

Knowledge Governance in an Industrial Cluster
the Collaboration between Academia-Industry-Government
in Indonesia

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To

Busyairi A., Muslich R. & K.H Muslich

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Acronyms

ATMI: *Akademi Teknik Mesin Industri* (Technical Academy of Manufacturing Engineering)
APBN: *Anggaran Pendapatan dan Belanja Negara* (Central Government Budget & Spending)
APBD: *Anggaran Pendapatan dan Belanja Daerah* (Regional Government Budget & Spending)
BAKOSURTANAL: *Badan Koordinasi Survei dan Pemetaan Nasional* (National Coordination Agency for Surveys and Mapping)
BAPETEN: *Badan Pengawas Tenaga Nuklir* (Nuclear Energy Regulatory Agency)
BAPPEDA: *Badan Perencanaan Pembangunan Daerah* (Regional Planning and Development Agency)
BAPPENAS: *Badan Perencanaan Pembangunan Nasional* (National Planning and Development Agency)
BATAN: *Badan Tenaga Nuklir Nasional* (National Nuclear Energy Agency)
BALITBANG: *Badan Penelitian dan Pengembangan* (Ministerial R&D Unit)
BALITBANGDA: *Badan Penelitian dan Pengembangan Daerah* (R&D Unit at the Province Level)
BHMN: *Badan Hukum Milik Negara* (State Legal Entity)
BKN: *Badan Kepegawaian Nasional* (National Civil Service Agency)
BKPM: *Badan Koordinasi dan Penanaman Modal* (Indonesia Investment Coordinating Board)
BLU: *Badan Layanan Umum* (Public Services Organisation)
BPPT: *Badan Pengkajian dan Penerapan Teknologi* (Agency for the Assessment and Application of Technology)
BPS: *Badan Pusat Statistik* (National Statistical Agency)
BSN: *Badan Standardisasi Nasional* (National Standardisation Agency)
DIKTI: *Direktorat Jenderal Pendidikan Tinggi* (Higher Education General Directorate of the Ministry of National Education)
DPR: *Dewan Perwakilan Rakyat* (The House of Representative)
DPRD: *Dewan Perwakilan Rakyat Daerah* (The Regional House of Representative)
DRN: *Dewan Riset Nasional* (National Research Council)
IMDIA: Indonesian Mould and Dies Association
IPB: *Institut Pertanian Bogor* (Bogor Technology Institute)
ITB: *Institut Teknologi Bandung* (Bandung Technology Institute)
JICA: Japan International Cooperation Agency
JMR: Jakarta Metropolitan Region
JIT: Just-in-time
LAPAN: *Lembaga Penerbangan dan Antariksa Nasional* (National Institute of Aeronautics and Space)
LEMHANAS: *Lembaga Ketahanan Nasional* (National Resilience Institute)
LIPI: *Lembaga Ilmu Pengetahuan Indonesia* (Indonesian Institute of Sciences)
LPNK: *Lembaga Pemerintaban Non Kementrian* (Non-ministerial Government Institution)
MENDIKNAS: *Kementerian Pendidikan Nasional* (Ministry of National Education)
Menko-Perekonomian: *Kementerian Koordinator Bidang Perekonomian* (Coordinating Ministry for Economic Affairs)
MIDEC: Manufacturing Industry Development Centre
MP3EI: *Master Plan Percepatan Pembangunan Ekonomi Indonesia* (Master Plan for the Acceleration and Expansion of Indonesia Economic Development)
OMCD: Operations Management Consulting Division – Toyota
PBET: Production Based Education Training
PNBP: *Penerimaan Negara Bebas Pajak* (Non Tax State Revenue System)
PPIC: Production Planning Inventory Control
PU: President University
PUSPIPTEK: *Pusat Penelitian Ilmu Pengetahuan dan Teknologi* (Science and Technology Research Center - Science Park)
PERISKOP: *Proyek Evaluasi Riset Sains Teknologi untuk Pembangunan* (The Evaluation of Indonesian Science, Research and Technology Landscape to Strengthen the National Innovation System)
PT: *Perseroan Terbatas* (Limited Liability company)
QC: Quality Control

