutinized in detail to unravel the characteristics of the physical and socio-economic environment, physical connectivity, and intra- and inter-centre interactions of individual urban centres in the Perak urban system. From

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this starting point, the study explores the eventual presence of polycentricity in the functioning of the regional urban system, assessing its relevance from the perspective of performance related to urban structure and inter settlement configuration. It follows an investigation of the potential for the Southern Perak region to develop into an urban structure whereby network substitutes for the size of a main centre to enhance polycentricity with a view to building more agglomeration economies, density and mass, deriving into feasible performance gains (van Grunsven, 2019).

Providing the basis for and criteria in the definition of polycentricity, several dimensions are addressed:

- Morphology: equal size urban centres located in proximity
- Functional: economic specialisation and complementarity; borrowing size and economic 'scale'
- Relational: multi-directional connectivity and flows, with a minimum and maximum time taken to cross distance
- Institutional: coordination-driven integration

Within the context of the joint research, this thesis' focus is on the functional dimension of polycentricity. It does so by unravelling planned industrial policies and actual patterns of private investment as well as examining interactions between economic agents and discussing a set of conditions for a polycentric configuration within the urban system. Ultimately, this will result in a presentation of findings related to urban and economic mass and centricity of the Southern Perak urban region.

1.4 Aim of the thesis and research questions

The aim of this thesis is to clarify centricity in Perak's urban system and to investigate whether the urban system can be considered as polycentric (or an alternative urban configuration such as monocentricism or an archipelago). This is carried out from an economic perspective with spatial aspects approached by private investments. Within the context of this research, private investments, as a form of economic activity, are used as indicator for patterns of specialisation in urban centres which can ultimately lead to complementarity. Derived from this, a statement on centricity is explained by (I) a comparison of Perak's investment performance to that of other states in Peninsular Malaysia; (II) an analysis of the reigning industrial policy on federal, regional, and city scale levels; (III) a discussion of the characteristics and spatial distribution of private investments in Perak; (IV) and a description of conditions for centricity in the urban system. Based on the above, the following main research question has been formulated:

"What is the economic performance of Southern Perak measured by levels of private investments, how are private investments spatially distributed over the Southern Perak urban region and what does the spatial distribution of private investments indicate about the occurrence of complementarities in the regional urban system?"

This question will be answered based on the following research questions:

- How well does Perak performs regarding attracting private investments in comparison with other states in Peninsular Malaysia?
- What is the regional industrial policy, based on this, what location patterns of private investment are envisioned and what are the consequences for planned specialisation?

- What are the characteristics and spatial distribution of private investments over the region and what is the implication for specialisation and complementarity?
- What is the perception of economic agents on the regional assets of Perak and what does this tell about the occurrence of agglomeration economies in the regional urban system?

1.5 Scientific relevance

The scientific relevance that this research holds is mainly related to the specific way in which polycentric urban development is analysed. Most of the available empirical evidence in the field of polycentric studies is based on node characteristics by which interaction patterns can be mainly explained by distance and the size of nodes using methods such as rank-size relations and employment to work commuting patterns (Van Oort, Burger and Raspe, 2010). Van Der Laan states that authors often focus on daily flows of people and daily urban systems (1998). In this research the conceptualisation of urban network formation is tested by investment patterns of economic of economic agents. This relevance of this approach is emphasized by Taylor, Evans and Pain that state that the phenomenon of the polycentric urban region is an on-going process that can be explored best through methodologies that deal directly with the agents doing the networking (2008). Another author that argues that to fully understand the role of polycentricity in economic outcomes, empirical research that utilizes the functional and industrial dimensions of the concept, as well as the morphological dimension is needed. Such research is elusive at present, primarily due to empirical complexity and data availability (Seymour, 2017). Apart from the approach, the case study area is of relevance as well. This is stresses by Xie, Hou and Herold that stress that despite the fact that neither of the qualifications *developed* or *developing country* impedes reaping the benefits of polycentricity, in the majority of studies on polycentric urban development the case study area is a region in Europe or North America (2018). Moreover, most studies on urban and economic development that study Malaysia do this by taking Kuala Lumpur and its surroundings or Penang as case study. Therefore, a study on centricity in Perak is scientifically relevant.

1.6 Outline of the thesis

The thesis starts with the context of the research in which the case study area and its characteristics are described. Next, the theoretical underpinning on which the research builds will be discussed. Then follows a detailed description of the methodology and data used to answer the research questions. The results part of this thesis starts with a benchmark of investment performance, after which it proceeds with a policy analysis, private investment characteristics and spatial distribution to end this part with the conditions for centricity. At last, a conclusion of centricity and a reflection of the thesis complete the study.

2. Introduction to the study area

This chapter presents an overview of the state Perak. As stated, the objective is of this thesis to shed light on the urban configuration of the region from a functional approach, verifying whether a polycentric structure can indeed be identified. As the boundaries of the so-called Perak Diamond are not definite and require further analysis, this section describes the identified study area by means of demographic data as well as its history, economy and concludes with a city description.



Figure 2.1: Left-hand side: The location of Perak in Malaysia (Google Maps, 2019). Right-hand side: The ten administrative districts of Perak (Department of Statistics Malaysia, 2010)

2.1 Location and administrative districts

Perak is located in Peninsular Malaysia (Southeast Asia). It is one of the thirteen states of Malaysia, and the fourth-largest one (DOSM, 2019). The state's land borders are Kedah in the north, Penang to the northwest, Selangor to the south, Kelantan and Pahang to the east and Thailand to the northeast and is divided into 10 administrative districts¹ (Figure 2.1). The districts are further divided into municipal councils ('mukims' in Malay). The state's administrative capital is Ipoh, but the royal capital remains Kuala Kangsar because the palace of the Sultan of Perak is located here (Geografia, 2015). The signs of Dutch colonialism in the 17th Century, and the British Colonialism in the 19th Century, are still visible to this day in the Perakian history, culture and economy.

¹ The division among administrative districts of Perak is inconclusive in governmental documentation, that in some cases indicates to house 12 districts (Muallim and Selama are added). In this thesis, a total of 10 administrative districts are utilized (Figure 2.1)

2.2 Demarcation of the study area

The study area, as envisioned by means of the "Perak Diamond", has no official boundaries as it is a conceptual area. Broadly taken, the area covers the region between Taiping in the north, Sungai Siput in the east, and Sungkai in the south to run past Teluk Intan to Bagan Datuk in the west (Figure 2.2). The largest city is Ipoh, followed by Lumut-Sitiawan, Taiping and Teluk Intan. Other cities are Kuala Kangsar, Sungai Siput, Batu Gajah, Gopeng, Pantai Remis, Seri Iskandar, Kampar, Tapah and Bidor. The landscape in between these cities is characterized by agricultural land and forestry (see Appendix A). Most of the agricultural land in the south-west of Perak serves the goal of palm oil plantations (Appendix B).



Figure 2.2: The Perak urban system and the demarcation of the case study area (Federal Department of Town and Country Planning Peninsular Malaysia, Ministry of Housing and Local Government, 2016)

2.3 Demography

In 2017, Perak had 2,5 million inhabitants (DOSM, 2019). The state has further urbanized in the past three decades which increased the population likewise, albeit not at the same pace as other areas in Malaysia. When looking at the geographical distribution of the Perakian population, it is

noted that the majority is concentrated in the Kinta district where Ipoh is located (823,000), followed by Larut-Matang-Selama (357,000) and Manjung (252,000) (DOSM, 2019) (Figure 2.3).

District	Population in 2017
Kinta	823,000
Larut-Matang-Selama	357,000
Manjung	252,000
Hilir Perak	227,000
Batang Pedang	198,000
Kerian	194,000
Kuala Kangsar	173,000
Perak Tengah	111,000
Hulu Perak	101.000

 Table 2.1: The population of Perak divided by administrative district (DOSM, 2019)

2.4 Economy

Just after independence, until 1970, Perak was the most industrialized state in Malaysia with a thriving industrial sector. Favoured by a strategic location and abundant natural resources, Perak has historically been benefitting from its valuable minerals trading in tin-ore but also agriculture, fisheries and rubber industries brought wealth to the state. This advantage was translated, in the earlier history, in an economic and cultural flourishing state where residents had one of the country's highest standards of living. Nevertheless, because of the gradual depletion of natural resources and the drop in the price of tin-ore, the once most populous state of Malaysia is now experiencing an economic downturn as the socio-economic situation has gone from bad to worse and Perak is now among the poorest states of Malaysia (Yew Yin, 2018). Nowadays, the state is also facing issues related to a massive manpower drain to higher-growth neighbouring states such as Penang, Selangor and Kuala Lumpur (Mun, 2007).

The economy remains focused on agriculture, although services and manufacturing are of greater importance to the economy. A shift in economic thought with a strategy to attract (foreign) manufacturing firms (in accordance to the national strategy) is reflected in the composition of Perak's economy (Abdullah, 2012). In specific, the state focuses on iron and steel-related industries, beneficiation of minerals, automotive and transport equipment, machinery and fabrication, electronics, and food manufacturing (InvestPerak, n.d.). Perak also hosts several tourist attractions. Cultural, heritage and natural assets are mainly concentrated in four areas: Food, heritage and mining history in Ipoh and its surroundings; maritime attractions in Lumut; archaeological and geological sites in Lenggong; and zoological, botanical and heritage interest points in Taiping (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008).

2.5 Infrastructure

Perak is endowed with basic infrastructure. Main connections are the North-South highway and the recently completed electric rail service, connecting Kuala Lumpur to Padang Besar (in north Perak at the Perlis border). The Perakian region hosts 3 airports (one public and two private ones), a container port, bulk port, inland port and marina (Geografia, 2015) (Figure 2.2). By road, getting to Penang takes approximately two hours from Ipoh and Kuala Lumpur can be reached within three hours from Ipoh. Infrastructure in Perak is managed by means of a Development Fund which amounted for almost 400 MR million in 2016 (Malaymail, 2015). The recently elected government announced to continue investing in the development fund and said that the infrastructure development allocation was not tied to a respective area but based on priority.

2.6 Cities' profiles and economic activities

When zooming in on the cities of Perak, their profile can be described in terms of administrative, cultural and economic characteristics. In this section, an introduction to a selection of cities and districts is provided to contextualize the locational area of the thesis. As anticipated, the cities' profiles description is not limited to the case study area beforehand.

Ipoh

With a population of more than 700,000 people (and forecasted to increase to 800,000 by 2020, (Department of Statistics Malaysia, 2019) Ipoh is the largest urban centre in Perak and is recognized in the Perak State Structure Plan as the state capital (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008). Originally a tin mining town but the economic history relates to foundries and the printing industry as well dating back to 1852 (Ipoh Municipal Council, 1962). Nowadays, Ipoh is emerging as regional service and manufacturing centre. Its main functions include public, retail, health and education services. Furthermore, the city specialises in manufacturing electronics, metal products, processing of natural resources, machinery and transport equipment. The inland port of Perak is located in Ipoh. Looking at current and future economic development, The Ipoh Local Plan promotes a multi-nucleus urban structure featured by a commercial town centre, aviation industry, tourism-oriented area and heavy industries to the east, an industrial and a high-tech centre to north (Geografia, 2015).

Kamunting and Taiping

Taiping is the second largest urban centre in Perak with a population of more than 217,000 (Department of Statistics Malaysia, 2019). It is recognized in the State Structure Plan as the district capital. Other than a district level administrative, services and commercial centre, Taiping is featured by heritage, culture, tourism, recreation and education assets serving as supplementary functions (Perak State Economic Planning Unit, 2017). Kamunting, located in the vicinity of Taiping, hosts the industrial zone of this area. Looking at current and future development plans, Kamunting is the subject of the Greater Kamunting Blueprint that aims at revitalizing its service and manufacturing sectors, as well as infrastructure and education (Northern Corridor Implementation Authority, 2017)².

Kampar, Bidor, Teluk Intan and Tapah

These four cities, located in the southern part of the region, have a combined population of over 105,000 inhabitants (Department of Statistics Malaysia, 2019). Historically, Kampar's economy was based on tin mining activities, but this industry declined after the establishment of the North-South Expressway. Nowadays, Kampar has re-emerged as a university town, where the Tunku Abdul Rahman University College and the Universiti Tunku Abdul Rahman combined host more than 20,000 students (Geografia, 2015). Teluk Intan, with a population of nearly 42,000 is recognized in the Perak State Structure Plan as district capital (Department of Statistics Malaysia, 2019). It serves as a service hub to surrounding agricultural activities and is a relatively important institutional centre. Bidor and Tapah are significantly smaller towns, categorized as local service

 $^{^{\}rm 2}$ A detailed description of this plan can be found in Chapter 6

centres featured by an abundance of agricultural and residential land (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008).

Kuala Kangsar

Kuala Kangsar has a population of approximately 55,000 inhabitants (Department of Statistics Malaysia, 2019), and is the royal capital of Perak. In the State Structure Plan the town is defined as a high order local centre. Other than being a district administrative centre, it is identified as a relevant hub in terms of higher education, higher order commercial services, tourism and industrial hub specialising in food, agricultural and timber products (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008). Also, Kuala Kangsar's relative importance is associated with its role as gateway to the region.

Lumut-Sitiawan

Lumut-Sitiawan, with a combined population of 199,500 (Department of Statistics Malaysia, 2019; Data Asas Negeri Perak, 2016), is recognized in the State Structure Plan as district capital (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008). Lumut is, alongside Ipoh and Taiping, among the most important urban centres of Perak in economic terms. Its main asset is recognised in the secondary port and bulk terminal, which includes shipbuilding and repair industries (Geografia, 2015). The town site itself is relatively small, but there are significant industrial and residential hubs located in the northern and eastern periphery (Department of Statistics Malaysia, 2012), including Sitiawan, with a population of approximately 20,000 (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008). Surrounding agricultural activities comprise palm oil plantations (Appendix B) and industries includes oil and gas, chemicals, manufacturing, distribution (of for instance iron-ore) and ship building.

Seri Iskandar

Seri Iskandar has a population of approximately 52,600 residents (Department of Statistics Malaysia, 2019; Data Asas Negeri Perak, 2016). It is known for its role as higher education centre, characterized by a high proportion of institutional land use. As a matter of fact, it hosts the universities MARA University of Technology, Kolej Profesional Mara Seri Iskandar, Institute Kemajiran Belia Negara and the University Technology Petronas (Geografia, 2015).

Kerian

Kerian is a local municipality in the northeast part of the State close the Penang border. It has a population of approximately 120,000 inhabitants (Department of Statistics Malaysia, 2019; Data Asas Negeri Perak, 2016). The main towns within the municipality are Bagan Serai (8,304 inhabitants), Kuala Kurau (5,454 inhabitants) and Parit Buntar (3,857 inhabitants). Kerian's main economic focus is the agricultural sector, but the district is also characterized by nature-based tourism. Economic strengths are identified in rice padi's cultivations, alongside livestock, fruit and aquaculture.

Lenggong and Gerik

Lenggong, with a population of 2,013, and Gerik, with a population of 2,677 inhabitants, are located in the northern periphery of the State (Jabatan Perancangan Bandar dan Desa Negeri

Perak, 2008). Both towns are orientated on services to serve surrounding rubber plantations and other nearby agriculture activities. Gerik is also the administrative centre of the Hulu District.

Tanjung Malim

Tanjung Malim is a municipality close the Perak's Southern border. It has a population of 50,000 and comprises the towns of 'Proton City', Behrang, Sungkai and Slim River (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008). Proton City (Proton is a Malaysian car brand) is a major 1,600 hectares large industrial, commercial and residential development site that houses the Proton assembly factory. When fully developed, it is expected to have a population of 240.000 inhabitants (Jabatan Perancangan Bandar dan Desa Negeri Perak, 2008).

2.7 Development plans

Perak appears in an array of development plans by political bodies on the federal/national, regional, district and city/conurbation level such as the National Development Policy, Malaysian National Physical Plan, Five Year Development Plans and several economic corridors. These plans relate mainly to physical and industrial planning. Since Chapter 6 discusses industrial plans in detail and physical plans are irrelevant to this thesis, they will not be further be discussed in this section.

3. Theoretical Framework

In this chapter the theoretical underpinning of this research will be discussed, beginning with an introduction to the theory of polycentricity and its characteristics. Next, the functional dimension and the link to economic performance will be explained. Hereafter, the concepts of complementarity and specialisation follow. After a brief discussion on the role of industrial policy, the chapter concludes with a conceptual framework and a schematic overview of possible urban structure scenarios.

3.1 The concept of polycentricity

Regional and urban structures have long been in the scope of interest of economists and geographers. In the pre-industrial era, economic activity was concentrated in cities and restricted to the urban core whereby suburbs fulfilled a residential function. This was described as a hierarchical-nodal or centralised urban model (Pred, 1973; 1977). A growing realisation of the negative externalities of a centralised structure (such as the depletion of natural resources, noise, water and air pollution, loss of green areas, traffic congestion, intensive energy as well as rising rent prices and poverty rates) gave rise to the discussion on optimum city size (Capello & Camagni, 2000; Henderson, 1972). A topic that is nowadays still under discussion (Frick & Rodríguez-Poze, 2017), not only in economic and urban studies but also in environmental studies (Han, Zhou, Pickett, Li & Li, 2015).

Over the past decades, improvements in transportation and communication technologies enabled the emergence of urban regions with multiple centres (as opposed to a monocentric urban structure) to achieve externalities that are comparable to large monocentric cities (Lambooy, 1998). Researchers studying the urban system realised the importance of inter-urban interactions rather than focusing just on intra-urban flows (Kloosterman & Musterd, 2001). This is of key importance, since urban systems are blended in terms of intra-urban and inter-urban relations (De Goei, Burger, Van Oort, & Kitson, 2010). Consequently, boundaries of urban centres started to blur and overlap while metropolitan areas lost significance. According to this theory, daily urban systems between urban centres emerge, enabled by connectivity such as infrastructure and multiple transport modes and start forming a network rather than a monocentric region oriented towards one particular dominant centre. This is considered to be a polycentric urban structure. Importantly to note, and contrary to a metropolitan area, a polycentric urban region differs because spaces in between centres are not built-up (Parr, 2010). Even though the concept of polycentricism can be traced back to the late 19th and early 20th centuries (Green, 2007), recent literature still pointed at the vagueness of polycentricity (Granqvist, Sarjamo & Mäntysalo, 2019; Khiali-Miab, Axhausen & Grêt-Regamey, 2019).

The concept of polycentricism is exhibited at different scales: the national, regional, and metropolitan scale (Brezzi & Veneri, 2014). At the scale of the regional urban structure, the concepts of monocentricism and polycentricism are studied by means of two approaches: the morphological and functional approach (illustrated in Figure 3.1) (De Goei et. al, 2010; Meijers, 2008; Seymour, 2017). This research builds on the idea of regional polycentricity. This is understood as the co-location of multiple sizeable urban centres (or multiple urban nodes) in the same region which are separated by tracts of land (Seymour, 2017).





Morphologically Monocentric

Morphologically Polycentric





Functionally Monocentric Functionally Polycentric Figure 3.1: A schematic overview of morphological and functional centricity of urban configurations (Burger & Meijers, 2012)

3.2 The functional dimension of polycentricity

The functional dimension of polycentricity does not reject the morphological approach but rather extends it by including patterns of functional connections, linkages and interdependencies between urban centres in the polycentric urban region (Burgers & Meijers, 2012; Vasanen, 2013). Such relationships are of key importance to the understanding of economics and sociology since agglomeration benefits cannot be fully exploited in a polycentric region when there is a lack of interconnectivity between centres (Castells, 2000; Seymour, 2018). Moreover, it is not just the field of urban and economic studies but also organisational studies that argue for functional integration between centres (Barki & Pinsonneault, 2005). In other words, a functionally integrated urban network exists of a system of settlements whose linkages are represented by functional relations between economic actors. This results in size neutrality (a disconnection between the size and the function of a city as centre) as the functional hinterlands start to overlap. Such functions include, for example, overlapping, common or integrated labour markets (which is exemplified by commuting patterns between centres in the urban region) or access to specialised suppliers and/or services within the urban region (Parr, 2004). In this way, the presence of functions is no longer mere based on population size (Meijers, 2006).

For functional integration to be considered polycentric, some level of balance in the distribution of the relationships between centres rather than mono-directional linkages (which will indicate functional monocentricism) is necessary (Hanssens, Derudder, Van Aelst, & Witlox, 2014). Such an equal balance in the distribution of inflows can be found in an urban system in which functional relationships are not directed at one centre, but two-sided (reciprocal) and criss-cross (also existing between smaller centres) (Van Der Laan, 1998; Burger, De Goei, Van Der Laan & Huisman, 2011).

In addition, spatial integration is also key in this matter because the better a polycentric urban region is integrated, the better it is able to organise agglomeration benefits and thereby improving

its economic performance (Meijers, Hoogerbrugge & Cardoso, 2018). After all, a distribution of flows without any spatial integration gives a weak indication of the functional spatial structure. Spatial integration is, on its part, a result of improvements related to investments in 'hard' infrastructure (road, railway, airports, seaports and industrial estates) as well as soft connections (business linkages and partnerships) (Meijers, 2005; Hague & Kirk 2003).

3.3 Polycentricity and economic performance

The economic relevance that a polycentric urban region holds (as opposed to other forms of urban configurations) is its ability to let economic agents benefit from agglomeration economies while avoiding diseconomies such as higher factor costs, congestion and pollution (Parr, 2010; Anas, Arnott & Small, 1998). Hereby, the network structure substitutes for size. This mass of firms, services, employment, facilities, and amenities then results in the emergence of agglomeration economies. After the mass reached a (although undefined) critical point, the existent mass can subsequently be reinforced by entrepreneurial successes and growing levels of new investments (Saxenian & Sabel, 2008). Also, organisations such as universities and research institutes can provide the necessary inputs for growth such as knowledge and skills (Boschma, 2009).

Admittedly, a region with tracts of land in between urban centres, which typifies a polycentric urban region, instinctively seems to lack both volume and proximity. However, the critical mass to support particular functions can be obtained from the wider urban network through different sub centres in the region since the combined urban mass of these centres substitutes for one single mass. In this way, a polycentric region would be able to generate mass that is the equivalent or even superlative of a region consisting of one centre.

In the case of monocentricity, as opposed to polycentricity, a larger dominant city can borrow size from smaller cities or centres surrounding the large city. Hereby, the large city draws support for its urban functions from its hinterland. This can lead to a situation in which a smaller urban centre hosts fewer functions than it normally would support. This situation is conceptualized as those centres being "agglomeration shadows" (Burger, Meijers, Hoogerbrugge, & Tresserra, 2015). This will mean that the growth of areas near higher-order places will be limited due to competition effects. The other way around, where smaller urban centres borrow size for particular functions from larger urban centres, is a possibility as well. If all centres borrow size from each other, resulting in criss-cross relationships between centres, it is considered to be of polycentric structure.

If the urban centres in a polycentric urban region are able to successfully combine their mass, urban centres can economically perform better than by operating in isolation, and so increase their overall competitiveness which thereby results in the emergence of agglomeration economies (Docherty, Drake & Gulliver, 2004; Hague & Kirk, 2003). In this way, the benefits of agglomeration for small and medium-sized cities can in principle be substituted by being embedded in regional networks (Meijers, Burgers & Hoogerbrugge, 2016). Indeed, the specific characteristics of a polycentric urban region can fulfil or even substitute the role of such a network by becoming a network of urban centres on its own. Meijers points out that "one of the ideas behind the polycentric urban region concept is that it is not one city that provides a complete array of economic functions, urban facilities or residential and business environments, but rather the whole system of cities within a region" (2005, p. 3). In this way, linkages between constituent parts of polycentric urban regions are crucial in helping to create agglomeration economies for all parts concerned on a higher level than can be achieve by the individual parts. Hence, the urban

configuration of polycentric urban regions can enhance economic performance in such a way that it will even be able to compete successfully with metropolitan agglomerations (Meijers & Romein, 2003; Burgalassi, 2010; Liu & Liu, 2018).

3.4 Complementarity and specialisation

When analysing polycentricity in economic terms by means of the functional dimension, the concept of complementarity is of key importance. Based on the assumption of the aforementioned conditions of integrated functions related to connections, linkages and interdependencies between economic agents and spatial integration, this may open the road for urban centres in the region to develop functions that complement each other. Many authors argue for this because complementarity goes along with specialisation (Lambregts, Kloosterman, Van Der Werff, Roling & Kapoen, 2006; Meijers, 2006; Van Oort et al., 2009). The economic relevance of firm specialisation is the process of concentrating on and becoming expert in a particular subject or skill which thereby generates a competitive edge for that particular economic agent (Hughes, 1993). Hague and Kirk explain the concept of complementarity as follows: "different settlements or regions can fulfil different and mutually beneficial roles, through simultaneously embracing the advantages of competition but also overcoming the associated disadvantages" (2003, p. 4). Herein, both complementarity and specialisation are associated with functional polycentricity and directly linked to agglomeration economies because economic agents have the option to choose from a variety of specialised, related and high-quality urban functions (Franz & Hornych, 2010).

Indeed, according to complementarity in the theory of polycentricity, one location may be regarded as central in fulfilling the role in a particular function, whereas another location can fulfil that role when it concerns a function that differentiates from the other. In this way, urban centres within the same region do not compete for the same functions and become specialised in their own function (Hague & Kirk, 2003). To give an example, if one location has a dense network of electronic equipment producers and subcontractors its function will likely be the manufacturing centre. A different urban centre with an array of companies operating in the handling and packaging industry fulfils the role of processing, while another location in the same region that houses a container port at the coast, can act as the logistics hub. Together they will form a network of connected functions where they are all seen as central (and thereby specialised) in their particular function resulting in those urban centres complementing each other. Thus, they can be considered as a functionally integrated region with urban centres that are specialised in different economic (sub)sectors or functions and hereby fulfilling different economic roles (Meijers & Romein, 2003; Meijers, 2005). Spatial integration is key in this matter, since a lack of linkages will prevent synergies between urban centres (Burger & Meijers, 2011). Moreover, there is no functionally integrated urban region without linkages resulting from economic complementarities between the different centres (van Oort et al., 2010).

Together, functional integration and spatial integration with a large degree of interaction between economic agents, define a polycentric urban region that is characterised by economic complementarities (Van Oort et al., 2010). This mechanism is illustrated by the previous example where both the manufacturing, processing and logistical functions are considered central in its own distinct role. For centres in the polycentric urban region, the effects of specialisation are mutual since each centre can concentrate on its specific strength which leads to opportunities to generalize agglomeration effects while other centres within the urban network benefit from the stronger specialised supply in particular industries (Meijers, 2006). In this way, a broader supply of increasingly high-quality services is present in the region. This larger variety of specialised and

complementary centres, firms and business services creates an advantageous environment not only for current firms but also for firms looking to make new investments (Meijers & Romeijn, 2003).

3.5 Private investments and urban structure

In the case of polycentricity, firm investment relates to the concept because the specific urban configuration allows firms to make other decisions than in alternative urban configurations³. In this view, and on the assumption of an optimal functioning polycentric region, investment seeking firms can either choose to be in larger cities, sub centres or 'in-between regions' since the regional structure of the polycentric urban region allows to benefit from agglomeration externalities nonetheless of the exact location. Providing that a region functions as a polycentric urban region, it should be able to attract investments that are significantly higher than the total of what each of the centres can attract individually (the whole is greater than the sum of its parts). Also, the geographical distribution of these investments should be spread over the region in such a way that they concentrate together with related economic activities or functions instead of all investment flows orientated towards one or a few urban centres (this will hint at a more monocentric or bipolar configuration). Therefore, if the urban configuration performs in a proper manner, patterns of regional specialisation should emerge where investments take place in specialised centres within the region that already host a mass of economic activities in a specific (sub)sector. In other words, specialised centres should be 'fed' by a continuous flow of capital investments from firms operating in related industries and thus enlarging mass. If, on the contrary, investment is geographically dispersed over the region and do not seem to follow a specific pattern, this indicates a non-functioning urban structure where centres' benefits are apparently not appealing enough to overcome associated costs. In line with this, patterns of private investment can thus act as an indicator of a region's economic performance and the attractiveness for investors and thereby the functioning of its particular urban structure. Considering that an urban region is able to generate agglomeration, the inflow of (new) capital by means of private investments indicates to what extent a region (and the particular accompanying urban structure) performs in economic terms.

The above mentioned discussed the relationship between urban structure, economic performance and firm investment behaviour. Of course, firms analyse other indicators than just mass of related economic activity before making investments. Generally speaking, firms' investment choices concerning locations are influenced by 'hard' and 'soft' assets. Hard assets are tangible. This category comprises the availability, price and accessibility of land and real estate; the proximity and availability of different types of infrastructure (highways, main ports, utilities, specialised industrial estates or clusters); and the availability and prices of spatial non-homogeneities such as natural resources or raw materials (Kloosterman and Lambregts, 2000; Karakaya & Canel, 1998). Investment conditions that fall into the category of soft assets are intangible assets such as human capital characteristics (skills, costs and/or background); access to (specialised) services and protection (taxes and regulations but also political stableness and hazards) (Krugman, 1991; Targa, Clifton & Mahmassani, 2006; MacCarthy & Atthirawong, 2003). Apart from these quite straightforward considerations related to investment decisions, firms also seek an already present mass of (related) firms (Flyer & Shaver, 2003) whereas particularly foreign investors are attracted to a mass of firms and input providers (Jordaan, 2012). The preference for (foreign) investors to locate near other companies relates to the aforementioned possibility to benefit from

³ As explained before by utilising agglomeration economies while avoiding diseconomies

agglomeration economies and has been argued in a vast number of studies (Jordaan, 2012; Kohlhase & Ju, 2007; MacCarthy & Atthirawong, 2003; Karakaya & Canel, 1998; Head, Ries & Swenson, 1994; Malmberg, Malmberg & Lundequist, 2000).

Although many firms act in the same way in their decision-making process, not all firms can be treated in the same way. Differences emerge mainly when it considers size, core activities and the history of a firm. Whereas the process of land purchasing is frequently a multi-phase, -person, departmental and -objective process for large firms, small and medium-sized firms are more likely to seek a location in close proximity to markets, suppliers or the owner-manager's home (Mazzarol & Choo, 2003). Also, a concentration of firms in the same location may simply be the result of reliance on or exploitation of raw-material locations or making use of the same suppliers that hinders the possibility to locate elsewhere (Glaeser et al., 1995; McCann, 1995). The same applies to the role of history. Concentrated economic activity may simply be the result of locational choices of production in previous industrial eras or coincidence. Head et al. argue that "the cumulative location choices that constitute the process of agglomeration allow accidents of history to influence the long-run geographical pattern of industry. Local expansion of a sector sows the seeds for further expansion by increasing the supply of the factor that made the location attractive in the first place" (1994, p. 4). Glaeser confirms the view that existing location patterns for an industry — and mainly firms that are active in the industrial sector — are strongly influenced by history (1992). This also relates to path dependency in which structural and historical choices of firms explain a firm's current situation. Once in a specific path or trajectory, switching costs are high and therefore firms tend to stick with the current situation.

3.6 Government policy

Government bodies play a principal and decisive role in attempts to create a favourable investment environment in the polycentric urban region (Bergsli & Harvold, 2018; Crouch, 2003). With sound policy, policy makers have the ability to increase the intraregional organising capacity of efficiently sharing resources, co-ordinating assets as infrastructure and industrial land, foster urban centre complementarity and cooperation and prevent disorders by administrative or political boundaries (Van Den Berg & Braun, 1999). Institutions responsible for policy can, ultimately, implement supportive policies that provide grounds for the organisation of critical mass which subsequently can lead to the emergence of agglomeration economies (Meijers & Romein, 2003; Meijers, 2018). Absence of policy alignment and the right instruments to develop complementarity will lead to fragmentation and hampers the development of complementarities and thereby economic performance (Docherty et al., 2003). In this light, it is key for the whole array of institutions and government organisations to align policies, strategically coordinate structural interdependencies and manage existing and arising conflicting interests in the form of a governmental industrial master plan that is complied with (Andreoni & Chang, 2019; Yue, Liu & Fan, 2010). Also, since a large part of industrial policy is formulated at the federal level, the need for a decentralized approach is stressed (Nathan & Overman, 2013). This requires an institutionalised framework of cooperation and industrial development where emphasis should be put not only on cooperation across tiers and industries but also between public and private actors (Boelens, 2000; Meijers, 2006). Developing conditions for public and private participation in decision making relevant to the polycentric urban region creates 'institutional thickness' (John & Cole, 1999). Amin defines this as: "an elaborate network of institutions whose task is to represent, mediate conflicts and collaborate with each other" (1994, p. 21). This is a vital component since it contributes to the vision and confidence of the region and secures consensus for growth strategies and urban economic performance (Travers, 2003; Meijers et al., 2018). Given these points, it has to be mentioned that institutional integration for a polycentric urban region does not mean that the region should be one single compact or 'closed' system (Albrechts, 2001).

The principal way in which institutions can shape the investment climate relates to the organisation of the region's assets by means of public expenditure, the regulatory environment or growth enablers such as industrial estates (Dimitriou, 2018). Spatial development policies relate mostly to public expenditure in hard and soft infrastructure and utilities (Maier, 2009). Major infrastructure projects that reshape regional economies are, however, often managed by a higher order than regional governments.

Another possibility to influence the investment climate by means of regulatory measures. The most straightforward in this is to manipulate fiscal policy by progressive taxation that will foster a catalyst effect (Hudson & Lemein, 1995). This can, for example, been done by using the tax system to incentivize new industrial entrants or firm-level locational choices. In recent literature, the strategy of governments to offer incentives to firms to attract investments has, however, been criticized because the results are rather small or even negligible (Head, Ries & Swenson, 1998; Wheeler & Mody, 1992; Devereux, Griffith & Simpson, 2007). Fiscal incentives do work to some extent, although if other regions match them or offer comparable incentives, it is most likely that firms will locate themselves in regions that have most economic mass (Wheeler & Mody, 1992).

Decisions on public expenditure related to infrastructure by governments is a possibility to attract investments as well. This can be done by establishing specialised industrial zones. For such zones to be able to thrive, the so-called institutional thickness is of crucial importance where a strong and proactive institutional presence of, among others, local authorities, government agencies, innovation centres and trade associations exhibit a high degree of interaction (of contact, cooperation and information exchange) that serves to mediate inter-institutional conflicts, forges a collective culture, and provides a strong representation of local interests in the wider political economy (Liu and Liu, 2018). As a result of this institutional thickness, the possibility of a local industrial atmosphere arises so that individual entrepreneurship can draw upon an elaborate system of local support. Therefore, it is key to clearly identify areas and their sector focus in which policy interaction is desirable to foster specialisation and co-operation. This way, local economic agents contribute to the emergence and continuation of areas that are highly specialised in a limited number of specific activities that can build upon the same regional and sometimes even local base of competitive advantages. These highly specialised areas function as critical masses and their distinct functional structure allows them to complement each other. This relates to the previously discussed concepts of complementarities and private investments since different industrial areas can fulfil different and mutually beneficial roles and therefore give grounds to complementarities. Subsequently, new flows of private investments concentrate in these specialised industrial estates and thereby enlarge their mass. Therefore (specialised) industrial areas relate to complementarity and patterns of private investment function as indicator of the functioning of the urban system.

All things considered, a set of conditions can be derived based on the above where sufficient urban and economic mass should be present in the region in order to be considered a polycentric region. In the polycentric network configuration, the functional relations between urban centres should be such that the network of centres is able to generate sufficient human capital, specialised services and suppliers to generate private investments. If this is insufficient in the urban region, exemplified by economic agents seeking human capital or specialised services or suppliers outside of the urban region, this suggests that the region is not integrated adequately. Another condition is spatial differentiation in the form of infrastructure (such as industrial estates) and patterns of specialisation. If these conditions are met, the polycentric urban region should be able to attract investments that are significantly higher than the total of what each of the centres can attract individually. Together, functional integration and spatial integration exhibiting large degrees of interaction between economic agents, characterise polycentric urban region that is characterised by economic complementarities.

3.7 Conceptual framework

The conceptual framework illustrates relationships of variables that are derived from the theoretical framework (Figure 3.2). Starting from the top, the framework argues that industrial policy influences the quality of regional assets (thus on the regional level) and to what extent assets are localised (on a lower scale level of urban centres). The extent to which assets are localised influences the emergence of agglomeration economies. If agglomeration economies emerge it would be reflected in the size of investments. The size, on its turn, can lead to complementarities (because of the fact that urban centres differentiate from each other due to localised assets) which leads to a specific type of urban configuration. One layer below this, although still within the local context, is critical mass reflected by the combined size of urban centres. This mass is also of influence on the size of investments since because a larger combined size of urban centres leads to more attractivity for investors. This can also lead to complementarities and thereby influences the urban configuration likewise the layer above. Last, the bottom layer, is the extent to which variations in the investment environment emerge. If so, the theory states that private investments will follow their specific related investment environment (the spatial configuration of investments). This will lead subsequently lead to the possibility of urban centres that complement each other which will decide the particular urban configuration.



Figure 3.2: Conceptual framework of the study

3.8 Study scenarios

Three different urban configuration scenarios are derived from the theoretical framework (Figure 3.3). The schematic overview with scenarios includes predictions on the outcomes of a specific

type of urban configuration and its accompanying conditions. The possible outcomes are a polycentric, monocentric or archipelago urban configuration. Herein, a functional polycentric urban region (Scenario A) is characterised by sufficient mass of the region as a whole, size borrowing between urban centres, spatial integration and interactions between economic agents whereas agglomeration economies arise at the level of the polycentric urban region and urban centres complement each other. This is supported by political bodies with institutional thickness that align policies in such a way that interaction among economic agents are encouraged where spatial industrial planning is aligned. As a result, the combined size of private investments is higher than what each of the urban centres could have achieved individually. This is exemplified by a concentrated flow of related private investment in specialised urban centres.

The urban structure of Scenario B, monocentricity, is characterized by a strongly hierarchical structure, with one dominant city surrounded by peripheral and dependent urban centres. As a result, mass is restricted to the main centre and its surroundings centres and typically for this urban configuration is spatial integration with the functional hinterland while the main centre borrows size of its smaller surrounding centres which reinforces its dominant role and keeps accompanied agglomeration economies in one location. Policies are drawn up in such a way it favours the dominant centre. Hence, agglomeration economies emerge in the main centre. The size of private investment depends on the size of the main centre and investment flows will orientate mainly orientate towards the dominant centre.

This research adds a third urban configuration possibility: the so-called archipelago urban configuration as visualised in Scenario C (Van Grunsven, 2019). In an archipelago system, subregional centres are not organized according to a particular hierarchy, and the interaction among them is insignificant as they show a rather random pattern of autonomous development. In this view, and based on the specific urban configuration, there is insufficient mass and a lack of size borrowing, spatial integration and interaction between economic agents which hampers the emergence of agglomeration economies. This results in urban centres duplicating each other's' functions which leads to competition. Policy makers have a tendency to privilege the higher order centres in the region. The implications for the size of private investments are that this remains at levels comparable to the size of what would be expected of such urban centres and a scattered pattern of private investments over the region.

Scenario A Polycentric Urban Configuration	Scenario B Monocentric Urban Configuration	Scenario C Archipelago Urban Configuration
Sufficient mass of human capital, specialised services and suppliers on the scale of the polycentric urban region leading to functional integration	Mass of human capital, specialised services and suppliers on the scale of one main centre	Insufficient mass of human capital, specialised services and suppliers leading to extraregional linkages and fragmentation
All urban centres within the urban region, regardless of size, borrow size from each other	Main centre borrows size from other centres which reinforces local externalities	Absence of borrowing size from other urban centres
Spatial integration of urban centres on the scale of the polycentric urban region	Spatial integration of one main centre and its surrounding smaller centres	Spatial separation of urban centres
High degree of interactions between economic agents throughout urban centres in the region	Interaction between economic agents from the main centre and surrounding centre	Lack of interaction between economic agents in the region
Policy alignment that fosters interaction between economic agents, specialisation and complementarity	Policy has a tendency of privileging the main centre	Policy has a tendency of privileging higher order centres
Agglomeration economies emerge at the subregional level	Agglomeration economies emerge in one centre	Absence of agglomeration economies on both the macro- and subregional scale level
Urban centres differentiate from, and complement each other	All economic functions in one centre or its surrounding smaller centres	Duplication of functions in urban centres leading to competition
Size of private investments is significantly higher than the total of what each of the centres can attract individually	Size of private investments depends in particular on the size of the main centre	Size of private investments is similar to the size of individual urban centres
Concentration of related private investments in specialised urban centres	Private investments concentrated around one centre	Scattered distribution of private investments over the region

Figure 3.3: Overview of the three possible urban configuration scenarios

4. Methodology

This chapter gives an outline of methodology and the data that has been used for this research. For every chapter it will describe the type of data used, its source and characteristics, shortcomings and advantages as well as how it is implemented in the research. It also gives, where necessary, an explanation on where to find the raw data or how to interpret the results.

4.1 Comparison of investment performance and benchmarking

The chapter on investment performance answers the research question: *How well does Perak performs regarding attracting private investments in comparison with other states in Peninsular Malaysia?* For this question to be answered, detailed data, values and characteristics on investment performance were necessary. At first, publicly available data sources from DOSM and MIDA were examined. As this included mostly qualitative data such as general descriptions on industry focus or case examples of investing firms (in which often other states were used as case example) and on top of that this was only available for the years 2017 and 2018, more informative and reliable data was necessary.

The next step was a series of visits to MIDA and DOSM offices in Perak and Penang. As a DOSM official (Ahmad Sauqi Haris, Integration & Data Management Division) indicated that they did not collect data on investments, and both officials from MIDA Perak (Muhammad Sawaddee Islamuddin, Deputy Director Perak State Office) and MIDA Penang (Yusni Md Yusop, Deputy Director Penang State Office) offices told that they are not allowed to share this information or did not reply at all despite several visits to the office, the only possibility to gain a complete overview was collecting this data from the source itself, MIDA headquarters in Kuala Lumpur.

After making an official request for collecting investment data of all Peninsular Malaysian states (as well as detailed information on Perak⁴) over the past ten years. The request was passed and subsequently a datasheet was handed over that included the total capital volume of investment in the manufacturing sector that had been approved by MIDA from 2006 – 2018 for all Malaysian states (divided by foreign and domestic origin), the total number of jobs this was accompanied with and the number of manufacturing investment projects (Figure 4.1).

 Number
 Employment
 Domestic Investment (RM)
 Foreign Investment (RM)
 Total Capital Investment (RM)

 Figure 4.1: The column names of the provided datasheet on state investment performance from 2006 – 2018 (MIDA, 2019).
 Vertice of the provided datasheet on state investment performance from 2006 – 2018 (MIDA, 2019).

2006

In order to analyse investment performance in relative terms, data on the size of the, in the benchmark included, states of Peninsular Malaysia were needed. This has been collected via the DOSM's online service databank "eStatistik". Here, all state Gross Domestic Product values were obtained from 2006 to 2018. The GDP values are per state at constant prices of 2000 up to 2010. From 2010 onwards, the DOSM rebased Malaysia's Gross Domestic Product by the 2010 constant prices to ensure the statistics reflect a more recent economic structure. This explains the steep increase of State GDP between 2010 and 2011. Since all of the Malaysian states underwent the same rebasing, this does not affect the analysis or reliability of the data.

Subsequently, the analysis on investment performance of Perak in comparison with other states in Peninsular Malaysia was conducted. In this comparison (referred to as *benchmark* in this

⁴ See Chapter 4.3

thesis), only investments in the manufacturing sector were taken into account since investments in the primary sector are not documented on the state level in Malaysia (Darmawati Binti Lahibbu, Strategic Planning and International Division, Ministry of Primary Industries Malaysia), and only selected services which includes energy generation and conservation, private education, private healthcare, research & development, and tourism but not include data on real estate, financial services, transport, telecommunication, utilities, distributive trade and financial services (Sharmila Suntherasegarun, Assistant Director Investment Statistics Division, Malaysian Investment Development Authority). Thus, services and the primary industries are not included in the benchmark.

Before calculating the benchmark, the states Sabah, Sarawak and the Federal Territory of Labuan in East Malaysia have been excluded from the columns and totals in the tables. Apart from overviews with all Peninsular Malaysian states, some overviews include a selection of states. This has been done because in this way Perak could be compared to its specific 'competing' states. These competing states are Penang, Selangor and Johor.

The benchmark makes use of a coefficient. This is a modified ratio calculation based on the 'Share of Total Investment' equation by the World Bank TCdata360 (2019). The World Bank calculates investment performance expressed as a ratio of total investment (in current local currency) and GDP (in current local currency). Both values in the investment coefficient are expressed in MR million since the DOSM always uses this for displaying (State) Gross Domestic Product. Therefore, the investment volumes from MIDA have been divided by 1,000,000.

As stated, the investment coefficient calculates the investment performance expressed by the ratio of total private investment (in MR million) by the state GDP (in MR million) (Figure 4.2). Other variables, such as the number of investments or job addition, have not been used in the benchmark because the volume of investments gives a better picture about the actual size of investments. The outcome gives an indication of the relative investment performance. The coefficient is rounded off to three decimal places because Kuala Lumpur's investment coefficient scores structurally below 0.0, Kelantan (in 2006 – 2008, 2011 – 2013, and 2017 – 2018), Terengganu (in 2013, 2015 – 2017), and Perlis (in 2007, 2009 – 2014, 2015 – 2016 and 2018).

To clarify the calculation: if the coefficient is 0.21 in year X, this means that the investment volume equals 0.21% of state GDP in year X (Figure 4.2). In this case, a high coefficient means that the state performs well in attracting manufacturing investments. If the coefficient is increasing over time, this means that levels of private investments are increasing in comparison with the state economy. In other words, if a state has a high coefficient it is able to generate a relatively high volume of investments into the state which subsequently gives an indication about the attractiveness of the state's economy and its investment climate. The investment coefficient is calculated repeatedly for every year. Thus, it only explains investment performance for that specific year.



Figure 4.2: Calculation of the investment coefficient

The investments data is displayed in the form of a graph which is a combination of a clustered bar chart (for the investment volumes or investment coefficient) together with a line chart that indicates the national average and the average of selected states. These averages are calculated as the total number of investments divided by the total number of states (without the three Eastern Malaysian states), or divided by the three selected states Penang, Selangor and Johor. Due to rounding off, the totals might differ from the sum of the individual amounts. For graph Figure 5.5 (Chapter 5.2) the vertical axis range has been restricted to enhance clarity. Differences in states with low investment values would otherwise have been difficult to see. The same line of reasoning applies to making use of selected states since this made the differences easier to distinguish.

4.2 Analysis of industrial policy

The chapter on regional industrial policies and the planned patterns of private investments that are derived from these policy documents answers the research question: *What is the regional industrial policy, based on this, what location patterns of private investment are envisioned and what are the consequences for planned specialisation?* For this question to be answered, a complete overview of all policy plans on all scale levels was needed.

This list was obtained from the website of the Department of Statistics Malaysia where a complete overview of the variety of development plans for Perak was stated (n.d.) (Table 4.1). This online Excel spreadsheet has been updated most recently on the 21st of September 2019 which was also the version that has been used for the policy analysis. The same applies to the development plans where the most recent publication of every plan has been used as well ranging from 2010 to as recent as 2017, although many of the development plans build on (a review of) a previously published development plan.

Development plan	Institution or governmental body	Geographical demarcation	Year of issue
The Eleventh Malaysia Plan 2016-	Malaysia Federal Government	Malaysia	2015
2020			
New Economic Model (NEM)	Malaysia Federal Government	Malaysia	2010
Northern Corridor Economic	Northern Corridor	Perak, Penang,	2016
Development (NCER) Blueprint	Implementation Authority	Kedah and Perlis	
2.0	(under the federal		
	government)		
Perak Amanjaya Industrial	Perak State Economic Planning	Perak	2013
Development Action Plan	Unit		
	(State government)		

RancanganTempatanDaerahManjungPengubahan2020(ManjungDistrictRegionalTransformationPlan 2020)	Perak State Economic Planning Unit (State government)	Perak	2013
<i>Rancangan Struktur Negeri Perak</i> <i>2040</i> (Perak State Structure Plan 2040)	Perak State Economic Planning Unit (State government)	Perak	2017
ICT Strategic Blueprint 2010	KPerak Implementation and Coordination (INC) Corp (State government)	Perak	2010
<i>Wilayah Perak Selatan</i> (South Perak District)	Perbadanan Kemajuan Negeri Perak (PKNP) (State government)	The southern Perak districts Muallim, Batang Padang, Hilir Perak and Bagan Datuk	2016
Rancangan Tempatan Daerah Manjung 2030 (Manjung District Local Transformation Plan 2030)	Manjung district government	Manjung	2014
RancanganTempatanDaerahLarutMatang2035(LarutMatangdistrictLocalTransformationPlan 2035)	Larut Matang district government	Larut Matang	2016
Rancangan Tempatan Daerah Hulu Perak 2030 (Hulu Perak District Local Transformation Plan 2030)	Hulu Perak district government	Hulu Perak	2016
Rancangan Tempatan Daerah Selama 2030 (Selama District Local Transformation Plan 2030)	Selama district government	Selama	2015
RancanganTempatanDaerahBatangPadang2020(BatangPadangDistrictLocalTransformationPlan 2020)	Batang Padang district government	Batang Padang	2017
RancanganTempatanDaerahKualaKangsar2020(KualaKangsarDistrictLocalTransformationPlan 2020)	Kuala Kangsar district government	Kuala Kangsar	2015
Rancangan Tempatan Ipoh Pengubahan 2020 (Ipoh Local Transformation Plan 2020)	Ipoh local government	Ipoh	2014
PelanStrategikMajlisTaiping local governmentPerbandaran Taiping 2016 - 2020TaipingMunicipalCouncil(TaipingMunicipalCouncilStrategic Plan 2016 - 2020)		Taiping	2015
Rancangan Tempatan Daerah Kampar 2030 (Kampar Local Transformation Plan 2030)	Kampar local government	Kampar	2014
Rancangan Tempatan Majlis Daerah Batu Gajah 2025 (Batu Gajah Local Transformation Plan 2025)	Batu Gajah local government	Batu Gajah	2014

Table 4.1: Overview of consulted development/transformation plans on all scale levels (DOSM, n.d.)

With the aim of this thesis, only parts of the policy plans that related to the planning of industries, economic activities, industrial estates or cluster initiatives have been used. Hence, policy that discussed spatial or land planning issues was irrelevant. Also, industrial planning that was not yet been implemented, has not been taken into consideration in the analysis. These initiatives include Glove City (Bidor, Kinta district), Ipoh Shoe City (Pengkalan Light Industries Park, Kinta district), Ipoh Sentral project (Ipoh, Kinta district) and the Perak Hi-Tech Industrial Park (Chemor, Kinta district).

In some cases (mainly on the lower scale level) the development plans were written in Malay. In order to translate it to English, Google Translate has been used. In cases this did not work out or remained unclear, a Malay-speaking individual helped translating (parts of) the texts. However, the major constraint in the analysis of industrial policy was not a language barrier, but the fact that most of the policy documents remained quite unclear without stating any details. For instance, the Perak Amanjaya Industrial Development Action Plan argues for establishing economic growth corridors between districts and urban centres in Perak (Figure 4.3). However, apart from the given illustration, the report completely lacks any line of argumentation behind the corridors and their configuration as well as the meaning of the arrows in between them which makes room for speculation.



Figure 4.3: The 3D Regional Growth Plan of Perak (Perak State Economic Planning Unit, 2013)

4.3 Mapping of planned patterns of private investment

Policy makers were unfortunately sometimes unspecific in the development plans. Despite the sometimes incomplete or missing idea behind spatial industrial policies, a map with initiatives for industry focus regarding specific locations have been made. Herein, the majority of the economic plans has been pinpointed to the exact designated location although some remained a bit unspecific when whole districts were mentioned instead of a town or particular location. The maps have been divided into two categories which subsequently gave a clear overview of what policymakers had in mind for the region in terms of patterns of spatial concentrations of

industries (even though many policies were duplicating, contradicting or lacked clear specialisation as they claimed to focus on multiple industries at once).

The categorisation of policy initiatives has been done because the alternative was displaying 34 industries over 18 initiatives in one map, which would have made it impossible to distinguish location from each other. The first category contains policy related to economic activities that include (the processing of) natural resources or raw materials. Within this category are a total of 11 different industrial plans in 7 industry categories (minerals & ceramics, aquaculture & maritime, plastic, chemicals, wood & timber, metal & steel, and palm oil processing). The other category comprises industries that are not directly linked to natural resources or raw materials. The industries here are food manufacturing, aerospace, automotive, train manufacturing, ICT, medical equipment, paper, printing & publishing, entertainment and animation. These 9 industries are divided over 10 different industrial areas in the discussed policy plans.

The maps with the concentrations of industries in Appendices K and N have been made using Google My Maps. The maps that visualise the industrial plans in Perak were made in Excel 3D Maps. The table with industry specialisation, location and development plans in Appendix P has been made by categorizing all policy plans into its specific sector or industry.

4.4 Description of industrial estates and the composition of industries

The chapter on patterns of private investments answers the research question: *What are the characteristics and spatial distribution of private investments over the region and what is the implication for specialisation and complementarity?* To answer this research question, a total overview of all details on investment projects in Perak over the past ten years was most conducive.

Whilst investment statistics on the state level per year were rather easily to obtain after the request was made at MIDA, this did not apply to detailed investments statistics in the same manner. The main objection of MIDA for provision of all details which were available, was the privacy of private investors. The Assistant Director of the Investment Statistics Division explained on this matter: "(...) as part of our data anonymization practices, we are unable to share information at that level⁵. This is to avoid the risk of disclosing micro firm-level investment data especially for locations with only one project." (Sharmila Suntherasegarun, personal communication, July 19, 2019). For this reason, upon delivering a database with many details on investment projects in the manufacturing sector over the past ten years, actual investment volumes were not included. However, the list did include the company name; year of approval; registered address; location registered; state registered (all firms in Perak); factory location; telephone number; fax number; webpage; products (for which the approval was given by MIDA); industry; and ownership (whether it was a domestic or foreign investor).

Even though this provided a comprehensive idea of characteristics of private investments in the state and locational patterns, it included only the number of investments and not the values. Therefore, a 400 MR million investment in the construction of a new large-scale factory was put on equal footing with a 1 MR million investment. Hence, this would have distorted clear analysis. To solve this problem, multiple requests were made at MIDA for receiving the accompanied volumes, ensuring confidentiality, without any success. As an alternative, all 361 investment projects were researched online by hand, making use of news articles, press releases, databanks,

⁵ At the firm-level

and annual reports. Except that this was time consuming, many investments projects (mostly small-scale projects) were unable to trace back online.

Subsequently, and in a final attempt to receive the data, the idea was brought up to anonymise the capital volume data. Hereby, the suggestion was, by way of middle ground, to use a threshold of >4 projects per location. In this way, it will not be possible to identify locations with individual projects while there was sufficient coverage for a fruitful analysis. MIDA agreed with this proposal and together with the already researched investment volumes by hand, investments volumes were included in the research.

In addition, the implementation rate of approved investment projects was requested as well. This turned out to be complicated as problems were arising with the reliability and validity of the data. One data source that was provided by MIDA only showed an average implementation rate over the past 18 years. Obviously, this does not give any details about the reason behind delays in the implementation process nor any developments in the implementation rate over time. Another data source that was provided did state the specific industries and its implementation rates over time. However, 7 out of 19 industries did not have any data on implementation status and among them were 3 industries of importance to the regional economy since they ranked high both in number and capital volume of investment projects. Moreover, where the approval overview stated a category as "miscellaneous", the implementation overview categorised this in "others". On average, this category made up one-third of all investments projects in the approved/implementation overview. Under those circumstances an analysis of this may lead to a distorted picture of the situation. For this reason, an analysis on implementation rates has not been conducted.

In the analysis of the received data, it turned out that not all investments where documented accurately as investments locations as Ipoh, or even the district Kinta were included in the datasheet. Therefore, the assumption that investments in this location(s) are actually spatially concentrated does not hold. Fortunately, this only comprised a small part of the data whereas most of these errors could been corrected for by using Google Maps to determine the exact location that was used for the investment.

Admittedly, the overview of specialised industrial areas as it is presented in Chapter 7.4 is not the ideal way of presenting the data. However, because the industrial areas differ that much from each other and many comments and notes had to be included for a particular industrial area that were not necessary for others, made this the clearest way.

4.5 Mapping of patterns of private investment

The same data sources as described above in Chapter 4.4 were used to answer this question.

Next, in the analysis on patterns of private investment, maps were made to visualise the data and compare actual patterns of private investment to planned industrial patterns. These maps have been made in Excel 3D Maps that runs on Bing Maps. All industrial estates and other investment locations have been plotted by the factory location addresses as provided by MIDA. In this way, the actual location of investment is always used for the analysis. Two different maps have been used which were subsequently added together. The first map includes all the cluster initiatives as derived from policy documents and is split up in the same two categories as in the industrial policy chapter. Within the cluster map, three different layers have been used: the state contours demarcated in blue, the district contours in which the cluster is located demarcated in orange and
at last the cluster location. Since 3D Maps only allows the district level as the lowest scale level to have contours, clusters are marked by a green dot on the map. Subsequently, in the second mapping process, investments in the last ten years have been displayed over the state of Perak (Figure 4.4). This has been done twofold both by the number of investment and the investment value.



Figure 4.4: One of the maps used in the analysis. This is the spatial distribution of private investments in rubber industries (MIDA, 2019).

4.6 Trend overviews of industries

The same MIDA data as discussed above has been used for the trend overviews of investments by industry to analyse patterns of specialisation at the regional level. For the purpose of clarity, only industries that were able to generate a minimum of 2 investments per year were included in the analysis. This meant that beverages & tobacco, textiles, leather, furniture & fixtures, paper, printing & publishing and medical equipment are not displayed in the radar graphs.

Some industries that were initially separately categorized by MIDA have been grouped together. This has been done because the initial grouping had only a few investment projects (3 or less) and the industry were related to each other. This concerns the industries minerals & ceramics, wood & timber and metal & steel.



Figure 4.5: Radar graph of the trend overview of industries section (MIDA, 2019)

The time view in the industry trend analysis has been cut up into three parts (Figure 4.5). In this way, differences emerging over a longer period could be compared. If this would not have been done, annual changes in investment numbers appeared to be remarkable while it considered minor changes such as one investment project per year difference. The years were categorized in three time periods: 2008 - 2011, 2012 - 2015 and 2016 - 2018. The last time period comprises one year less than the other times series because the total analysis was not dividable by three. As a result the last time period is expected to include less total investment projects. The average investment volume per project is calculated by dividing the total capital volume over the past ten years by the total number of projects over the past ten years.

4.7 Description of regional assets

The chapter on regional assets and agglomeration economies answers the research question: *"What is the perception of economic agents on the regional assets of Perak and what does this tell about the occurrence of agglomeration economies in the regional urban system?"* To answer this research question, insights on the opinion of economic agents and representatives of political bodies with respect to regional assets was necessary. Economic agents were also asked about specific business decisions regarding location and investments.

Comprehensive quantitative analysis, such as surveys among firms (such as Van Oort, Burger & Raspe, 2010 or Burger, Van Der Knaap & Wall, 2014) or other forms of large-scale analysis on intra-firm relationships were not possible because of time and budgetary limitations as well as data availability. Hence, a more qualitative approach to provide the more quantitative data on investments statistics from context was conducted. This has been done by both interviewing private investors as well as representatives of government institutions or organisations.

In the public sector, 10 different organisations, responsible for industrial policy, investment development, statistics, economic planning and industry research on the federal, regional and district level have been interviewed (Table 4.1). Whereas MIDA and DOSM turned out to be of

great help for obtaining investments statistics, PKNP, IDR, the FIZ managements and to a lesser extent Invest Perak and UPEN were of importance to provide a complete and contextualised overview of Perak and its economic actors. Herein, PKNP mainly explained the history, Perak's economic actors as well as strategies of the state's investment arm related to the regional economy and industrial estates. IDR was most helpful in critically assessing policy and handing over several research documents (on human capital). The managements of Kinta and Jelapang FIZ also played a key role in evaluating policy and providing case examples.

With regard to economic agents and their input concerning business, location, and investment decisions, a total of 28 interviews have been conducted (Table 4.2). Interviewees included both domestic and foreign economic actors from different industries and firm sizes that implemented new or expansion investment projects. Whereas interviews with governments and large firms were scheduled in advance in a more formal environment, many interviews with firms of smaller size had much more of an informal nature. Sometimes, these came into being after talking for a while with a security guard or simply by ringing the intercom and asking to come in. Where possible, business cards were collected but not every interviewee had one to hand out. Therefore, Table 4.2 is missing some names and specific positions of employees of companies.

In the presentation of the findings in this chapter, several footnotes are used. Even though this looks rather messy, the readability of a list of firms in the main text would have been worse.

Institution / Organisation	Responsibility	Location	Representative(s)
Malaysian Investment Development Authority (MIDA) HQ	Principal agency to oversee and drive investment into the manufacturing and services sectors in Malaysia	Kuala Lumpur (Federal Territory of Kuala Lumpur)	Santha Devi Subramaniam (Sr. Deputy Director Investment Statistics Division) Sharmila Suntherasegarun (Assistant Director Investment Statistics Division)
Department of Statistics Malaysia (DOSM) HQ	Premier agency in the field of statistics and an information system for the formulation of policies for national development planning and administration.	Putrajaya (Federal Territory of Kuala Lumpur)	Norhayati Binti Yahya (Chief Statistician Malaysia, Data Management and Integration Division)
Malaysian Investment Development Authority (MIDA) Perak	Principal agency to oversee and drive investment into the manufacturing and services sectors in Perak	Ipoh (Kinta, Perak)	Muhammad Sawaddee Islamuddin (Deputy Director Perak State Office)
Malaysian Investment Development		Georgetown (Penang)	Yusni Md Yusop (Deputy Director Penang State Office)

Authority (MIDA) Penang			
Department of Statistics Malaysia (DOSM) Perak	Premier agency in the field of statistics and an information system for the formulation of policies for national development planning and administration.	Ipoh (Kinta, Perak)	Ahmad Sauqi Haris (Integration & Data Management Division)
Perbadanan Kemajuan Negeri Perak (PKNP)	Key state agency entrusted to spearhead the economic development and socio- economic growth in the State of Perak	Ipoh (Kinta, Perak)	Goradial Singh Ban Singh (Manager)
Perak Investment Management Centre (InvestPerak)	Principal investment promotion agency of the Perak State Government and reports directly to the Chief Minister of Perak	Ipoh (Kinta, Perak)	Encik Ahmad Shahir Bin Abdul Aziz (Chief Executive)
State Economic Planning Unit (UPEN)	Plans and formulates the state's policies as well as development strategies in the economic sectors identified.	Ipoh (Kinta, Perak)	Mohd. Nadzri bin Kamsin (Assistant Director) Hajah Syariza Binti Datuk Haji Mohamed Odman (Assistant Director)
Federation of Malaysian Manufacturers (FMM) Perak	Premier economic organisation for Malaysian manufacturers in spearheading the nation's growth and modernisation.	Ipoh (Kinta, Perak)	Louis Gnanapragasam (Senior Manager) Evonne Tan (Executive)
Kinta Free Industrial Zone (FIZ) Management; Jelapang Free Industrial Zone (FIZ) Management	FIZ's offer a company located within these zones tax advantages. FIZ are for foreign manufacturing companies only.	Ipoh (Kinta, Perak)	Mohd Nazri (Kinta FIZ Manager) Syafiqah Binti Abu Yusrino (Jelapang FIZ Manager)
Institut Darul Ridzuan (IDR)	A think-tank body for the Perak State Government that undertakes independent research on public policy and recommendations, strategies and facilitation.	Ipoh (Kinta, Perak)	Salina Binti Nor Azam Mohd. Nadzri bin Kamsin

Table 4.2: Overview of interviewed representatives from the public sector

Company name	Industry	Location	Representative
Finisar Malaysia	Electronics &	Kinta FIZ	William Yu (Shipping Manager)
Sdn. Bhd.	Electrical	(Ipoh, Kinta, Perak)	Rozita Mohamed Razi
	Products		(Assistant Manager HRBP)
Kuala Lumpur	Palm Oil	Kinta district, Hulu	Dato' Lee Hau Hian
Kepong Berhad		Perak district	(Director, Non-Independent
(KLK)		(Perak)	Non-Executive Director,
			Member of Remuneration

			Committee, Member of Nomination Committee)
Malayan Flour Mills Berhad	Food Manufacturing	Lumut Port Industrial Park (Lumut, Manjung, Perak)	Yong Yee Wan (Plant Manager)
Kamaya Electric (M) Sdn. Bhd.	Electronics & Electrical Products	Kinta FIZ (Ipoh, Kinta, Perak)	R. Abza (company representative)
Yamaha Electronics Manufacturing (M) SB	Electronics & Electrical Products	Kinta FIZ (Ipoh, Kinta, Perak)	N/A
White Cafe Sdn. Bhd.	Food Manufacturing	Ipoh (Ipoh, Kinta, Perak)	N/A
Hasrat Meranti Sdn. Bhd.	Paper, Printing & Publishing	Kanthan I IE (Chemor, Kinta, Perak)	Mok Tuck Meng (Managing Director)
Latexx Manufacturing Sdn.Bhd.	Rubber Products	Kamunting I IE (Kamunting, Larut, Matang and Selama, Perak)	N/A
Lhoist (Malaysia) Sdn. Bhd.	Mineral & Ceramic Products	Chenderiang (Chenderiang, Batang Padang, Perak)	N/A
Hume Cement Sdn. Bhd.	Mineral & Ceramic Products	Kinta (Kinta, Perak)	N/A
Bidor Kwong Heng Sdn.Bhd.	Food Manufacturing	Bidor (Bidor, Batang Padang, Perak)	Lee Kok Tan (Managing Director)
Synergy Pipes & Parts (M) Sdn.Bhd.	Metal & Steel Products	Kanthan IV IE (Chemor, Kinta, Perak)	N/A
Tiger Casting Solution Sdn. Bhd.	Metal & Steel Products	Pengkalan II (Ph II) IE (Ipoh, Kinta, Perak)	Ooi Ken Syn (Director)
River Electronics (Ipoh) Sdn. Bhd.	Electronics & Electrical Products	Tasek IE (Ipoh, Kinta, Perak)	N/A
Leader Glass Trading Sdn.Bhd.	Mineral & Ceramic Products	Pengkalan II (Ph I) IE (Ipoh, Kinta, Perak)	Wong Kok Kuen (Managing Director)
Ecoauto Assembly Plant Sdn.Bhd.	Transport Equipment	Kamunting I IE (Kamunting, Larut, Matang and Selama, Perak)	Mr. Lau (Former Owner- Manager)
Megah Transport Sdn. Bhd.	Transport and shipping	Kamunting I IE (Kamunting, Larut,	N/A

		Matang and Selama, Perak)	
K-One Manufacturing Sdn. Bhd.	Electronics & Electrical Products	Silibin Light IE (Ipoh, Kinta, Preak)	N/A
Wei Dat Wiremesh Netting Sdn. Bhd.	Metal & Steel Products	Batu Gajah (Batu Gajah, Kinta, Perak)	N/A
Big One Timber Moulding (M) Sdn Bhd	Wood & Timber Products	Pengkalan II (Ph I) IE (Ipoh, Kinta, Perak)	N/A
Farmcochem Sdn. Bhd.	Chemical & Chemical Products	Silibin Light IE (Ipoh, Kinta, Preak)	N/A
Super Coach Assembly Plant Sdn. Bhd.	Transport Equipment	Kamunting I IE (Kamunting, Larut, Matang and Selama, Perak)	Mr. Lau (Owner-Manager)
Topfur Dressing Industries Sdn.Bhd.	Leather & Leather Products	Jelapang FTZ (Ipoh, Kinta, Perak)	N/A
Antico Stone Sdn. Bhd.	Mineral & Ceramic Products	Kampung Kepayang (Kampung Kepayang, Kinta, Perak)	N/A
Ambang Wibawa Sdn. Bhd.	Chemical & Chemical Products	Mambang Diawan (Kampar, Kampar, Perak)	N/A
YNH Property Bhd	Real Estate	Ipoh, Kinta, Perak	Lim
White Cafe Sdn Bhd	Food Manufacturing	Tasek IE (Ipoh, Kinta, Perak)	N/A

Table 4.3: Overview of interviewed representatives from the private sector

4.8 Presentation of conclusion and reflection

The conclusion part answer the main question on the network structure of Perak. It does so by combining the concepts of the spatial configuration of private investments, agglomeration economies and its conditions, specialisation and complementarity together to discuss a conclusion on the centricity of the urban system of Perak. It finishes with the potential for a network structure in the form of polycentricity in Perak and a reflection of the research.

5. State investment performance

An analysis of the investment performance of Perak in comparison with the other states in Peninsular Malaysia is given in this chapter. It starts off with stating different indicators of performance such as absolute investments, projects, employment addition, and investment volumes. Subsequently, the states will be compared by means of a benchmark.

5.1 Absolute investment statistics

The state investment performance in this chapter is measured by incoming flows of capital from private investments in the manufacturing sector over the period 2006 – 2018. It starts off with an overview of projects, jobs and volumes of investment flows to continue with volumes.

5.1.1 Number of projects and jobs

Between 2006 and 2018, roughly 10,000 investment projects have been approved (MIDA, 2019). The vast majority (73%) of those projects went to Selangor, Johor or Penang, with Selangor being distinctly the largest receiver by attracting over one-third of all investments (Figure 5.1). Perak ranks fourth with a 6% share of national manufacturing investments, closely followed by Kedah.



Figure 5.1: Total number of investment projects in the manufacturing sector per state between 2006 – 2018 (MIDA, 2019)

To give a better view on the development of incoming investment projects, a trend overview has been analysed (Figure 5.2). At first glance, the selected states seem to change according to national averages. It becomes clear that the dominance in terms of the number of incoming investments in the manufacturing sector in Selangor seems to ease a bit over the years. The same slight decrease applies to Johor. Both Penang and Perak, as the remaining two states, do not change sharply.



Figure 5.2: Trend overview of the total number of investment projects in the manufacturing sector per state between 2006 – 2018 (MIDA, 2019)

The dominance of the states Selangor, Johor and Penang is reflected in terms of employment as well. The three states combined make up a total share of over 70% of the total number of jobs in Malaysia as a result of private investments in the manufacturing sector between 2006 and 2018 (see Appendix C). Perak ranks fourth, although far behind the first three, with a 7% share, followed by Malacca, Kedah and Negeri Sembilan.

5.1.2 Investment volumes

If volumes (measured by capital volume in MR million) are the unit of analysis, the view on the performance of the 12 states changes (Figure 5.3) (MIDA, 2019). While Selangor was topping the charts in terms of number of projects, the capital volume that is linked to this is less evident. It turns out that Selangor is apparently able to attract most of the projects while Johor attracts those that involve the highest levels of capital. Concerning Perak, while the state was ranking just behind the traditional top three in investment numbers, in terms of capital volume the state is doing worse with place 7 closely followed by Negeri Sembilan and Terengganu. Kedah, Malacca and Pahang are all able to attract higher valued investment projects over the past 13 years. Kelantan, Kuala Lumpur and Perlis are seemingly not that attractive for firms operating in the manufacturing sector seeking for investments. For the case of the federal territory of Kuala Lumpur this can be explained by the fact that is a services economy (Hall, 2004).



Figure 5.3: The total capital volume of investment projects in the manufacturing sector per state between 2006 – 2018 (MIDA, 2019)

When a distinction is made between the source of investment volume by domestic or foreign origin, changes appear. While Perak is ranked 6th compared to the other states in terms of its ability to attract investments by domestic firms, it ranks only 9th out of the 12 states when it concerns inflows of foreign capital (see Appendix C). Moreover, of the 9 states that received over 1 MR billion of foreign investment since 2006 (Kelantan, Kuala Lumpur and Perlis are below this threshold), the state of Perak ranks lowest with 15,5 MR billions of incoming foreign capital. With one single exception, Perak performs below the national average in terms of foreign investment and scores way below the average of the top three investment receiving states (Figure 5.4). Both investment rankings are surprising since Perak's economy is the fifth largest (measured by GDP) in all consecutive years between 2006 and 2018. However, even though Perak ranks substantially lower in terms of attracting foreign investments in comparison with the volume of domestic investment compared to the other states, the internal composition of incoming investments is still predominantly of foreign origin (14,621 MR million incoming foreign investment versus 13,711 MR million domestic investment).



Figure 5.4: Trend overview of foreign investment capital in the manufacturing sector per selected state between 2006 – 2018* (MIDA, 2019). *Vertical axis range restricted to 16000 to enhance clarity

5.2 Relative investment performance

In an attempt to gain a clearer view of investment performance in relative terms (i.e. the ability of states to attract private investments related to the size of the economy) a benchmark has been conducted. This is done by means of the investment coefficient. Most of the variation in the annual national investment coefficient over time seems to fluctuate simultaneously with national or higher scale economies (the financial crisis in 2008 is clearly reflected in investment flows). In addition, sometimes above-average performance of an individual state influences the national trend. For instance, major government-linked investment project such as the establishment of state investment corporations⁶ (Invest Kedah and Terengganu Incorporated Sdn Bhd in 2006 and 2007) help explain a steep increase in relative investment performance (see Appendix G for a table with all investment coefficient).

On average, the investment coefficient for Peninsular Malaysia is 0.08 between 2006 and 2018 (MIDA, 2019; DOSM, 2018). If investments flows are analysed based on origin, it turns out that Malaysia attracts more foreign investment capital than domestic (0.046 foreign whereas domestic has a coefficient of 0.036. Similar to the previously discussed indicators, Johor scores high in the coefficient (Figure 5.5). In other words, likewise the high number and capital volume of investments, the state also scores high when this is weighted for the size of the economy. Other high performing states, when total averages are compared, are Kedah (0.179), Penang (0.113),

⁶ As explained in Chapter 4, including this into the state investment volume can be called into question

Malacca (0.125) and Terengganu (0.104). The high investment coefficient of Kedah can largely be explained by its investment arm (if the year of establishment of Invest Kedah is excluded, the investment coefficient drops to 0.08). The same applies to Terengganu (when 2006 and 2007 are not included in the average total, it decreases to 0.063). The states that perform below the national average are Perak (0.051), Selangor (0.054), Pahang (0.062) and Negeri Sembilan (0.08). The states Perlis (0.010), Kelantan (0.018) and Kuala Lumpur (0.002) score far below the national average of manufacturing investments compared to their state economy.



Figure 5.5: Trend overview of the coefficient of total investments: selected states compared between 2006 – 2018 (DOSM, 2018; MIDA, 2019).

Figures 5.6 and 5.7 show the relative performance as to origin. On the one hand several states are heavily depending on foreign investment while others on domestic investors. As aforementioned, Peninsular Malaysia in its entirety relies more on foreign than on domestic investments over the past 13 years. Thus, logically, more states have a higher coefficient for foreign investments than for domestic investment. This is most prominent in the case of Penang, with foreign coefficients over twice as high (0.077) as domestic ones (0.036). For the case of Perak, it becomes clear that the state performs below the national average in attracting domestic investments (with a single exception in 2016). As to foreign investments, Perak is more in line with the national average trend. In comparison to the three most dominant investment receiver, Perak scores structurally their average relative investment performance.



Figure 5.6: Trend overview of the coefficient of domestic: selected states compared between 2006 – 2018 (DOSM, 2018; MIDA, 2019).



Figure 5.6: Trend overview of the coefficient of foreign investments: selected states compared between 2006 – 2018 (DOSM, 2018; MIDA, 2019)

Conclusion

After the indicators of relative investment performance of the 12 states in Peninsular Malaysia have been set out, it turns out that Johor, Selangor and Penang are the three obvious major economic powerhouses. They top the rankings in terms of job addition, number of projects, size of capital inflow and the relative performance of their investments compared to the economy.

When it comes to the number of projects and jobs, Perak performs best after the three states (albeit by large distance). The gap between Perak and the three biggest states has decreased over time although that is mainly because the other states are receiving less investments instead of increasing performance of Perak. With capital volume as the unit of analysis, Perak underperforms. Although Perak ranks higher in attracting domestic investments compared to foreign investments in a ranking with the other states in Peninsular Malaysia, the internal composition of investments shows that foreign investment makes up a larger share in terms of capital volume. When investment performance is discussed when controlled for the size of the economy, Perak performs below average. In terms of domestic investments, Perak is on the national average, but when it comes to foreign investments the state is lagging well behind the majority of the other states. This is surprising, since the economy of Perak is fourth of the country (measured by GDP). In conclusion, Perak's investments performance is structurally below national averages and way below the three most dominant states.

6. Industrial policy

The analysis on Perak's industrial policy starts with an overview of the array of development plans on different scale levels. Based on this, the section thereafter summarises the planned industrial patterns within the region, categorised by core economic activity. Last, the chapter states an evaluation and statement on issues that occur related to industrial planning.

6.1 Policy plans

In this chapter, a summary of industrial policies follows as derived from strategic and structural plans on the federal, inter-state, state and local level as compiled by the Department of Statistics Malaysia (n.d.). The development plans are arranged by from the federal/national level, to that of the state to conclude with the district/city level. Federal development plans are listed first, followed by state development plans and local development plans. Only policy plans that specifically treated industrial policies were examined in the analysis of government development plans. Topics such as land planning, sustainability and social issues are not taken into consideration.

6.1.1 Federal development plans

On the highest scale level, the federal government of Malaysia released several development plans. Every five year a Malaysia Plan is issued. Also, directives for general national economic policy are published in an economic model. On a lower scale level, where states are grouped together, the Malaysian federal government published economic corridor strategies.

The Eleventh Malaysia Plan (11MP) 2016-2020

Five-year development plans have been used as a tool of medium-term economic policymaking in Malaysia since the early 1950s. In recent years, Malaysia's five-year development plans have contained less and less information on detailed sectoral development allocations (Lee, 2018). The Eleventh Malaysia Plan was released by the Economic Planning Unit in 2015. The plan emphasizes the importance of geographical balance in regional investments and mentions industrial estates and specialised services as growth enablers. A full life cycle costing approach will be adopted to ensure viability and sustainability of the industrial estates, supported by a self-sustaining park management model to enhance governance and competitiveness. MIDA will utilise a centralised database to streamline information on industrial estates to facilitate investment promotion. To date, the database has not yet been launched. Also, the need for a strategic review of regional economic corridor master plans priorities and industry focus is stressed. 11MP identifies the automotive and aeronautics industries as Perak's most promising industries. The key initiatives that are mentioned are the Manjung - Aman Jaya Maritime City and the Greater Kamunting Conurbation. Also, the establishment of Ipoh Aerospace Park next to the Sultan Azlan Shah Airport in Kinta is mentioned as a promising project for further economic growth in the region. 11MP does not clarify what these planned key initiatives related to industrial focus exactly include or what form these should have.

New Economic Model (NEM)

The NEM was published in 2010 and replaced the New Economic Policy dating from the 1970s. The initial main goal was to double per capita income in Malaysia by 2020. The model builds on the idea of dynamic clusters and critical mass as an effective ecosystem for business operations as this generates benefits from scale through industry clustering and networking (National

Economic Advisory Council, 2010). The NEM substitutes its foregoing old approach of dispersing economic activity geographically across states to spread benefits from development with the new approach of cluster- and corridor-based economic activities. The most detailed description of this strategy given by NEM is to build scale of industries and production networks for specialisation, concentration of economic activity and better provision of supporting services. In this way, clustered industries leverage on integration, scale and connectivity as agents both collaborate and compete with each other. As a result, major cities will specialise in terms of function and industrial activities. For this to happen, budgetary and development plans need to have a geographical focus, and systematically avoid sector silos (poorly coordinated bureaucratic structures). The NEM does not discuss any industries of focus.

Northern Corridor Economic Development (NCER) 2016 - 2025 (Blueprint 2.0)

On a sub-national level, the Malaysian government grouped the country's states in five economic corridors: Northern Corridor Economic Region (NCER), Iskandar Malaysia in Southern Johor (IRDA), East Coast Economic Region (ECER), Sabah Development Corridor (SDC) and Sarawak Corridor of Renewable Energy (SCORE) (MIDA, 2019). The NCER has been initiated in 2007. At that time, only the northern Perakian districts were included in the corridor together with the states Penang, Kedah and Perlis. The rest of Perak became part of the NCER upon the release of Blueprint 2.0 in 2017. The NCIA, as a federal institution, mainly invests in major infrastructural projects but also emphasises the importance of the growth nodes within the four northern Malaysian states. The Blueprint 2.0 identifies two major growth nodes for Perak: the Greater Kamunting Conurbation (GKC) and Manjung - Amanjaya Maritime City. It also points out the Wilayah Perak Salatan (WPS) in the Southern part of Perak. In general terms, GKC plans the Taiping – Kamunting area to focus on manufacturing, agriculture, tourism, education and human capital by means of "focus clusters". The Manjung - Amanjaya Maritime City's industrial focus is on manufacturing, agriculture, tourism, education and human industries by "industry support clusters".

More detailed, the NCER Blueprint mentions automotive, aerospace, green technology, medical equipment and printing as focus clusters categorised under manufacturing industries. Plans on patterns of specialisation in this view, are geographically dispersed with several conurbations, districts or even states focusing on the same industries. A total of 10 districts over three states are intended to specialise themselves in automotive manufacturing according to the GKC. For the aerospace industry, a total of 5 industrial zones are appointed to become aerospace manufacturing hubs. In Perak, the GKC designated Seri Iskandar as aerospace hub (while the 11MP located an Aerospace park in Ipoh). Similarities in appointing multiple, nearby urban centres to specialise in a certain industry are concerning the manufacturing of medical equipment (7 urban centres in three states), the printing industries (4 urban centres in three states) and green technology (12 urban centres in three states). So, the NCIA states the term "focus clusters" without being explicit as regards details or define what they mean by this.

In other words, even though on the federal level industrial estates are argued as growth enablers and NEM argues for concentration of related economic activities in clusters, the NCIA (which is also a federal institution) formulates industrial planning where one industry is designated to locate themselves and specialise in different centres over three states. To give an idea, the GKC designates the medical equipment industry over different urban centres with a distance between the two furthermost of over 190 kilometres (see Appendix K). In addition, some urban centres (Kulim in Kedah and Batu Kawan in Penang) are appointed to specialise in three different, unrelated industries (medical equipment, automotive and printing).

6.1.2 State development plans

On a lower scale level, there are also several strategic economic development plans. Such plans are issued on a less regular base but provide a better picture of policy variations within the region.

Rancangan Struktur Negeri Perak 2020

The Perak state government released the Perak State Structure Plan 2020 (Rancangan Tempatan Daerah Manjung Pengubahan 2020 in Malay) and the associated Perak Amanjaya Industrial Development Action Plan in 2013. These development plans cover the entire state's industrial and land use planning. In this issue, Perak was divided into four economic corridors: the Northern-, Southern-, Central- and North-Eastern-Corridor. The Industrial Development Action Plan identifies the Northern Corridor Economic Region as the manufacturing hub of Perak. The Central Perak Economic Corridor is also planned to specialise in the manufacturing industries and in education and tourism. The automobile industries are assigned to the Southern Perak Economic Corridor (which mainly exists of the Hilir Perak district) specialises in agriculture and eco-tourism. The Structure Plan uses terms such as development zones, industrial hubs, and a trade zone, although it remains unclear what this exactly comprises.

Perak Amanjaya Industrial Development Action Plan

The Perak Amanjaya Industrial Development Action Plan was published concurrently with the Perak State Structure Plan 2020. This development plan stressed the importance of the manufacturing sector and argues for focus on the processing of natural resources, foundry and engineering and biotech-related manufacturing. In detail, the action plan states that strategic thrusts for Perak are seen as basis for cluster and industrial estates in the resource-based industries (minerals, wood-based); new industries (biotechnology and automotive industry); marine-based industries; agro-industries related to palm oil, rubber, aquaculture, coconut, livestock; ICT related industries; foundry and engineering industries; SMEs in related/supporting industries and services; tourism industry and services (nature and health tourism); educational hub and services (Perak State Government, 2015). This is illustrated by the 3D Regional Growth Plan (see Appendix L). The plan emphasises the importance of intensifying the relocation of scattered industries into planned industrial estates and the zoning of industrial estates areas based on business activities and based on value chain and resources. The Action Plan does not state in which industrial estate a specific type of business activities should be (re)located. Also, the planned economic corridors are illustrated on a map with 9 corridors in between 5 urban centres that are connected by arrows (Appendix L). The reasoning behind the corridors, or what the arrows exactly mean is not specified.

Rancangan Struktur Negeri Perak 2040

The updated publication of the Perak State Structure Plan 2020 was released in 2017 under the name of Rancangan Struktur Negeri Perak 2040 (Perak State Structure Plan 2040). Similarly to '2020', the importance of controlled and concentrated growth is stressed. Whereas the Perak State Structure Plan 2020 stated industries of focus but remained rather unclear about which conurbation or industrial estate should specialise in this, the 2040 version is much more specific.



Figure 6.1: The Perak State Development Strategy and Focus 2040 (Rancangan Struktur Negeri Perak 2040, 2017)

The report refers to five growth nodes: Greater Kamunting Conurbation, Kinta Valley Metropolitan Area, Southern Perak Region, North Perak Region and Wilayah Hulu Perak. Consistent with earlier mentioned federal reports, the Greater Kamunting Conurbation is stated as a major growth node of the Perak Northern Territory which is developed in integration with Penang and Kedah (Figure 6.1). Kinta, Kampar, Manjung and the Kuala Kangsar district make up the Kinta Valley Metropolitan Area. This is supposed to be an integrated development area where Ipoh functions as the central investment area, Manjung is appointed as steel-based manufacturing

area and maritime investment centre, Seri Iskandar for Aerospace (named the Green Asia Aerospace Technology Park in this report) and Batu Gajah as locomotive hub (see Appendix M for an illustration of the Integrated Development of the Kinta Valley Metropolitan Area). The WPS (Southern Perak Region) with an integration of the Bagan Datuk, Hilir Perak, Batang Padang and Muallim districts forms the third growth node. The Larut, Matang and Selama district together with Kerian make up the North Perak Region (WPU). This means that the Kamunting-Taiping conurbation is included both in the Greater Kamunting Conurbation (which is integrated with the southern parts of Penang and Kedah) but also in the WPU (with its clear orientation towards the southern Perakian coastline). According to the Perak State Structure Plan 2040, the WPU should function as a chemicals industrial cluster.

Apart from the five growth nodes, the plan describes plans to establish a food manufacturing hub which is located in Selama, Pengkalan Hulu, Bagan Serai, Parit Buntar, Seberang Perak, Manong and Titi Gantung (for a map with the urban centres that are planned to specialise in food manufacturing see Appendix N). Similar to the previous example of the medical equipment industry under the Perak Amanjaya Industrial Development Action Plan, plans for food manufacturing hubs are geographically distributed over 7 locations in 2 states. Thereby it does not follow the directives as given in federal-level policy recommendations (such as 11MP and NEM). The last part of the plan is about industrial focus that is spatially bounded to a single conurbation or industrial estate, although some industries are designated to more than one location. The Perak state government advises some of the districts to focus on tourism as their main economic activity (Kuala Kangsar, Sungai Perak, Manong, Teluk Intan) while other districts should focus on economic activities related to natural resources that are in proximity (Gerik on the timber industry, Selama, Lenggong and Pengkalan Hulu in the northern peripheral parts of Perak on agriculture). Kamunting-Taiping, Kampar, Tapah, Seri Iskandar and Tanjung Malim should all focus on education, of which Kampar and Seri Iskandar go by the name of 'City of Education' and Tapah is on its turn the 'Education Hub'. Apart from the City of Education, Kampar is also a 'T-city' in the Structure Plan, just as Gopeng. T-city is a township development project endorsed by Malaysia's Economic Action Council as part of the key economic transformation program in enhancing the national economy (2014). Contrary to the claims of the Perak state government of Tapah as a T-City, T-City (Ipoh) Sdn Bhd (the executor of T-City) does not mention Tapah as part of the project. The plan is jointly sponsored by private investors and endorsed by the Economic Action Council as part of the state's key economic transformation programme. The Economic Action Council is a federal council and within the development of T-City there is no involvement of the Perak state government or other state governmental bodies (Mat Arif, 2016). The initiative will comprise a racing circuit, auto mart, theme and water park together with hotels, high rise condominiums and an international school.

The Perak State Structure Plan 2040 also identifies three 'ZPP's' (Development Promotion Zone) in Lumut-Sitiawan, Kamunting-Taiping and Ipoh (Figure 6.1). Herein, the ZPP of the Lumut-Sitiawan area is planned to focus on marine industries, ZPP Kamunting-Taiping on palm oil and manufacturing as well. The development promotion zone of Ipoh should focus on manufacturing, an ICT technology park and, surprisingly, maritime industries as well. Apart from the planning zones, districts or cities that are mentioned are Batu Gajah as a Locomotive Center, Seri Iskandar as Aerospace Technology Park, Bagan Datuk as Perak Heavy Industrial Park (PHIP) and Tanjung Malim as automotive city. At last, two initiatives follow: Parit Buntar as a mineral industries hub and Animation industries in Ipoh.

Wilayah Perak Selatan (WPS)

The last state development plan is the Wilayah Perak Selatan (WPS) which translates to South Perak District. The WPS reports argues that the area consists of four interconnected nodes focusing on 15 Economic Catalyst Projects, in line with the key promoted sectors under the NCER Blueprint. PKNP is the implementing agency of the development plan. The first node (Bagan Datuk) focuses on heavy industries by means of the Perak Heavy Industrial Park (PHIP), Logistics Hub, Bagan Datuk Water City (BDWC), RESCOM (research-commercialisation project located within BDWC) and the Palm Oil Industrial Cluster (POIC). The second node is Tanjung Malim and focuses on the automotive industry. The third node is Tapah which is said to focus on education by means of a new township (EduCity) and an R&D Hub with SME Park. EduCity will focus on training students to work at the heavy industrial hub or the automotive industry in Tanjung Malim. The last node is Teluk Intan with its key industry agro-based industries. The three catalyst projects that are planned to be established over here are the palm oil bio cluster, the organic cluster (plastic, chemicals, rubber and fertilisers) and agro-based industries. The concrete implementation of the plans is missing. Hence, it remains unclear what PKNP understands under an industrial park, logistics hub, or industrial cluster.

Two other state development plans were relevant to mention, although they were not suitable to list under the previously mentioned categories. Under the ICT Strategic Blueprint 2010, which was introduced in 2005, Perak was envisioned to be an entry-level knowledge state by 2010 and to become a full-fledged knowledge state by 2015. The focus is on turning Meru Raya (a new township in Ipoh) into a creative multimedia hub and shared services and outsourcing (SSO) global hub. The Perak Corp Bhd. Tourism Blueprint (2012) discusses the development of a family entertainment hub with a theme park, hotels and water park in AmanJaya, Ipoh (Kinta district). The Movies Animation Park Studio theme park functions in this view as a catalyst for attracting more investment in the entertainment industry.

6.1.3 Local development plans

On the sub regional level, policy is formulated as well by both district and city governments. Although the majority of the contents in strategic plans on the lower level covers subjects such as land use and registration issues, policies related to industrial planning are mentioned from time to time.

The Rancangan Tempatan (RT) Daerah Manjung 2030 (Manjung District Local Transformation Plan 2030) was released in 2016 and builds on the previous issue RT Daerah Manjung 2015 as well as on plans of a lower scale level such as the RT's for Lumut, Seri Manjung, Sitiawan, Ayer Tawar and Pulau Pangkor which were published in 2015. The plan mostly discusses the development of Port City around the Lumut area. It articulates the need for developing maritime and biotechnology-based industrial areas in Tanjung Hantu and Tanjung Batu. All these plans should be included in the overarching Manjung Exclusive Economic Zone.

The Rancangan Tempatan Majlis Daerah Batu Gajah 2025 (Batu Gajah District Local Transformation Plan 2025), a 2014 report by the Batu Gajah district council, argues for the locomotive industry in Batu Gajah city and establishing ICT industries south-west of Batu Gajah in Tronoh - Iskandar. RT Majlis Daerah Batu Gajah 2025 also argues for enhancing the poultry industry to become one of the major producers of duck meat and eggs.

The Rancangan Tempatan Daerah Kampar 2030 (Kampar District Local Transformation Plan 2030) discusses mixed development areas with corridors although no specific industry focus is mentioned. Kampar's transformation plan does argue, however, by its establishment of a food manufacturing centre that goes by the name of National Food Terminal in 2014 in Gopeng. This plans was never executed.

Kuala Kangsar's local transformation plan (Rancangan Tempatan Daerah Kuala Kangsar 2020) tells that the main focus is on the food and beverages industries. Apart from this, Kuala Kangsar city also plans to attract firms in ceramic industries, wood products and agro-based halal foods. Sungai Siput, in turn, focuses, according to the local transformation plan, on wood products as well but also basic metals, rubbers and plastic. Furthermore, the plan argues for Padang Rengas to be transformed to a heavy industries zone focusing on mineral & ceramic products. Last, Lake Chenderoh should be an industrial zone for aquaculture livestock. It is not clarified what is necessary to implemented these plans as no detailed information on industrial development is stated, apart from focus industries.

Local transformation plans for the districts Larut Matang, Taiping, Selama, Batang Pedang and Hulu Perak and the city of Ipoh only cover topics related to land planning without explicitly stating industrial sectors or specialisations.

6.2 Planned spatial industrial focus

The industrial planning in the development plans on all scale levels have been combined in a list (see Appendix P for an overview of planned spatial industrial focus as derived from the policy plans). In order to retain a clear overview, industrial focus policies have been divided into those that are related to (the processing of) natural resources or raw materials and locations that are designated in policy plans to focus on industries other than natural resources or raw materials.

6.2.1 Industrial focus on natural resources or raw materials

In the first place, spatial planning related to natural resources or raw materials will be discussed. Plans indicate a total of 7 different industries consisting of 17 planned initiatives in 10 industrial estates on the federal, (inter-)state, district and city level (Figure 6.2). The districts Kinta and Manjung are designated to specialise in manufacturing by means of the ZPP' s, although no specific type of manufacturing has been mentioned in the reports. The only exemption was concerning the economic activity of fisheries, aquaculture or maritime activities where Lumut, Kuala Kangsar and Ipoh are planned to specialise in while Bagan Datuk calls itself the 'Water City'. Another industry that is in the scope of interest in several policy plans is the mineral industries. In the north of Perak, the district transformation plan indicates that Parit Buntar should focus on this industry with its 'Mineral Industries Hub', and so are Kuala Kangsar and Sungai Siput planned to do. This is remarkable since Kuala Kangsar and Sungai Siput are both in the same district (Kuala Kangsar district) at a distance of about 25 kilometres away from each other. Another industrial focus of Kuala Kangsar, according to its industrial planning, is the (to minerals related) ceramics industry. Sungai Siput's industrial planning aims at minerals, metal & steel, wood & timber and plastic industries. In its district development plans, Hilir Perak assigns the plastic industries to its district capital Teluk Intan as well as a planned chemical industries cluster. In addition, and similar to Bagan Datuk, a Palm Oil Industrial Cluster is mentioned in the policy plans as well as the focus on the processing of palm oil. The Kamunting industrial zone is also specialising in chemicals according to its industrial planning. The city Kuala Kangsar in the eponymous district also state multiple on multiple industries at once as planned industrial policy (two mineral clusters and wood and timber industries). So does Lumut with its designated steel-based manufacturing hub in the metal and steel industries and the aforementioned maritime investment centre. The northeastern district Hulu Perak devotes itself to wood and timber industries in policy planning.



Figure 6.2: Overview of designated clusters that are related to natural resources or raw materials in Perak as retrieved from the list of development plans (Department of Statistics Malaysia, n.d.)

6.2.2 Industrial focus on the remaining industries

The remaining industries are food manufacturing, aerospace, automotive, train manufacturing, medical equipment manufacturing, printing, ICT, animation, and entertainment. These 9 industries are spread out over 11 industrial estates in policy planning (Figure 6.3). Within this category, food manufacturing is the most geographically scattered industry in policy planning as 5 industrial estates (Gopeng, Kuala Kangsar, Batu Gajah, Parit Buntar and Pengkalan Hulu) in 5 districts (Kampar, Kuala Kangsar, Kerian, Kinta and Hulu Perak) are competing each other to become the state food manufacturing cluster. Apart from food manufacturing, the industries aerospace, automotive and ICT are designated to multiple locations as well. Discrepancies arise for the location of the aerospace cluster in policy reports as this is both mentioned to be located in Ipoh due to the presence of the airport but also Seri Iskandar because of the technical university. Concerning automotive, there is Proton City with Malaysia's largest car assembly plant in Tanjong Malim. However, some 125 kilometres away Bagan Datuk also claims to have a specialised automotive cluster in its district transformation planning. Another example of this type of duplicating clusters in planning reports is ICT with Ipoh and Seri Iskandar. When it comes to the entertainment industry, both Gopeng (Kampar) and Amanjaya (Ipoh, Kinta) have a hub for this although they differ in terms of core activity. Other clusters are medical equipment (Kamunting), printing (Kamunting), animation industries (Ipoh) and train manufacturing (Batu Gajah).



Figure 6.3: Overview of the second category of clusters in Perak as retrieved from the list of development plans (Department of Statistics Malaysia, n.d.)

6.3 Industrial policy from a district perspective

Confusing and duplicating policymaking emerges not only from the perspective of industrial estates as this is also the case when districts are the unit of analysis. Districts that are planned to focus on a variety of different industries are mainly Kuala Kangsar and Kinta. The Kuala Kangsar district does not only plans to specialise itself in as much as 5 different industries (wood & timber, mineral, food manufacturing, plastic, and aquaculture), the (yet to be established) wood & timber and mineral clusters are also located in its two main towns Kuala Kangsar and Sungai Siput (Figure 6.4). A similar view emerges when analysing planned cluster initiatives in the Kinta district (Figure 6.5). Here, designated clusters in the two main cities are planned to specialise in 7 industries (whereas undetailed cluster descriptions such as manufacturing without a location have been excluded from the analysis). In policy plans, Ipoh is said to specialise in ICT, aerospace, animation, family entertainment, and maritime industries. Batu Gajah in food manufacturing and train manufacturing by its poultry cluster and locomotive hub according to its local transformation plan.



Figure 6.4: Overview of clusters and their industry specialisation in Kuala Kangsar district (in blue) (Department of Statistics Malaysia, n.d.).



Figure 6.5: Overview of clusters and their industry specialisation in Kinta district (in blue) (Department of Statistics Malaysia, n.d.).

Conclusion

Development plans, industrial policy and cluster initiatives overlap or duplicate each other, government bodies of different scale levels contradict, planned industrial clusters are not clearly demarcated (to districts or urban centres) or lack any location information at all, policy plans describe specialisation or industry focus to different cities or towns within the same district and locations that are designated to focus on an industry are sometimes spread out over one or even multiple districts or states. These issues arise already on federal levels of policymaking and seem to trickle down to the state, district and city level. As a result, a rather confusing, unclear and unaligned planned industrial pattern arises in the region where it remains unclear who is supposed to specialise in what economic activity. Moreover, the reasoning behind industrial focus for districts or urban centres misses. In addition to the above, in the sparse case that policymakers state an industrial focus and specific location, terms as clusters and industrial estates, hubs or zones are used interchangeably where none of the industrial development plans specifies what it actually includes. Hence, it remains unclear if the idea behind a cluster or specialised industrial estate is an agglomeration of related firms, supported by specialised services, suppliers and institutes or just the concentration of firms is the idea behind it.

7. Patterns of private investments

In order to gain a general idea of the regional economy, this chapter begins with an overview of the characteristics of the incoming flows of capital investments. Next, the development of the most common industries in Perak will be discussed. The chapter continues with an analysis of industrial areas and, where relevant, specific industry specialisation and location of investments. It concludes with a chapter where actual patterns of private investments are compared to what policy makers had in mind in development plans on industrial location patterns.

7.1 Regional investment patterns

To begin with an analysis of industries that enjoy the most investments, the total number of approved investment projects is displayed (Figure 7.1). This shows that mineral products, electronics, food manufacturing, chemicals, transport equipment and rubber products enjoy the highest number of investment projects in Perak over the past 10 years. After these six industries, wood & timber, machinery & equipment, and plastics attracted the most investments.



Figure 7.1: The number of approved investment projects per industry in Perak between 2008 – 2018 (MIDA, 2019)

When it concerns the volume of investments, industries perform differently. It shows that whereas the differences in number of projects where often rather marginal between industries, capital volumes differ more clearly. Mostly, the explanation needs to be sought in individual differences such as large-scale investments and acquisitions rather than in the array of investments⁷. The electronics and electrical products industry is with a total volume of 6 billion

⁷ More details on this in Chapter 8

invested Malaysian Ringgit over the past ten years analysed the largest industry (Figure 7.2). Hereafter, the rubber industry takes up the biggest volume with around 5,4 MR billion. The third place in terms of capital volume, although with quite some distance, are metal & steel products with 4,6 MR billion. Next are transport equipment (2,2 MR billion), food manufacturing (2 MR billion) and minerals (1,7 MR billion).



Figure 7.2: Total capital investment in MR millions of approved investment projects in Perak between 2008 - 2018 (MIDA, 2019)

When analysing the average capital volume per project in Perak over the past ten years, rubber and electronics & electrical products manufacturing projects top the charts as highest valued projects with respectively 122 and 121 MR million average investment per project (Appendix I). Hereafter comes the metal & steel industry (95 MR million). Next comes printing with an average of 56 MR million spent per project. Subsequently, beverages & tobacco (53), transport equipment (48), and food manufacturing (42). Plastics and chemicals average at 24 and 23. The remaining industries invest an average amount of 15 MR million per project or less. In terms of employment addition, it is rubber that adds the most jobs to the state as a result of its investments (16,745 jobs). Next come electronics (9,521 jobs), food manufacturing (4,934 jobs) and transport equipment (4,825 jobs).

When it comes to the type of projects, it stands out that the vast majority of approved investment projects concerns expansions: over 80 per cent of identified investment projects were firms expanding their current business operations. New investments took up a share of 19 per cent and diversification projects 0.6 per cent. When it comes to the origin of investments, 72 per cent of the

investments in Perak comes from domestic investors⁸. Slightly more than 16 per cent is wholly foreign. The remaining part are either foreign majorities or joint ventures.

7.2 Industrial investment trends

In order to find out if the region in its entirety is become more specialised, the trend of investment projects per industry over the past 10 years is discussed (Appendix S). In accordance with expectations, some industries stand out above the others. In the first time period (2008 – 2011), the industries food manufacturing, electronics, metal & steel and minerals & ceramics attracted most of the investments (around 20 in total over the time period). For the second time period this are chemicals, food manufacturing and minerals & ceramics. For the years 2016, 2017 and 2018 it are mainly rubbers, electronics, minerals & ceramics, transport equipment and metal & steel that are popular industries to invest in. To gain insights in to what extent industries show patterns of specialisation over the years, the individual industry changes should be discussed. This has been done using a radar chart (Figure 7.3). This should be read as following: the more round the shape is of the lines within the chart, the less one specific industry stands out in terms of the number of investments in comparison to other industries. The other way around applies where the more spikey the shape inside the chart is, the more investments are flowing to this specific industry compared to the others. If the region is specialising in certain industries, according to the theory of specialisation⁹, the shape should become more spikey over the years.

The industries transport equipment, minerals, plastics, and wood & timber have remained at a rather similar level which indicates that there is no evidence that these industries show a pattern of specialisation. The industries food manufacturing and machinery & equipment show a steep decrease over the years and the same applies to metal & steel and electronics although these industries decrease less significantly. Based on this, there is no indication of specialisation but rather the opposite. Chemicals increased in the second time period to decline in a later stage again, ending at a lower level than the first time period. Thus, no evident changes appeared in this industry. Last, the rubber industry shows a steady increase over time. This shows that the number of investments continues to increase over time, although the differences are marginal. Based on the above, it can be concluded that there is no industry in Perak that shows a clear pattern of becoming more specialised measured by an increasing number of investment projects over the past 10 years.

⁸ This differs from aforementioned because here the number of projects are analysed whereas in Chapter 5 it comprised volumes of investment



2008-2011 2012-2015 2016-2018

Figure 7.3: Trend overview of investments per industry for the three time periods 2008-2011, 2012-2015 and 2016-2018 (MIDA, 2019)

7.3 Policy, structure and location of private investment

To find out to what extent regional investment patterns show behaviour that is in line with regional industrial policy plans as analysed, a locational comparison has been made by means of maps¹⁰. Since the investments patterns can only be compared to industrial policy plans if the specific industry is actually mentioned in policy documents, only the industries that are mentioned in those plans will be analysed. As previously stated, these are listed in two categories: industries that use raw materials or natural resources in their production process and those that do not. Starting with the first category, this paragraph will discuss both discrepancies and similarities. The next paragraph addresses the specific investment characteristics in greater depth per industrial estate.

Initially, the manufacturing industries of minerals, wood & timber, metal & steel, plastics, chemicals, aquaculture & maritime, palm oil processing and rubber industries will be discussed. As stated before, a total of 17 initiatives regarding industrial focus for a specific location have been mentioned in policy documents that were divided over 10 industrial areas. If a policy document only stated to focus on manufacturing without any further details, it is not taken into consideration as any form of investment will be considered as according to policy plans.

 $^{^{10}}$ As not all industries will be discussed in this paragraph, private investment patterns compared to spatial industrial policy of the remaining sectors can be found in Appendix Q

There was no evidence found in the analysis that an industrial area was able to attract the vast majority of investments into the designated industrial estate as was planned by policymakers. The most notable exception was the automotive industry. Within this industry, some investment took place in the Kamunting industrial zone and Kinta district, although most of the investments were implemented in Tanjung Malim (although this urban centre is out of the case study area) (Figure 7.4). This is in line with spatial industrial policies that aim for Proton City in Tanjung Malim as a car assembly hub. Bagan Datuk also mentions this industry as their focus in policy plans, because of the initial 500 MR million auto hub investment project by Tan Chong Motor Holdings Bhd which was called off due to changes in policy (Yunus, 2019).

Other cases were actual patterns of private investments were in line with spatial industrial planning to some extent were in the industries of rubber, chemicals, metal & steel, wood & timber, palm oil, food manufacturing and printing, paper & publishing (Appendix Q). However, this included only several investments that took place according to industrial planning and are not comparable to the case of Tanjong Malim.



Figure 7.4: Private investments in the automotive industry (coloured dots) compared to spatial industrial policy (green dot), the dotted line demarcates the case study area (MIDA, 2019)

Another noteworthy case is that of Kamunting where the Greater Kamunting Conurbation policy plan mentioned to aim at attracting investments from manufacturers of medical equipment & scientific measurement (Seong, 2007). Half of the investments in this industry over the past 10 years took place in the Kamunting industrial estate (Figure 7.5).



Figure 7.5: Private investments in the medical equipment & scientific measurement industry (coloured dots) compared to spatial industrial policy (MIDA, 2019; Wei Seong, 2007).

Other industries where investment patterns were in line with industrial planning were rubber (Teluk Intan), food manufacturing (Gopeng and Batu Gajah), chemicals (Kamunting, Figure 7.6) and metal & steel (Lumut).



Figure 7.6: Private investment in the chemicals industry compared to spatial industrial policy (MIDA, 2019).

Train manufacturing is logically in the scope of interest in Batu Gajah as the Chinese CSR Rolling Stock Center established business in this area with a 400 MR million investment. This has not been followed up by any related investments so far. The only investment in this industry, after the entrance of CSR in Perak, has been in the assembly of turnouts for railway lines far away from Batu Gajah in the Selangor bordering town Slim River. Another large-scale investment projects is the planned establishment of an aerospace cluster. As shown before, it remains unclear where this should exactly be located. To date, an aerospace hub is only proposed and in fact no step are undertaken yet (Federation of Malaysian Manufacturers, n.d..

Last, the patterns of private investment which did not behave similar to what was meant in policy plans at all. The most convincing examples of this were minerals, plastic and aquaculture & maritime.



Figure 7.7: Left-hand side: private investments in the minerals industry to spatial industrial policy Right-hand side: private investments in the plastic industry to spatial industrial policy (MIDA, 2019)

7.4 Specialised industrial areas

Another approach of analysing patterns of spatial concentration of industries is not from the industry or planned spatial distribution but from industrial areas and their industrial composition since industrial zones could show patterns of specialisation on their own and have characteristics of cluster formation. Thus, a closer look into noteworthy developments of industrial estates is given (see Appendix S for a comprehensive explanation of all investments within industrial estates with 5 investments of more). The discussed industrial areas (shown on a map in Figure 7.8) will be discussed by those attracting the most investments to the least.

Industrial estates that were unable to attract more than 5 investments over the past ten years are not taken into consideration because the lack of mass of investments. This included a total of 37 industrial estates of which the majority is located in Kinta between Chemor and Batu Gajah or around Taiping-Kamunting in Larut, Matang and Selama District (see Appendix O for a list, and Appendix R for a map with industrial estates with less than 5 investments).



Figure 7.8: Overview of all industrial estate that were able to attract more than 5 investments between 2008 - 2018. Industrial locations with an asterisk are outside of the case study area (MIDA, 2019)

Kamunting I IE (35 investment projects in 9 industries)

Kamunting I is the industrial estate that is part of the city of Taiping (Larut, Matang and Selama district) and is incorporated in the Greater Kamunting Conurbation under the Blueprint 2.0 initiative (implemented by Northern Corridor Implementation Authority). Kamunting I, as showpiece of the GKC, is an industrial estate with a diversified portfolio of investment projects. As an illustration, industries that attract investments over the years have become more diversified, i.e. the latest 9 investments (from 2015 – 2019) where in 6 different industries. Perhaps this is the result of the rather unclear classification of industrial focus in the Blueprint (focus on all

manufacturing activities) which results in a lack of industry specialisation. In terms of size (both number and capital volume of projects), the rubber industry is the largest sector in Kamunting I. Of the 12 investment projects in the rubber sector, 5 investment capital volumes were traceable. Latexx Manufacturing Sdn Bhd. expanded business over the years with a 70 MR million investment in a new production line in 2008 and another 110 MR million investment in 2017 in an additional production line (and a 110 MR million investment in scientific equipment to test the quality of its rubber gloves although this cannot be classified under the rubber sector). Everthrough Rubber Products Sdn Bhd. performed a small-scale investment (3.8 MR million) in 2016 to increase its tire production capacity. Another noteworthy development in the Kamunting rubber industry is the role of acquisitions. Riverstone Holdings Limited (the holding of Riverstone Resources Sdn Bhd.) acquired the neighbouring company Sinetimed Consumables Sdn Bhd. for 57.5 MR millions to expand their operations by the construction of a new glove factory building. Another acquisition was done by Toyo Tyre Malaysia Sdn Bhd. (the Malaysian subsidiary of the Japanese Toyo Tire & Rubber Company). Toyo Tire acquired Silverstone Berhad which have been producing tires in Kamunting since the late '80s for 774 MR million in 2012 (Toyo Tyre Malaysia Sdn Bhd. company representative, June 17, 2019).

Ipoh (31 investments in 10 industries)

As aforementioned, Ipoh (Kinta district) as investment location differs from the other investments locations as it comprises a city and not a clearly demarcated industrial estate. The investment profile of Ipoh gives, similarly to Kamunting IIE, a diversified view on investments. However, since the city is documented by MIDA as one single investment location, a scattered geographical distribution of investments is logically accompanied with this. As a result, there is no case of agglomeration externalities because of the simple fact that firms within Ipoh do not agglomerate in space, apart from – separately treated – industrial estates. Some noteworthy projects are the diversification project of multinational corporation Balda Solutions Malaysia Sdn Bhd. in the design and production of broadband devices which involved a 462.5 MR million investment in 2008. A year later the company invested an unknown amount in the production of renewable energy harvesters in the same factory location. Another electronics company that made multiple investments in Ipoh is Carsem (M) Sdn Bhd. in the semiconductor industry. The firm invested in advanced semiconductor packaging and testing in 2014. The following year they invested energy conservation and efficiency for own consumption (listed as an investment in the services sector) to invest in 2016 in the production of semiconductor devices. Also notable is that all known investment types except for two in Ipoh are expansion projects. The two non-expansion projects are one company that renamed itself (which counts as a new investment but is basically a reregistration) and the Swiss subsidiary Omya entering the market with its plant opening in 2008. Omya Malaysia Sdn Bhd. invested four years after its entry to the region to increase its calcium carbonate production capacity.

Silibin Light IE (18 investments in 7 industries)

The Silibin Light Industrial Estate is located on the outer west side of the Kinta district. What stands out in the Silibin Light Industrial Estate is that if multiple investments in the same industry occur, they are often done by the same company. This applies to bio fertilizers in the chemicals industry and firms investing in the metal & steel industry. Therefore, at first glance, it seems like a mass of companies is doing investments in the same industry while in fact it is one individual company that is scaling-up its business.

Kinta FIZ (17 investments 3 industries)

The Kinta Free Industrial Zone is located between Ipoh and Chemor in the Kinta district. Foreign firms operating in an FIZ in Malaysia mainly benefit from tax advantages¹¹. Kinta FIZ behaves like one would expect from an industrial zone where large multinational manufacturers are located. As no other firm entered the zone over the past ten years (no new may enter the zone at the moment as vacant land is reserved for current firms), all investment projects have been projects that functioned as expansion of current business. The investments took place in electronics, metal and machinery. The two investments where capital volumes were identified in the zone are a 2015 investment by Finisar Malaysia Sdn Bhd. (Perak's largest employer with a contribution of 5% to the manufacturing GDP) in a new production floor at its product development and manufacturing facility to produce transceiver modules and transceiver modules accessories. This 610 MR million investment added 500 extra jobs to the regional economy. The other investments was a 130.7 MR million investment by Kamaya Electric (M) Sdn Bhd. in automotive chip fuse and chip resistors in 2017.



Figure 7.9: The highly guarded large-scale industrial complex of Finisar Malaysia Sdn Bhd at the Kinta Free Industrial Zone. May 2019

Chemor (15 investments in 10 industries)

Chemor is a main town in the Kinta district, about 17 kilometres north of Perak (half an hour drive by car). The Ceramic Industrial Park Chemor is also part of the Chemor Industrial Estate

¹¹ As explained in the list of definitions

(Bloomberg.com, n.d.)¹². All known types of investments projects where to expand current business. Correspondingly to the previous investments locations, Chemor's industrial estate does not have a clear industrial specialisation. The most prevalent is chemicals. The only traceable investment for the industrial estate was a Hovid Berhad acquisition of half of the stocks of Carotech Bio-Vits Sdn Bhd for 35 MR million in 2008. All subsequent investments by the company have been in this factory location. The presence of the Ceramic Industrial Park Chemor is not reflected in investments data as there are no registered investments in any ceramics related industry in Chemor over the past ten years.

Lumut (15 investments in 7 industries)

The industrial estate in Lumut (Manjung district) are the industrial zones surrounding the port. As known, the port is a bulk port which has consequences for the types of cargo that the port is able to process. In short, Lumut Port Industrial Park shows some typical economic activities for both an industrial zone at the sea and a bulk cargo port exemplified by ship building, processing of chemicals, diesels and bulk food. For 9 out of 15 investment the type of projects was identified which turned out that 5 expansion projects and 4 new investment projects were approved. A nearly equal distribution within an industrial estate is an uncommon phenomenon in investment patterns in Perak. This is explained by the fact that some economic activities that are undertaken in Lumut are typically projects that have a clear beginning and end like ship repairing. Each individual investment in this situation counts as a new project. Investment volumes for this industry clearly differ as the construction of a whole new yacht hotel was approved for a value of 80 MR millions and the repair of a ship 9.6 MR million. Other volumes identified were in the field of food manufacturing. As part of the growth strategy of Malayan Flour Mills Berhad they acquired Dindings Soya & Multifeeds Sdn Bhd. and subsequently invested 35 MR million in its wheat process facility. At last, a 40 MR million new investment in the development of an oil and gas fabrication yard added 800 jobs the Lumut Port Industrial Park.

Batu Gajah (14 investments in 9 industries)

Situated 20 kilometres south of Ipoh, Batu Gajah is a town in Kinta district. The largest share of investments went to the industries of minerals and plastic. The only new investment within Batu Gajah the past ten years was a major Chinese investment in the CSR Rolling Stock Center (Malaysia) Sdn Bhd. (400 MR million investment providing 800 jobs). This facility will function as the main plant for the manufacturing of electric locomotives that will subsequently exported to China. Surprisingly, this investment did not function as a catalysator for further related and new investments as investments hereafter in Batu Gajah were expansion projects in wood pellets and rubber condoms.

Menglembu (13 investments in 7 industries)

Menglembu is a small township in the southern part of the Ipoh City Area within the Kinta district. Over the past years there were just a few investments in the plastic industry by the same expanding firm. The industrial estate does not seem to follow a specific investment pattern. Since all investment in the plastics and rubber industry are done by the same two firms, it is a gathering

 $^{^{12}}$ Since the Ceramic Industrial Park Chemor is not mentioned in any policy document in the list from DOSM (n.d) it is not taken into consideration in Chapter 6

of investments in unrelated industries with the exception of machinery & equipment although this were 3 firms expanding their own business within a period of five years.

Pengkalan II (Ph I) IE (12 investments in 6 industries)

The industrial estate Pengkalan II (Ph I) is located in the Kinta district between Ipoh and Batu Gajah. It consists of two neighbouring industrial complexes completed in two phases. It is mainly popular among firms expanding in the metal & steel industry. The only identified investment projects has been categorized by MIDA as miscellaneous. The 20 MR million expansion project concerned an industry brush which suggests an investment in the metal & steel industry. As seven out of 12 the investments are related to metal or steel (although not all categorised under the metal & steel industry), it gives a view of industry specialisation within the industrial estate.

Teluk Intan (11 investments in 6 industries)

The capital town of Hilir Perak, Teluk Intan, is situated around the Perak river in the southwestern part of Perak. The town acts according to expectations based on the nearby economic activities with industries related to surrounding palm plantations. There are only few recent investments of which the majority are investment in the production of organic fertilizers (chemicals industry).

Kinta district (10 investments in 6 industries)

Kinta is an even more remarkable investment location than Ipoh is since it covers a whole district which is as large as 1,300 km² instead of a city (Perak State Government, 2018). This is reflected in scattered geographical distribution of the factory locations of the 10 investments in 6 industries in Kinta. For this reason, a summary of Kinta's industries as one single entity is incoherent and will not be described.

Tasek (10 investments in 7 industries)

Tasek is located in the city area of Ipoh (Kinta district), just north of the city centre. The three industries that had more than 1 investments over the past ten years are minerals, rubber and chemicals. Identified volumes where investments in the production of gloves (19.5 MR million capital volume) and rubber profiles (50.2 MR million capital volume) in respectively 2011 and 2014.

Hutan Melintang (8 investments in 3 industries)

Hutan Melintang is (Bagan Datuk district) characterised by its location at the river which is reflected in a mass of food manufacturing firms that require proximity to water such as fish and seafood producers. The main investor in Hutan Melintang is QL Foods Sdn Bhd. with three expansion projects in surimi products with a total worth of 135 MR million in 2012, 2014 and 2017.

Tanjung Malim (8 investments in 2 industries)

Tanjung Malim (Muallim district) is the most southern city of the Perak region, bordering Selangor. From this town it is 120 kilometres to Ipoh and about 80 kilometres to Kuala Lumpur. It is known for the assembly plant of the Malaysian car brand Proton and is therefore also referred to as Proton city. This is also reflected in patterns of private investment as all investments over
the past ten years were related to the manufacturing of automotive. This shows that of all Perakian industrial estates, it is the most southern and most proximate to Selangor industrial area of Tanjung Malim that turns out to be the most specialised.

Jelapang FIZ (8 investments in 4 industries)

Jelapang is the second of the two Free Industrial Zones in Perak and is situated in the Kinta district as well. Firms within the Free Industrial Zone in Jelapang benefit from the same tax advantages as those in Kinta FIZ although this zone is less popular. This is reflected by firms leaving the zone because of its bad conditions, abandoned factory locations and the fact that there is still space available for new entrants (which is not the case in Kinta FIZ). Investments took place in 4 industries: chemicals, metals, leather, and wood & timber. Of the Jelapang FIZ there were no traceable investment volumes.

Parit Buntar IE (8 investments in 4 industries)

The industrial estate Parit Buntar is in the upper northern part of Perak and is situated both in the states Perak and Penang while bordering Kedah. The industrial state received 8 investments in 4 industries by 8 firms. Two Food manufacturers locate here close to the sea because of the nature of their business (fish and seafood processing). T.E.M Casting Products Sdn Bhd. conducted an expansion projects as capacity enlargement in their production in iron castings which costed 5 MR million in 2009. The other firms operating in the metal & steel industry invested in the metallic treatment of plastic parts. Two firms operating in the paper, printing & publishing performed investment projects in 2016: one in wet tissues and the other in paper products. In plastics, 2 firms invested in recycling of plastics while the other invested in industrial plastic products.

Lahat (7 investments in 7 industries)

The Lahat area is located just south of Menglembu in the Ipoh city area (Kinta district). Here, 7 different firms invested in 7 industries. Thus, it is a highly diversified industrial area. All projects were expansion projects with the exception of one. This concerned an investment project in the mineral industry where the Danish company Aalborg acquired a local factory and expanded production capacity in 2009.

Kanthan IE (6 investments in 6 industries)

The industrial estate Kanthan is located between Chemor and Sungai Siput in the Kinta district. All investments went to a different industry. All known investments are expansion projects. Only one is recent (2016), the rest dates back to 2010 or earlier.

Pengkalan II (Ph II) IE (6 investments in 3 industries)

The second phase of Pengkalan industrial estate is situated in the Kinta district. One investment in the metal & steel industry was done in 2014 by Waiko Engineering Works Sdn Bhd. with an associated capital volume of 81.9 RM million. Other investments were a 2011 acquisition of a glove manufacturer (in the machinery & equipment industry) and an expansion project in the same industry.

Chenderiang (5 investments in 1 industry)

The industrial zone in Chenderiang is located south of Ipoh along the highway next to Tapah (Batang Padang district). All documented investments were done by the Belgian multinational Lhoist when they took over a local limestone quarry in 2008. After the acquisition, Lhoist (Malaysia) Sdn Bhd. ran 5 investment projects to produce calcium carbonate (mineral industry). There are no other firms around the mill because of its unique location in the hills.

Jelapang I IE (7 investment projects in 4 industries)

The Jelapang I industrial estate is located in close proximity to the other Jelapang industrial zones in the Kinta district. Although there were four investments in the same industry (electronics), there is no case of industry specialisation in this industrial estate since all four investments were done by Carsem (M) Sdn Bhd. in its own production facility. Two major investments (254.1 MR million) in production of semiconductor devices were implemented in 2016.

Seri Iskandar (5 investments in 3 industries)

Seri Iskandar is about 40 kilometres southwest of Ipoh and is the district capital of Perak Tengah. Within the town there is a Seri Iskandar Pharmacy Business Centre. This is also reflected in investment patterns. The town had two investments by Idaman Pharma Manufacturing Sdn Bhd. in the production of pharmaceutics (chemical industry). Other investments were in Scientific & Measuring Equipment by Pharmasafe Laboratories Sdn Bhd. in contact lens care and Bio Care Manufacturing Sdn Bhd. investing in inhalers. All medical related investments were done by domestic investors. So, even though the size of investments is not excessive, the Pharmacy Business Centre did have 4 related firms investing in a period of 5 years.

Sungai Siput (5 investments in 4 industries)

The second-largest town of Kuala Kangsar district, Sungai Siput, has a diverse investment portfolio with only one industry receiving more than one investment: food manufacturing. Also, the investments took place over a rather short period of time (2009 – 2012). Within this investment location, Thong Thye Groundnut Factory Sdn Bhd. was acquired by Pagoda Foods (Malaysia) Sdn Bhd. which is on its turn part of the American conglomerate The Schwan Food Company.

Conclusion

Investment statistics show that the industries minerals & ceramics, electronics, food manufacturing, chemicals, metal & steel, transport equipment and rubber play a dominant role in the regional economy of Perak. Differences in investment volumes are rather large whereas electronics, rubber and metal & steel are the top capital receivers. The vast majority of investment projects are expansion projects of current economic activities performed by domestic investors. Furthermore, there is no indication of increasing industry specialisation for the region as a whole. A view where industrial areas do not specialise emerges, which is in accordance with previous findings of a lack of alignment of policies and industrial planning. The absence of sound policymaking in combination with the inability to increase the intraregional organising capacity seems to affect lower scale levels (on the urban centre level) where there is a mismatch of investment patterns and planned policy. This incongruity between targeted locational patterns by government bodies and actual investment patterns is a logical result of the fact that the majority of the investments are re-investments in the form of expansion projects. In the few cases where it seemed that one particular industry was dominant in an industrial zone, it often turned out to be

the result of investment efforts by one individual firm. The only exception was the Tanjung Malim automotive cluster (Proton City) that managed to attract investors from a diverse origin and product portfolio investing in related products over the years.

Another key point that arises based on the analysis of industrial policy and patterns of private investment are clusters and industrial estates. It are mainly clusters that are often mentioned in policy documents as argued in the previous policy chapter, but apparently these so-called clusters are unable to attract investments with one exception. Moreover, it remains unclear what is exactly meant by this, which raises the presumption that it is more of a loosely used term by policymakers that in fact means an industrial zone or estate.

One of the explanatory reasons for the poor performance of industrial zones can be sought in the current practice of choosing locations for industrial zones as this happens on a federal level by the Ministry of Finance who lack comprehensive knowledge on region-specific characteristics. As stressed in the theoretical framework, decentralization could help in this matter. Also, problems arise in industrial park management as once industrial estates are established by PKNP they are handed over to local city authorities, who just collect taxes and do not put any effort in improving conditions of the industrial estate. (Mohd. Nadzri bin Kamsin, personal interview, June 17 2019). This makes them unappealing and as the different industrial estates within the regions have the same level of facilities, firms are not particularly attracted to enter specific industrial estate. Further elaborations on industrial park management can be found in the next chapter.

8. Regional assets

This chapter discusses the role that history and efficiency play in the location decisions of economic actors in Perak. In addition, it covers the conditions of agglomeration economies, as the conceptualisations, of regional assets based on interviews held with private investors and political bodies. It concludes with a view on externalities and mass as well as statements about the functioning of the urban system of Perak based on the conditions.

8.1 History and path dependency

As argued before, most of the investment developments are current firms doing repeat investments. Perak's rich history of tin mining activities and the exploitation of natural resources is still reflected in the economy the present day, especially in the districts Kinta, Larut, Matan & Selama and Manjung (Goradial Singh Ban Singh, personal communication, July 6, 2019). This is exemplified by the composition of the regional economy in which industrial activities are mainly related to manufacturing, engineering, rubber, foundries and limestone. Often, current economic activities date far back (for instance KL-Kepong Rubber Product Sdn Bhd that started at their current location in the early '60s, but also numerous other companies that diversified over the past decades). Thus, in line with the discussion in the theoretical framework, industries are strongly influenced by history and historical choices of firms in the past explain a firm's current situation. Once in a specific path or trajectory, firms tend to stick with the current situation (Head et al., 1994; Glaeser, 1992).

Many firms explicitly mention history as explanation for their current location¹³. Moreover, this was the most often mentioned answer. History, in this view, also relates to family or personal ties of economic agents. Contrary to what the theoretical framework states, the influence of family ties on location decisions does not necessarily limit itself to small or medium-sized firms. The directors of Kuala Lumpur Kepong Berhad, for instance, decided to move its headquarters to Perak because of the family ties that the founders have to the region (Dato' Lee Hau Hian, personal communication, June 17, 2019). As a further example of locational choices of production in the past that influence the long-run geographical pattern of firms' economic activities are Leader Glass Trading Sdn Bhd, River Electronics (Ipoh) Sdn Bhd, White Cafe Sdn Bhd, Ecoauto Assembly Plant Sdn Bhd, and Bidor Kwong Heng Sdn Bhd.

In like manner, the presence of food manufacturers, rubber processors and firms conducting agricultural activities and their location can be explained by the role of history as well, albeit in a slightly different way. Here, firms and their specific location, is principally the result of reliance on or exploitation of spatial non-homogeneities such as raw-materials or natural resources (Glaeser et al., 1995; McCann, 1995). This can either be access to water for instance by using ponds to breed fish (Malayan Flour Mills Berhad, Ambang Wibawa Sdn Bhd, Sin Chip Huat Fishmeal Sdn Bhd, Fantastic Seafood Industries Sdn Bhd, Manjung Aqua-B Sdn Bhd), the usage of waterways for shipbuilding (Johor Shipyard and Engineering Sdn Bhd, CKG Marine Shipyard Sdn Bhd, Sunborn Marine Malaysia Sdn Bhd), or proximity to forests (Kin Heng Timber Industries Sdn Bhd Sunrise Bioeco Sdn Bhd). Other firms that process raw materials locate next to limestone quarries or other

¹³ Including the firms Tiger Casting Solution Sdn Bhd, Leader Glass Trading Sdn Bhd, River Electronics (Ipoh) Sdn Bhd, Ecoauto Assembly Plant Sdn Bhd, Super Coach Assembly Plant Sdn Bhd, Wei Dat Wiremesh Netting Sdn Bhd, Big One Timber Moulding (M) Sdn Bhd, Farmcochem Sdn Bhd, White Cafe Sdn Bhd, Bidor Kwong Heng Sdn Bhd, Sin Yong Guan Industries Sdn Bhd, Kewpump (M) Sdn Bhd, Sanchuan Medical Sdn Bhd, Kemasik Industries (M) Sdn Bhd, Yew Lee Pacific Manufacturer Sdn Bhd, T.E.M Casting Products Sdn Bhd, and K-One Industry Sdn Bhd

sources of minerals (Lhoist (Malaysia) Sdn Bhd, Antico Stone Sdn Bhd, Omya Malaysia Sdn Bhd, Sika Kimia Sdn Bhd, Southern Concrete Sdn Bhd, Zantat Sdn Bhd). Last, processors of palm oil locate in or near plantation areas (Unitata Berhad, Sykt. Cahaya Muda Perak (Oil Mill) Sdn Bhd, PGEO Oil Mill Sdn Bhd, PMC Oil Palm Industries Sdn Bhd, BAC Biomass Sdn Bhd, Sern Lee Fibre Sdn Bhd, Solvent Sdn Bhd).

8.2 Efficiency and other considerations

Different from historical ties to the region, are firms that indicated real estate prices and availability as (a part of) their location strategy. The Free Industrial Zone authority of Kinta even considers this as the main regional asset of Perak. This is confirmed by firms operating in the Kinta FIZ whereas they mainly specify that low land prices in combination with proximity to Penang, Kuala Lumpur and Johor convinced them to choose Perak¹⁴. In like manner, also smaller-sized firms state low land prices as reason of their location choice (Tiger Casting Solution Sdn Bhd, Leader Glass Trading Sdn Bhd, Ecoauto Assembly Plant Sdn Bhd, White Cafe Sdn Bhd, Kemasik Industries (M) Sdn Bhd, and Sika Kimia Sdn Bhd).

Firms also indicated that their locational choices where influenced by proximity to buyers or suppliers. Some want proximity to buyers to save on transportation costs (Yokohama Reclamation Sdn Bhd). Also market characteristics play a role, for instance some firm's buyers mainly have a Chinese background, something that Perak is known for (both Sanchuan Medical Sdn Bhd and Munsang Sdn Bhd indicated this). There were also reported cases of service suppliers that are located near their clients (Asiagreen Resources Sdn Bhd as a waste management provider for palm oil industries, Sykt. Cahaya Muda Perak Sdn Bhd as a recycler of used oil and Technofit Sdn Bhd that supplies machinery to heavy energy users in the port of Lumut). Also, the ability to take advantage of tax exemptions was a reason for them to establish in their particular industrial location which mostly mentioned by firms in FIZ's. Other considerations mentioned were the open economy (Lhoist (Malaysia) Sdn Bhd), government stability and a low risk of natural disasters (Synergy Pipes & Parts (M) Sdn Bhd),

8.3 Agglomeration economies in Perak

In this thesis, urban structure has been argued to be directly related to economic performance and productivity levels of firms due to the impacts of conditions for agglomeration economies involving human capital, specialised services and connectivity as well as urban functions and resources. Hereafter, it will be analysed to what extent such types of externalities are actually emerging in Perak.

In contrast to the previously discussed (mostly domestic) firms that are implementing expansion projects and have historical ties to the region, are new investment projects. New investments are outnumbered by expansion projects as they represent less than 20 per cent of the total of investment projects¹⁵. This emanates from the attraction that Perak has on economic agents seeking new investment opportunities which is dictated by its regional assets. These regional assets, argued from the perspective of conditions in the theoretical framework, influence the emergence of agglomeration economies and have implications for the level of economic and urban mass in the region and thereby the investment climate of Perak. The conditions human capital, specialised services, connectivity and infrastructure will be discussed below.

¹⁴ For Finisar Malaysia Sdn Bhd, Kamaya Electric (M) Sdn Bhd, Yamaha Electronics Mfg. (M) Sdn Bhd, Tigges Fastening Technology Sdn Bhd, and Topfur Dressing Industries Sdn Bhd.

¹⁵ As stated in Chapter 5

Previous studies indicated human capital as one of the difficulties that manufacturing firms face in Perak (Mun, 2007). Some major issues are related to training since firms experienced difficulties in engaging talented employees due to failure of the education system to equip graduates with the relevant skills needed by the industries (Salleh, 2014). Another point of concern was the attractiveness of Perak as people are less interested to work in Perak, industrial areas are not attractive to young people, augmenting a lack of engineers interested to work in the manufacturing sector in Perak. Last, it is argued that there is a lack of learning and development opportunities and training facilities offered by the Perak state government. This is also reflected in the large number of young bachelor degree holders remaining unemployed and the fact that the number of vacancies exceeds unemployment numbers in Perak (Khairuddin, Osman, & Shuib, 2017). This clearly shows the mismatch of supply (because of the educational background) and industry demand.

This view is confirmed by institutions and economic agents in Perak. Institutions recognise the general lack of expertise and the complications that economic agents encounter in finding suitable workers (Mohd. Nadzri bin Kamsin, personal communication, June 17, 2019; Goradial Singh Ban Singh, personal communication, July 6, 2019). They state this as a brain drain: the emigration of highly trained or qualified people from Perak to other states. One of the reasons for the lack of relevant expertise (apart from the previously discussed) can be attributed to shifts in economic activities in the region over the past decades. Many current firms diversified from activities related to natural resources or raw materials to more specific knowledge as traditional industries faded away. Accompanied with the decline of for example tin mining activities are the expertise related to mining and quarrying (such as repair and install skills) leaving the region. The director of Kuala Lumpur Kepong Berhad (a Malaysian multi-national company whose core business is plantations), Dato' Lee Hau Hian, stresses his concerns on finding professional workers for their factories in Perak. "Many educational institutes are based outside of (the centre of) Perak and so are jobs. This results in a brain drain as students favour jobs close to their previous environment. Therefore, they are willing to pay a higher price to live in Kuala Lumpur or Penang. The region lacks a strong base. Klang valley has simply too much mass. The only real links that make people stay in or go to Perak are either family ties or financial incentives". The manager of Leader Glass Trading Sdn Bhd, Wong Kok Kuen, states that better salaries in Kuala Lumpur and overseas makes professional workers leave Perak. Lhoist (Malaysia) Sdn Bhd, the Malaysian subsidiary of a Belgian minerals producer, solves problems with human capital by bringing in their own workforce from other states.

However, not all firms experience problems with human capital. Some firms favour Perak specifically because of low labour costs (mostly multinational firms operating in Free Industrial Zones). This applies to Kamaya Electric (M) Sdn Bhd that states that the relatively low for factory employees as one of the reasons for locating in Perak. For activities that require a higher level of skills, they use their inboard machinery specialists. Finisar Malaysia Sdn Bhd also makes use of the local workforce (up to a radius of 60 kilometres from their factory) because of the cost advantages this brings. Another multinational located in the FIZ that chose Perak for this reason is Yamaha Electronics Manufacturing (M) Sdn Bhd. In case specialised workers are required they will be hired from Selangor. Apart from large manufacturing firms that operate in multiple countries, smaller-sized firms also stated labour costs as a reason for doing business in Perak (White Cafe Sdn Bhd and Tiger Casting Solution Sdn Bhd). Synergy Pipes & Parts (M) Sdn Bhd mentioned, apart from the costs of labour, to favour Perak because population characteristics

(many Chinese-speaking inhabitants) that saved costs as work processes in Chinese did not need to be translated. Hasrat Meranti (Tapah) Sdn Bhd noted that a possible lack of skilled workers is negligible for them as most of the processes are fully automated.

The issues that arise concerning human capital are also reflected in the presence of specialised services. As a result, specialised knowledge has to come from elsewhere. As stated, economic activities that require a lower skill level are present (although sometimes insufficient) while there is a serious lack of specialised knowledge. As a result, firms maintain extraregional linkages to specialised service suppliers from Kuala Lumpur, Penang, Johor, and Selangor. For instance, Malayan Flour Mills uses engineers from Ipoh for minor repairs such as machinery malfunctions. However, for any repair or modernisation activities that require more complex skills, expats or experts from Kuala Lumpur and Johor have to be brought in on a temporary basis. Finisar Malaysia Sdn Bhd has subcontractor partnerships with multiple companies related to electronics located in Penang. These firms have more expertise and a larger mass of firms makes them more competitive, both on quality and pricing (William Yu, personal conversation, June 20, 2019). Hereby the rule applies that the higher the level of specialisation, the further away knowledge has to come from. Such specialised services are already accompanied with high costs in the first place, but importing them to Perak makes those services even more expensive. Also, lead times are much longer for firms seeking specialised services if they are located in Perak since they have to come from other states. In addition, many supplier-buyer relations of raw materials are with firms outside of the region because there is much more demand for materials for example for construction companies operating in the real estate sector (Lim, Personal Communication, June 17, 2019).

Apart from the highly specialised knowledge, less specialised supporting services such as simple modification activities are carried out by local engineers from Ipoh (for instance in the case of Kamaya Electric (M) Sdn Bhd). For Finisar Malaysia Sdn Bhd, lead time and distance are crucial during machine failures for their firm so they will put priority to hiring local regional suppliers to support in this (William Yu, personal conversation, June 20, 2019). The only firm that emphasized the presence of specialised suppliers as regional asset was Hudson MPA Sdn Bhd, a mineral clay producer which ships its products as bulk and works together for this with Lumut Maritime Terminal Sdn Bhd.

Another condition that can lead to the emergence of agglomeration economies, is connectivity. This condition includes hard and soft infrastructure. Hard infrastructure comprises transportation and distribution links as well as industry locations (Meijers, 2005). Connectivity by road is considered to be an asset as firms indicate to be able to reach both Kuala Lumpur and Penang reasonable time. Synergy Pipes & Parts (M) Sdn Bhd calls roads in Perak of similar quality to developed countries. Omya Malaysia Sdn Bhd notes that the road network also played a role in their choice of location.

The most debated form of infrastructure is the port of Lumut. The port can only process bulk products and therefore many firms cannot make use of the port (since their products are finished goods and need to be handled with some degree of caution). Also, the port is seen as a terminal rather than an actual port because containers cannot be shipped (Mohd. Nadzri bin Kamsin, personal communication, June 17, 2019; Goradial Singh Ban Singh, personal communication, July 6, 2019). Kuala Lumpur Kepong Berhad calls the port an unreliable partner as there are no regular shippings because of a lack in volume. This is exemplified by the fact that many firms cannot or do

not want to use the port. Therefore, firms need to make use of extraregional linkages in the form of the port of Penang or port Klang (close to Kuala Lumpur)¹⁶. There was also a firm identified that used a port outside of Perak despite the fact that its products are suitable to transport through the port of Lumut (Big One Timber Moulding (M) Sdn Bhd). They stated this was because of a more punctual shipping schedule and better facilities.

The only exception regarding the opinion on the port during the interviews was Malayan Flour Mills Berhad. This firm mentions the port as the main reason why they are located in Lumut. Upon establishment of the firm, the owners chose for Lumut as there was sufficient space to expand while land prices were low. Because of its early entrance to the Lumut industrial area (1965), they were offered an own jetty which allowed them to operate independently of external shipping partners and drastically decreases transportation costs. Thus, for the nature of business of Malayan Flour Mills Berhad, the port meets the needs.



Figure 8.1: An abandoned factory in the Jelapang Free Industrial Zone. May, 2019

Another point of attention regarding connectivity in Perak is the Sultan Azlan Shah Airport in Ipoh which is criticised because of the limited destinations (Mohd. Nadzri bin Kamsin, personal communication, June 17, 2019; Goradial Singh Ban Singh, personal communication, July 6, 2019). This is due to the length of the runway that makes it impossible for large planes to land. Unfortunately, this cannot be changed because land is limited around the area as it is highly populated (Kaur, 2017). Therefore, there are government initiatives to establish a new airport. As

¹⁶ This applies – among other – to Megah Transport Sdn Bhd, Hasrat Meranti Sdn Bhd, Ambang Wibawa Sdn Bhd, Kemasik Industries (M) Sdn Bhd, and Tiger Casting Solution Sdn Bhd

a result, companies that ship their products through air (mostly firms producing electronics) use cargo airports in Penang or Kuala Lumpur (Finisar Malaysia Sdn Bhd).

Last, on conditions for agglomeration economies related to hard connectivity, are industrial zones. As argued before, industrial planning overlaps, duplicates or contradicts. In addition to this, interviews with firms operating within the two FIZ's as well as the Free Industrial Zone Authorities managing the zones complain about bad industrial park management from the local government (which is carried out by the Ipoh city council). The Ipoh City Council approved requests for firms that were not allowed to enter the zone. Also, there are reports of products being stolen from FIZ factories, abandoned buildings that are not being demolished (Figure 8.1) and when it rains, the drainage cannot handle the rain, resulting in flooding.

Concerning soft connections, such as business linkages and partnerships, issues arise as well. As discussed before, economic agents maintain extraregional linkages regarding human capital, specialised services and infrastructure. There was no evidence found that such economic interactions are taking place within the region. This can be explained by the fact that many firms are organised as a centralised system in which they encompass the whole value chain of production, processing, packaging, marketing, and shipping¹⁷ where firms strive for efficiency within their own facilities. The lack of interaction can be demonstrated by that only few cases of interaction were found: Malaysia Flour Mills and Lumut Maritime Terminal Sdn Bhd work together (although not on the core activities of the food manufacturer), providers of machinery parts and engineering services from Ipoh (because proximity makes the service level faster and thereby the costs of demobilisation lower) and Finisar Malaysia Sdn Bhd and Tigges Fastening Technology Sdn Bhd in the Kinta FIZ (where Finisar buys a special type of screws). Megah Transport Sdn Bhd, a firm that transports containers by truck, had the majority of its clients on the industrial estate in Kamunting where they are located. Another company mentioned that the only time they worked together with another company was when they constructed production facilities for them (Synergy Pipes & Parts (M) Sdn Bhd). Other interactions between economic agents were rather hard to identify.

This lack of interaction is illustrated by the fact that the manager of the Kinta Free Industrial Zone Authority described the firms within Kinta FIZ as 'islands' where there is no case of any cooperation apart from the necessary (related to zone-specific factors as waste management and safety) (Mohd. Nazri, Personal Communication, June 18, 2019).

Conclusion

The interviews that have been conducted among economic agents in Perak show an image of a region where investment behaviour is rather static and primarily driven by path dependency while showing signs of inertia. Newly incoming investments (if any are implemented) favour the region because of its proximity to the main metropolitan urban regions of Peninsular Malaysia and the possibility to establish large-scale factories while avoiding diseconomies such as higher land prices and labour costs.

¹⁷ This applies to Lhoist (Malaysia) Sdn Bhd, Wei Dat Wiremesh Netting Sdn Bhd, Big One Timber Moulding (M) Sdn Bhd, Antico Stone Sdn Bhd, Ambang Wibawa Sdn Bhd, Uniplaster Industries Sdn Bhd, Sanchuan Medical Sdn Bhd, Yokohama Reclamation Sdn Bhd, Hasrat Meranti (Tapah) Sdn Bhd, Farmcochem Sdn Bhd, Hume Cement Sdn Bhd, White Cafe Sdn Bhd, T.E.M. Casting Products Sdn Bhd, K-One Industry Sdn Bhd, Latexx Manufacturing Sdn Bhd

The conditions for the emergence of agglomeration economies turned out to be inadequate. It can be concluded that in the current configuration, the urban system is incapable of generating sufficient mass for certain urban function to be viable. As a result, firms experience negative externalities which they address by maintaining extraregional linkages through borrowing size from outside of the region to function properly. In practice, this means that other states are used for obtaining human capital and specialised service suppliers. The same extraregional linkages exist concerning connectivity problems.

Conclusion and reflection

The analysis conducted in this thesis defines the functional characteristics of the economic and spatial configuration of the urban system of Perak (Peninsular Malaysia). Drawing on an evidencebased line of argument addressing several, to urban structure related, challenges that Malaysia is currently facing, the thesis explores the urban configuration of Perak with the aim to determine the centrality of the regional urban structure. Contrary to the commonly used hierarchical approach of studying urban structure, it analyses economic dynamics from a functional perspective following insights of the relevance of performance beyond city size by studying connections, interdependencies and functional linkages between urban centres and its economic agents. Within this context, patterns of private investment are utilised as evidence for the presence of agglomeration economies, local specialisation and complementarities within the urban system of Perak.

The industry composition of the region reflects the economic history of the exploitation of spatial non-homogeneities on the one hand but is also consistent with more recent economic policy of attracting manufacturing firms on the other hand. Statistics show that most of the investment projects undertaken over the past ten years in Perak are domestic firms expanding current economic activities. As such firms often have historical or personal ties to the region, investment decisions show most resemblance of path dependency. To put it differently, these firms act as separate entities striving for efficiency and internal economies of scale. The other – much smaller – group of economic agents, implementing new investments do this mainly due to low costs of land and labour while being able to perform economic activities in proximity the main metropolitan urban regions of Peninsular Malaysia.

The inertia of Perak is reflected in its below-average investment performance as the state experiences relatively low numbers of incoming projects and capital flows. This is in contrast to expectation in the context of Perak's economy which ranks fourth-best of the country. Several reasons with regard to the organisation of regional assets are at the basis of this underperformance. These assets, conceptualised in this thesis as conditions for the emergence of agglomeration economies, are related to human capital, specialised services, connectivity and policy.

As more traditional economies declined or moved away, associated knowledge and expertise disappeared from the region. This is recognised by economic agents encountering difficulties regarding human capital because of brain drain effects, mismatches between supply of human capital and industry demand, and issues in the attractivity of Perak and its industrial zones. Quality jobs for workers due to higher levels of urban mass in major urban agglomerations such as Kuala Lumpur and Penang turn out to be attractive enough to cancel out accompanied diseconomies. Similar challenges arise as economic agents try to draw on specialised services as the region seriously lacks providers of specialised knowledge and skills.

Another point of concern, as the analysis indicated, is connectivity. As transportation and distribution linkages by road are considered to be appropriate, other forms of hard infrastructure are not. The port of Lumut, which is a bulk terminal, is commonly named inoperable as most of the manufacturing firms cannot use its facilities. Moreover, some firms even indicated that even though they could make use of it, they prefer not to because it is unreliable. In addition to the port of Lumut, the airport of Perak unsuitable because of its limited destinations and length that makes it impossible for larger airplanes to land. Industrial zones are also said to suffer from poor

management and industry focus. This thesis has found no evidence of soft connectivity in the form of business linkages and partnerships. Firm's nature of path dependency and the tendency to organise as a centralised system to foster efficiency do not motivate firms to establish relationships with other economic agents.

As a result of insufficient supply of human capital, specialised services and connectivity, economic actors maintain extraregional linkages with economic agents or urban centres outside of the region. This is exemplified by firms that temporarily hire knowledge workers from Malaysian metropolitan regions or abroad for more complex business process, the occurrence of subcontractor partnerships with firms outside of the region, and the fact that many firms utilise sea- and airport facilities in Penang and the Klang Valley. As these conditions for the emergence of agglomeration economies are absent or at least inadequate, it can be concluded that Perak's current urban configuration is incapable of generating sufficient mass for certain urban functions to be sustained or to be viable at all.

The incapability to generate sufficient mass to facilitate certain urban functions is a result of poor integration hampering a network structure of urban centres. An inadequate organisation of conditions can be sought in the performance of regional governments as they play a principal role in shaping the investment environment. There is a lack of policy alignment in different political layers and institutions as industrial plans consist of overlapping, duplicating and contradicting spatial planning. In addition, terms as clusters, specialised industrial estates and industrial hubs are used interchangeably whilst explanatory notes for the effective implementation of such policy measures were missing. The absence of institutional thickness hampers the implementation of supportive policies that provide grounds for the organisation of agglomeration economies leading to critical mass. Inefficient instruments to develop complementarity lead to fragmentation and affect economic performance.

This is exemplified by different urban centres that fulfil roles and maintain functions that duplicate and are non-beneficial to one another. It results in a situation where urban centres in Perak are not regarded as central in their role or distinct function. Even though cities are in proximity, they lack functional linkages and act as separate entities. Investment analyses confirm this view as the spatial configuration of private investments is dispersed over the region where spatial concentrations of unrelated investments in industrial areas occur. As a result, urban centres attract rather random investments thus making the industry composition of urban centres more diversified. Hence, the region is not able to successfully combine mass from the wider urban network that is higher than the total of what each of the centres can attract individually to increase overall competitiveness and compete with states as Selangor, Johor or Penang.

Urban configuration scenarios

Referring back to urban configuration scenarios, it is evident that the polycentric urban configuration may be considered as inappropriate for the urban system of Perak. This is because the absence of (combined) mass; agglomeration economies; spatial integration; size borrowing; interaction between economic agents; policy alignment; urban centre differentiation and the combined size of investments. Also, there is no concentration of related private investments in specialised urban centres.

However, Perak's urban system does show similarities with both an archipelago urban configuration and monocentricism. First, an archipelago with a diversity of individual urban

centres that are not necessarily organised according to a particular hierarchy settlements showing a rather random pattern of autonomous economic developments. Conditions as insufficient mass leading to extraregional linkages and fragmentation of urban centres are argued. Also, there is a lack of interactions between economic agents, absence of agglomeration economies at the macro- and subregional scale, and duplication of urban functions. In addition, policy has a tendency to privilege a number of main centres (e.g. Ipoh, Lumut and Taiping-Kamunting). An archipelago urban configuration is exemplified by a scattered distribution of private investments over the region which was shown by the maps.

By the same token, some of the conditions for a monocentric urban configuration can be allocated to Perak's urban system as well. First, economic interactions between a dominant centre (here considered to be Ipoh) and its surroundings urban centres take place where this centre borrows size from functional hinterland (such as Lumut for engineering services and Lumut as well as and other surrounding urban centres as Chemor and industrial areas in the east for provider of machinery parts) although this were only low degrees of interaction.

Possibilities for polycentric urban development in Perak

The possibilities for Perak with respect to reaping the benefits of functional polycentric development are far-fetched at this moment as developing conditions for this particular urban configuration at short-term appear to be impossible. First, issues regarding brain drain effects should be addressed. Next, the dispersion of related economic activity should be stopped and centred. Investment environment variations by means of assets should be organised in such a way that the spatial configuration of investments is no longer scattered and rather randomly. Large-scale changes should be implemented in different layers of institutional bodies whereas the very raison d'être of organisations working against specialisation should be reconsidered.

Spatial and industrial policies need to be aligned in the form of a detailed regional master plan (including real implementation plans on the lowest scale level) that clarifies industry specialisation and attributes this to specific industrial estates accompanied by cluster formation that includes specialised services while adding knowledge or research institutes. Emphasis should be put on cooperation across public and private tiers. As a result, industrial estates would specialise themselves on one specific economic function while other, nearby industrial estates should focus on another related role, making them central in their own distinctive role and complementary to each other. However, keeping in mind the role of history, path-dependency and dependency on the exploitation of natural resources or raw materials at this moment, it is yet to be seen if the current mass of inertia firms can be retransformed into a network of urban centres that will form the polycentric urban region.

Limitations and future research

The main limitations for this thesis relate to data (availability), research methods, presentation of findings or scale. First the availability of appropriate data. The comparison of investment performance in this thesis could have been improved if it included investment data that comprises all investment values for the totality of sectors (including all services and primary industries investments). Even though Perak's most dominant sector is manufacturing, this will provide insights about the development of the composition of Perak over the years in comparison with the other states in Peninsular Malaysia and the national average of Malaysia. Also, a total different way of data collection, such as comprehensive quantitative analysis including surveys among large numbers of firms (such as Van Oort, Burger & Raspe, 2010; Taylor, Evans & Pain, 2008 or

Head, Ries & Swenson, 1999) or other forms of large-scale analysis could have presented a more generalisable view on the retrieved data. The same applies to publicly available data on intra-firm relationships (such as in Burger, Van Der Knaap & Wall, 2014 or Meijers, Hoogerbrugge & Cardoso, 2018) which would have made the data collection part faster and more precise. The usage of migration data to quantify brain drain effects would also have been of added value to this thesis, although that type of data is (currently) not available.

Another research method, such as utilising a functional primacy index of the balanced distribution of centres in polycentric urban systems measured by degree of primacy that indicate a functionally unbalanced (monocentric) urban system (calculated as the ratio of incoming flows to the principal city to the total incoming flows in the urban system) as done by Burger et al. (2011) could have statistically proven a more polycentric or monocentric urban configuration in Perak.

Concerning the presentation of findings, some of the maps could have been worked out better. Making maps in any software program has never been part of my curriculum as a student. Therefore, the most approachable methods have been used. Unfortunately, this gives the maps a slightly amateurish appearance. However, after a lot of practice and trail and errors, I did succeed in visualising what I had in mind.

One of the disadvantages of using investments as unit of analysis is the limitation it brings to the research beforehand. By looking at investing firms over a given time period, only those firms that consider Perak attractive (enough) are included in the research. Looking at profiles of firms investing in other states as well could provide more insights. Another point of view could be by analysing divestments. Even though this will complicate the data collection part even more as divestments are documented less as data on this in Malaysia is not up to date (Malay Mail, 2019).

Another point of reflection is the scale level of this research. As the joint research had its origin partly in the Malacca Straits Diamonds report with a vision of Perak as a polycentric urban region, the research area was demarcated to the network structure of the main urban centres within this diamond. This also relates to the urban challenges that Malaysia is currently facing. Another possibility could be to investigate a network structure from another scale level, namely that of the metropolitan scale. Ipoh, demarcated in this view as Greater Ipoh (ranging from Batu Gajah in the south to Chemor in the north representing similar boundaries as the Kinta district) and including its surrounding cities, could as well be an interesting study area for functional polycentric urban development since it could develop characteristics of such an urban configuration. Moreover, a large share of the totality of industrial estates in Perak are located within the Kinta district which makes polycentric urban development on the metropolitan level perhaps more plausible. Admittedly, it is likely that would make the region in its entirety more monocentric.

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Appendices

Appendix A: Overview of land use in Perak per district in 2017 (Perak State Economic Planning Unit, 2017)



Appendix B: Distribution of Oil Palm Areas in Perak in 2015 (Institut Darul Ridzuan & University of Malaya, 2017)





Appendix C: Overview of total private investment volume between 2006 – 2018 split up by source

Overview of inflowing domestic capital volume from private investments in the manufacturing sector between 2006 – 2018 (MIDA, 2019)



Overview of inflowing foreign capital volume from private investments in the manufacturing sector between 2006 – 2018 (MIDA, 2019)



Appendix D: Trend of total private investment volume between 2006 – 2018

Trend overview of domestic investment capital in the manufacturing sector per selected state between 2006 – 2018 (MIDA, 2019)



Appendix E: Overview of employment data as a result of investments in the manufacturing sector

State's share in job addition as a result of private investments in the manufacturing sector between 2006 – 2018 (MIDA, 2019)

AVERAGE	NATIONAL	PERLIS	TERENGGA	KELANTAN	PAHANG	KEDAH	MALACCA	NEGERI SEMBILAN	JOHOR	PERAK	PENANG	SELANGOR	LUMPUR	(DOSM 201	MILLION	STATE IN R	GDP PER
			5											8		≤	
	371669	2615	13258	7985	22080	16632	13072	17695	46498	25503	41516	100884	03931				2006
	397503	2802	14224	8712	22836	18168	13892	18675	48448	26979	44695	108242	05850				2007
	418707	2890	14715	9273	24217	18153	14385	19353	50040	28518	46744	116883	/3536				2008
	413962	2807	14308	9610	23948	17903	14445	19759	48287	28366	42036	115355	//138				2009
	450783	4105	22769	15591	35871	27356	24187	30229	74102	43313	52946	177718	113095				2010
	661084	4214	23509	16691	38148	29585	25487	23007	78946	46346	55827	187434	068771				2011
	627698	4426	24292	17558	40047	31241	27276	33924	84050	49756	58353	200906	131514				2012
	711181	4574	25326	18136	42201	32740	27933	34892	87974	52368	61324	212645	140534				2013
	729318	4807	26855	19053	43944	34098	30073	35951	93654	54781	66203	227000	152477				2014
	716671	4917	27742	19718	45900	36008	31712	37518	68886	58044	69825	240048	100388				2015
	865008	5108	28601	19718	46800	37170	33155	38839	104480	60408	73718	251599	1/6691				2016
	1033629	5772	34174	20664	56543	42626	40256	44466	123913	71348	85592	300627	204141				2017
	1091386	5962	35028	24799	58239	44374	41826	46333	130852	75129	89957	321069	818/17				2018

$\label{eq:appendix} \textbf{Appendix} \ \textbf{F}{:} \quad \text{Overview of GDP in MR million per state per year}$

National	Perlis	Terengg.	Kelantar	Pahang	Kedah	Malacca	Negeri S	Johor	Perak	Penang	Selangoi	Kuala Lu	<mark>Coeffici</mark> e
l average		anu	-				embilan				-	mpur	ent total
0,128	0,023	0,221	0,006	0,081	0,594	0,107	0,102	0,166	0,046	0,129	0,053	0,008	2006
0,182	0,003	0,433	0,009	0,068	0,770	0,276	0,143	0,191	0,075	0,107	0,103	0,001	2007
0,108	0,059	0,067	0,009	0,045	0,141	0,253	0,059	0,234	0,110	0,217	0,101	0,002	2008
0,041	0,000	0,035	0,013	0,025	0,084	0,062	0,043	0,084	0,032	0,052	0,059	0,002	2009
0,066	0,008	0,102	0,011	0,029	0,072	0,067	0,043	0,101	0,070	0,231	0,060	0,000	2010
0,092	0,006	0,059	0,008	0,080	0,207	0,171	0,257	0,083	0,021	0,163	0,047	0,003	2011
0,043	0,000	0,099	0,007	0,052	0,019	0,039	0,083	0,066	0,046	0,042	0,058	0,002	2012
0,053	0,010	0,007	0,055	0,067	0,077	0,053	0,048	0,164	0,045	0,064	0,046	0,001	2013
0,091	0,044	0,058	0,065	0,118	0,155	0,150	0,086	0,226	0,031	0,123	0,031	0,000	2014
0,075	0,001	0,050	0,018	0,025	0,038	0,216	0,046	0,315	0,067	0,096	0,033	0,000	2015
0,056	0,000	0,074	0,026	0,019	0,059	0,041	0,049	0,253	0,065	0,058	0,031	0,001	2016
0,058	0,091	0,002	0,000	0,052	0,059	0,116	0,025	0,177	0,028	0,126	0,019	0,001	2017
0,071	0,001	0,140	0,004	0,138	0,054	0,078	0,052	0,233	0,025	0,064	0,059	0,001	2018 S
0,082	0,019	0,104	0,018	0,062	0,179	0,125	0,080	0,176	0,051	0,113	0,054	0,002	tate aver

Appendix G: Overview of the investment coefficient per state per year

	Perlis	Terengganu	Kelantan	Pahang	Kedah	Malacca	N. Sembilar	Joho	Perak	Penang	Selango	Kuala Lumpu	GDP per state in RM million (DOSM, 2018)
2.615	0,	ı 13.258	י 7.985	22.080	י 16.632	a 13.072	י 17.695	r 46.498	ر 25.503	41.516	r 100.884	r 63.931	1 2006 1
2.802		14.224	8.712	22.836	18.168	13.892	18.675	48.448	26.979	44.695	108.242	69.830	2007
2.890		14.715	9.273	24.217	18.153	14.385	19.353	50.040	28.518	46.744	116.883	73.536	2008
2.807		14.308	9.610	23.948	17.903	14.445	19.759	48.287	28.366	42.036	115.355	77.138	2009
4.105		22.769	15.591	35.871	27.356	24.187	30.229	74.102	43.313	52.946	177.718	113.095	2010
4.214		23.509	16.691	38.148	29.585	25.487	23.007	78.946	46.346	55.827	187.434	122.890	2011
4.426		24.292	17.558	40.047	31.241	27.276	33.924	84.050	49.756	58.353	200.906	131.514	2012
4.574		25.326	18.136	42.201	32.740	27.933	34.892	87.974	52.368	61.324	212.645	140.534	2013
4.807		26.855	19.053	43.944	34.098	30.073	35.951	93.654	54.781	66.203	227.000	152.477	2014
4.917		27.742	19.718	45.900	36.008	31.712	37.518	98.889	58.044	69.825	240.048	160.388	2015
5.108		28.601	19.718	46.800	37.170	33.155	38.839	104.480	60.408	73.718	251.599	169.971	2016
5.772		34.174	20.664	56.543	42.626	40.256	44.466	123.913	71.348	85.592	300.627	204.141	2017
5.962		35.028	24.799	58.239	44.374	41.826	46.333	130.852	75.129	89.957	321.069	217.818	2018

Appendix H: Overview of employment data as a result of investments in the manufacturing sector

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Appendix I: General investment trend overviews of the state Perak between 2008 – 2018

Average capital investment per investment projects per industry in Perak between 2008 – 2018

Rubber Produc	ts		16.7
Electronics & Electrical Produc	ts	9.521	
Food Manufacturin	ng 4.934		
Transport Equipme	nt 4.825		
Plastic Produc	ts 2.409		
Basic Metal Produc	ts 2.338		
Non-Metallic Mineral Produc	ts 2.163		
Wood & Wood Produc	ts 1.699		
Fabricated Metal Produc	ts 1.661		
Machinery & Equipme	nt 1.638		
Textiles & Textile Produc	ts 1.537		
Scientific & Measuring Equipme	nt 1.383		
Chemical & Chemical Produc	ts 1.253		
Paper,Printing & Publishir	ng — 1.225		
Leather & Leather Produc	ts 217		
Furniture & Fixture	es 214		
Miscellaneou	15 62		
Petroleum Products (Inc. Petrochemical	s) 39		
Beverages & Tobaco	co 6		
-	- 2.000 4.000 6.000 8.0 Employ	00 10.000 12.000 14.0 yment addition	00 16.000 18.00

Employment addition of approved investment projects per industry in Perak between 2008-2018





Appendix K: Geographical distribution of the seven industrial estates that focus on manufacturing medical equipment over three states as designated in the NCER Blueprint 2.0 (NCIA, 2016).





Appendix L: The 3D Regional Growth Plan of the Perakian districts (Perak State Economic Planning Unit, 2013)

Appendix M: Illustration of Integrated Development of the Kinta Valley Metropolitan Area (Rancangan Struktur Negeri Perak 2040, 2017)



Appendix N: Geographical distribution of the conurbations that are part of the food manufacturing hub as designated in the Perak State Structure Plan 2040 (Perak State Government, 2017).



Appendix O: List of industrial estates that were unable to attract more than 4 investments between 2008 – 2018 (MIDA, 2019)

Number of	Name of industrial estate			
investments				
4	Bidor, Gopeng, Jelapang II, and Sitiawan			
3	Kampar, Kuala Kangsar MIEL, Taiping, Bota, Keramat Pulai, Kanthan IV IE			
2	Behrang, Kampung Gajah, Kampung Kepayang, Kuala Kurau, Mambang			
	Diawan, Matang, Parit Buntar, Pusing, Sungkai, Taman Meru 3A IE, Tanjong			
	Tualang, Tronoh, Zarib IE and Tupai I, II, III IE			
1	Ayer Tawar, Gerik, Hilir Perak, IGB, Kamunting Raya IE, Kanthan II IE,			
	Langkap, Pengkalan I, Pengkalan Light IE, Pengkalan Pegoh, Sungai Sumun,			
	Simpang, Siputeh, Slim River, Taman Meru 3B IE, Tanjong Piandang, Tapah,			
	and Tungzen (Sungai Raia) IE			
Name	Industry	Industry category	Location	District
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Mineral industries hub	Mineral industries	Mineral industries	Parit Buntar	Kerian
Mineral industries	Mineral industries	Mineral industries	Padang Rengas	Kuala Kangsar
Mineral industries	Mineral industries	Mineral industries	Sungai Siput	Kuala Kangsar
Ceramics Industries	Ceramics Industries	Mineral industries	Kuala Kangsar	Kuala Kangsar
Manjung - Amanjaya Maritime City	Fisheries, aquaculture and maritime activities	Aquaculture & Maritime industries	Manjung	Manjung
Industrial zone	Aquaculture	Aquaculture & Maritime industries	Lake Chenderoh	Kuala Kangsar
ZPP Ipoh	Maritime industries	Aquaculture & Maritime industries	Ipoh	Kinta
Plastic cluster	Plastic Industries	Plastic industries	Teluk Intan	Hilir Perak
Plastic cluster	Plastic Industries	Plastic industries	Sungai Siput	Kuala Kangsar
Chemicals cluster	Chemicals	Chemical industries	Larut, Matang, Selama and Kerian	Larut, Matang dan Selama
Chemicals cluster	Chemicals	Chemical industries	Teluk Intan	Hilir Perak
Wood Industries	Wood Industries	Wood & Timber industries	Kuala Kangsar	Kuala Kangsar
Wood Industries	Wood Industries	Wood & Timber industries	Sungai Siput	Kuala Kangsar
Timber hub	Timber-related industries	Wood & Timber industries	Gerik	Hulu Perak
Metal Industries	Metal Industries	Metal & Steel industries	Sungai Siput	Kuala Kangsar
Steel-based manufacturing	Steel manufacturing	Metal & Steel industries	Manjung	Manjung
Palm Oil Industrial Cluster	Palm oil processing	Palm oil processing	Bagan Datuk	Bagan Datuk
Timber hub	Timber-related industries	Timber industries	Gerik	Hulu Perak
National Food Terminal	Food manufacturing	Food manufacturing	Gopeng	Kampar

Appendix P: Table of specific formulated cluster initiatives from the development plans on all scale levels (Department of Statistics Malaysia, 2019)

Food cluster	Food manufacturing	Food manufacturing	Kuala Kangsar	Kuala Kangsar
Food hub	Food manufacturing	Food manufacturing	Selama - Bagan Serai - Parit Buntar	Kerian
Food hub	Food manufacturing	Food manufacturing	Pengkalan Hulu	Hulu Perak
Poultry cluster	Duck meat and eggs	Food manufacturing	Batu Gajah	Kinta
Ipoh Aerospace Park	Aerospace	Aerospace	Sultan Azlan Shah Airport	Kinta
Green Asia Aerospace Technology Park	Aerospace	Aerospace	Seri Iskandar	Perak Tengah
Proton City	Automotive Industries	Automotive industries	Tanjong Malim	Tanjung Muallim
Automotive Industries	Automotive Industries	Automotive industries	Bagan Datuk	Bagan Datuk
ICT hub	ICT	ICT	Meru Raya (Ipoh)	Kinta
ICT hub	ICT	ICT	Tronoh – Iskandar	Perak Tengah
T-City	Mixed-use entertainment zone	Mixed-use entertainment zone	Gopeng	Kampar
Family entertainment hub	Mixed-use entertainment zone	Mixed-use entertainment zone	Amanjaya (Ipoh)	Kinta
Greater Kamunting Conurbation	Medical equipment	Medical equipment	Kamunting	Larut, Matang dan Selama
Greater Kamunting Conurbation	Printing	Printing	Kamunting	Larut, Matang dan Selama
Locomotive Hub	Train manufacturing	Train manufacturing	Batu Gajah	Kinta
Animation hub	Animation industry	Animation industry	Ipoh	Kinta

Appendix Q: Patterns of private investment in Perak over the past ten years compared to spatial industrial planning from policy documents

Minerals & ceramics



<u>Rubber</u>



<u>Plastics</u>



<u>Chemicals</u>



Metal & steel



<u>Aqua & maritime</u>



Wood & timber



<u>Palm oil</u>



Food manufacturing



<u>Aerospace</u>



<u>Automotive</u>



Medical equipment



Train manufacturing



Paper, Printing & Publishing



Appendix R: Geographical distribution of industrial estates with 5 or less investment projects between 2008 and 2018 (MIDA, 2019)



Appendix S: Comprehensive investment description of industrial estates that attracted 5 or more investments over the period 2008 – 2018

Kamunting I IE

Since 2008, 35 investment projects have been approved by MIDA in 9 different industries ranging from 2008 to 2017. The majority of those investments was done in the rubber industry (12) by 8 different firms. Companies operating in this industry in Kamunting I IE either made investment in the production of gloves or tires over the period analysed. The Transport Equipment industry in Kamunting I IE generated 6 investments in expansion projects, although all of them were done by the same two companies that both have the same founder. The Food manufacturing industry attracted 4 investments by 3 companies in the production of coconut milk, honey and durian products. Manufacturing of Medical Equipment received 4 investments from 3 firms. The firms invested in caterers, medical devices and gloves. Kamunting I IE managed to attract 3 investments by 2 firms in the Electronics industry. One firm produces televisions and the other one LED strips. A total of 2 expansion investments by 2 firms in gas and paint were done in the Chemicals industry. Also, 2 printing investments by 1 firm in masking paper has been documented. At last, a 77 MR million expansion project polystyrene wall panels (Mineral industry) was done in 2014.

Ipoh

Ipoh was able to attract 31 investments in 10 industries over the period 2008 - 2017. The largest industry within the city is that of Electronics where 4 firms made 7 investments since 2009. The manufactured products in the Electronics industry in Ipoh include energy harvesters, LED displays, circuit boards, semiconductors and electronic security seals. The Metal & Steel industry accounts for 6 investment projects by 3 firms which are all located elsewhere in Ipoh over the period 2014 - 2017. Those investments are in the manufacturing process of products such as screws, fasteners or steel bands. The investment location Ipoh houses 5 investment projects in the Chemicals industry. The 4 investing firms produce antioxidants, pharmaceuticals, chloride, and calcium carbonate. Other industries are Food manufacturing (3 investments in cereal, white coffee and instant coffee powder), Machinery & Equipment (3 investments in bulldozers, welding machines, and boilers), Mineral Products (3 investments in marble slabs, tiles, and limestone powder), Plastics (3 investments in polypropylene films, plastic composite profiles, and plastic bottles), and single investments in Scientific & Measuring Equipment, Transport Equipment, and wood & timber.

Silibin Light IE

Over the past ten years it attracted 18 investments in 7 industries, merely expansion projects. Of these investments, the Chemicals industry had the most investments, although 5 out of 6 investments were done by the same company. These 5 investments were in bio fertilizers and the remaining single investment was in fever cough syrup. The Metal & Steel industry had 5 investments of which 3 in 2009 by 1 firm and 2 in 2017 by another firm producing gravure cylinders. The Electronics industry in Silibin Light IE had 1 firm doing 2 investment projects in 2008 and 2016 in cable wires and computer peripherals. Furthermore, there were two firms investing in minerals and sewage tanks. At last, there was a subsidiary of an Australian firm producing kitchen equipment listed in the Machinery & Equipment industry, an industrial paper bag producer (in the Paper, Printing & Publishing industry) and a firm that diversified from producing soybeans to an investment in 2009 in PVC hoses (Plastic industry).

Kinta FIZ

Firms in Kinta FIZ made 17 investments over the years 2008 – 2017. Most of the investment projects come from Finisar Malaysia Sdn Bhd, Kamaya Electric (M) Sdn Bhd, MMC Electronic (M) Sdn Bhd and Kamaya Electric (M) Sdn Bhd which all operate in the Electronics & Electrical Products industry. These investments took place between 2008 and 2017 and comprise products as chips, transceiver modules, sensors, and LCD panels. The second largest industry is Machinery & Equipment thanks to the three investments by the Swedish manufacturer of spreaders for (un)loading shipping containers Bromma (Malaysia) Sdn Bhd. They started business in the FIZ in 1996 and made investments in 2008, 2013 and 2016 in crane spreaders, automatic vehicles and cargo handling equipment. At last, two investments by Tungsten Carbide Tool Sdn Bhd in 2008 and 2009 took place in cutting tools and one investment by Tigges Fastening Technology Sdn Bhd in screws (both in the metal & steel industry).

Chemor

Investments in manufacturing projects here total 15 investments in 10 industries between 2008 – 2016. All known types of projects are expansion projects. One project is however listed as a new investment by MIDA but this involved a pharmaceutical firm that regained its manufacturing license. Chemicals is the largest industry within the industrial estate with 5 investment projects by 3 firms. Within this industry the products produced are either palm concentrate, bio diesel or pharmaceutical products. The second largest industry in Chemor Industrial Estate is Machinery & Equipment with 3 investments by the same firm. After this comes a producer of plastic pipes with two investments in 2016. Next, the Minerals & ceramics industry with a 2009 investment in roofing tiles and a 2012 investment in plasterboards. Others are a 2013 investment by a Malaysian firm operating in the Transport Equipment industry that makes commercial vehicles. Furthermore, a briquette producer, a ribbon producer, a producer of sanitary products made from paper, and a furniture producer have made single investments in Chemor.

Lumut

Lumut welcomed 15 investments in 7 industries over the past ten years. The major industry in the port is Food manufacturing. These have been carried out by 3 firms (all in 2012 with the exception of 1 investment in 2015). Products that are being processed in the port are wheat, palm oil, palm kernel (the edible seed of an oil palm), animal feeds and poultry. The Chemicals industry accounted for two investments in latex related chemicals and bio diesel. Two investment projects in an air preheater and a crane have been conducted in Machinery & Equipment and another two glove-related manufacturing products in the Rubber industry by the same firm were implied in 2013. The Transport Equipment had two ship construction related projects by two different firms in 2010 and 2014. At last, single investment took place in metal fabrication in 2009 and a 2016 expansion investment in mineral clay powder.

Batu Gajah

The largest share went to the Minerals & ceramics industry with a total of 4 different projects by 4 firms between 2008 and 2016. Products here are plastering materials, porcelain clay, and precast products. Also, the plastic industry takes its fair share with 3 investments by 2 firms in condoms and plastic furniture. For the rest the industrial estate is highly diverse given the fact that as much as 7 different industries got single investments between 2008 and 2016. Those are

Electronics (suppression filters), Metal (wires), Food (milk and coffee powder), Machinery & Equipment (air filters), Scientific & Measuring Equipment (surgeon materials), Transport Equipment (manufacturing of railway transport equipment), and Wood (pellets).

Menglembu

The location had 13 investments in 7 industries in between 2008 – 2015. The most recent two investments were done in 2015 while all other date back from 2012 and earlier. The Plastics industry is most prominent in the area although all investments were expansion projects by the same firm. Second most popular in this area are investment in Machinery & Equipment as 3 firms ran 3 investment projects in centrifugal pump, foundry-related and cylinder products between 2011 and 2015. A Rubber recycler, whose firm did expansion projects in 2008 and 2009, also has its facilities in Menglembu. Other industries in the township are steel fabrication, security devices (Electronics), woven textile fabrication and automotive parts (Transport Equipment).

Pengkalan II (Ph I) IE

In the Metal & Steel industry, 4 firms performed 4 investment projects of which two were in 2010 and the remaining two in 2017. All firms were expanding business in castings, metal structures, assembly parts, and steel pipes. The other industry that attracted more than 1 investment in Pengkalan II (Ph I) IE was the wood & timber industry. Two firms ran two expansion projects (in 2012 and 2017) where one was concerning timber moulding and the other one in wooden picture frames.

Teluk Intan

Over the years 2008 and 2016, 11 investments in 6 industries took place. Although 2016 is the most recent investment, the second-most recent investment dates back to 2012. The largest industry presence is chemicals with the production of organic fertilizers. This is not surprising since the town is surrounded by palm oil plantations. Another, to palm oil related, industry that is present in Teluk Intan is rubber with two firms that made a total of three investment in the production of gloves. Another industry that has more than 1 investment is Wood & Timber. Here, two firms invested in a manufacturing project both in producing fibre from palm biomass (which is also related to palm oil). Furthermore, an engineering company invested in its tools production facility in 2010, a food manufacturer in coconut oil, and, quite remarkable, a 2009 shipbuilding investment.

Kinta district

Investments within the Kinta district that could not be categorised in either an industrial estate or in the cities or towns within the district, are documented as investments in Kinta. As aforementioned, this category is unfit to make any assumptions on possible agglomeration externalities. However, the investments in Kinta districts total a number of 10 in the industries chemicals, electronics, food manufacturing, minerals & ceramics, rubber and wood.

Tasek

Since 2019, 9 firms made 10 investments in 7 industries. Three industries enjoyed more than 1 investment: minerals & ceramics, rubber and chemicals. At first, chemicals with 2 investments by 1 firm in ink and solder powder. Two 2017 investments in the Mineral industry where on invested

in carbonate and the other one in solid panels. Gloves (19.5 MR million capital volume) and rubber profiles (50.2 MR million capital volume) were investment projects in the Rubber industry in 2011 and 2014. Other investment flows went to electronics, plastics and a new entrant setting up business to produce medical equipment (scientific & measuring equipment industry).

Hutan Melintang

In Hutan Melintang, 6 out of the 8 investments went to Food manufacturing with QL Foods Sdn Bhd as largest investor. Other investors in the food industry were a fishmeal producer in 2008, and two producers of fibre from palm biomass. The remaining investments went to wood & timber thanks to the entrance of a briquette producer in 2014 and an investment in the chemicals industry (organic fertilizers).

Tanjung Malim

In Tanjung Malim 9 investments took place in two industries over the period 2008 - 2018. Of these investments, as suspected, the majority was in transport equipment. Here, 7 different firms invested in automotive-related products in a four-year period. The remaining two investments were done in Machinery & Equipment in 2012 and 2015 and were related to automotive as well.

Jelapang FIZ

However, what did become clear is that there are 7 firms investing in 4 industries by means of 8 investments over the period 2008 – 2015. The most recent investments were done in 2015 by the Scandinavian Topfur Dressing Industries Sdn Bhd in the Leather industries in processing dressed mink skins. Two firms invested in chemicals of which a 2008 investment in soap and shampoo and a 2012 expansion project in ferrite powder. In the meantime, one of the firms has left the FIZ. The Jelapang Free Industrial Zone houses furthermore two metal & steel producers in kitchenware and metal & steel products. Finally, there are two wood & timber producers in wooden pallets and wooden displays.

Lahat

The Lahat had 7 investments in 7 industries by 7 firms in the period 2008 – 2013. All of them are expansion projects. The industries in the industrial estate are metal & steel products, electronics & electrical products, leather & leather products, mineral & ceramics, paper, printing & publishing, plastic products, and rubber products.

Kanthan IE

Kanthan IE had 6 investments in 6 industries food manufacturing, scientific & measuring equipment, miscellaneous, paper, printing & publishing, textiles & textile products, and machinery & equipment. All known investments are expansion projects. Only one is recent (2016), the rest dates back to 2010 or earlier.

Pengkalan II (Ph II) IE

Pengkalan II (Ph II) IE had 6 investments in 3 industries in a six-year period (2008 – 2014). Two of them were in the metal & steel industry and two in machinery & equipment. Furthermore, there are two investments in the wood & timber industry.

Chenderiang

In 2008, there was 1 firm that ran 5 investment projects in the minerals & ceramics industry in the production of calcium carbonate.

Jelapang I IE (Kinta district)

The Jelapang I industrial estate had 7 investment projects in 7 years (2009 – 2016). Two of them were in the metal & steel industry. Other investments were in electronics (semiconductor devices), plastic packaging and textile ribbons.

Seri Iskandar

This location had 5 investments in 3 different industries over the years 2009 - 2015. The double investments were in chemicals and scientific & measuring equipment. The single investment was by the German stamping foil manufacturer Kurz Production (Malaysia) Sdn Bhd (plastic products industry).

Sungai Siput

Sungai Siput had 5 investments in 4 industries in the food manufacturing industry it was Thong Thye Groundnut Factory Sdn Bhd expanding business in the production of cashew nuts in 2009. Three years later the company was acquired by Pagoda Foods (Malaysia) Sdn Bhd. Other economic activities in Sungai Siput are the production of organic fertilizers (Chemical & Chemical Products), motorcycle casts and wheels (Transport Equipment) and the production of fibre from palm biomass (wood & timber industry).