QCD: Quality Control and Delivery
RISTEK: *Kementrian Riset dan Teknologi* (Ministry of Research and Technology)
STP: *Sentra Teknologi Polimer* (Polymer Technology Center)
STPDN: *Sekolah Pemerintahan Dalam Negeri* (Institute of Public Administration & Government Affairs)
TPS: Toyota Production System
UBM: *Unit Bisnis Mandiri* (Independent Business Unit)
UGM: *Universitas Gadjah Mada* (Gadjah Mada University)
UI: *Universitas Indonesia* (University of Indonesia)
UPT: *Unit Pelaksana Teknis* (Technical Implementation Unit)
WTO: World Trade Organisation

Glossary of Terms

<i>Genba</i>	: Walk in process in the shop floor
Good	: A term in production process to allude to parts that comply with the customer requirement and the quality system
Jabodetabek Region	: Jakarta-Bogor-Tangerang-Depok-Bekasi or Jakarta Metropolitan Region
<i>Jabatan</i>	: Administrative posts or administrative positions in an organisation
<i>Jishuken</i>	: Study group organised under the TPS system
<i>Juncto</i>	: A legal term which essentially means that a certain regulation/Act is to be interpreted in connection with other regulation/Act
JIT	: One of the pillars of TPS, it means to produce the number parts as requested by the customer
<i>Kanban</i>	: A piece of paper/card that contains production information
<i>Kecamatan</i>	: Sub-District
<i>Kabupaten</i>	: District
<i>Kota</i>	: City
No Good	: A term to refer to parts manufactured that are defect and do not comply with the quality system in place, it is often abbreviated as 'NG'
<i>Pemekaran</i>	: Splitting of administrative units
<i>Provinsi</i>	: Province
<i>Pusat</i>	: Central (National) Government
Rupiah Rupiah	: Indonesian national currency, 1 Euro = 12,500 Rupiah 1 USD= 9,000
<i>Romo</i>	: A Javanese term (from the word <i>Bapak/Ayah</i> or Father), this is used to refer to Catholic Reverend
Shop floor	: Areas in the production plant that are dedicated for the production or manufacturing process
<i>Tri Dharma</i>	: The three principles ideally carried out by universities in Indonesia which include teaching (<i>pengajaran</i>), research (<i>penelitian</i>) and community service (<i>pengabdian masyarakat</i>)
<i>Urang Bekasi</i>	: The indigenous local, this is mainly used to refer to the native locals in Bekasi

Deutsche Zusammenfassung

Die Verwaltung von Wissen in einem industriellen Cluster: Die Kollaboration von Industrie, akademischen Wesen und Regierung in Indonesien

Den Beginn der Forschungsarbeit leitet folgende zentrale Frage ein: Wie wird Wissen in Indonesien zwischen Hochschulen, Industrie und Regierung erzeugt, geteilt und verwaltet? Ich interpretiere Wissen als implizite Kenntnis, die tägliche Erzeugung von Wissen durch „Kopfarbeiter“, denn dadurch bietet sich mir die Gelegenheit mich in die obengenannte Nachforschung, im Rahmen des indonesischen Wissenschaftssystems, zu vertiefen. Den Terminus der Industrie (in Bezug auf die Zusammenarbeit von Industrie, Hochschulen und Regierung) wird im Folgenden auf die verarbeitende Industrie begrenzt, insbesondere auf die Automobilzulieferer Branche.

Die Hauptanliegen dieser Dissertation sind dreierlei. Zuerst beabsichtigt sie zu prüfen wie die Wissenspolitik, mit Hilfe einer Kanalisierung von Wissen im institutionellen, sozialen und regionalen Rahmen, realisiert wird. An zweiter Stelle wird die Abhandlung existierende Verknüpfungsrubriken welche den Wissensfluss auf der Ebene eines industriellen Cluster ermöglichen veranschaulichen, als auch eine Untersuchung zur Bedeutung der Lage des Cluster anzustellen. Zu Letzt wird versucht ein Verständnis für die Prozedere der Wissensverwaltung und –gewinnung und dem Austausch von Kenntnis mit der Industrie einzustellen. Ich werde versuchen mich der Fragestellung der Wissensverwaltung zu nähern indem ich mich einer mehrstufigen Annäherung bediene. Diese beginnt auf der Macroebene um Nachforschungen die Wissenschaftspolitik und den fortlaufenden Prozess der regionalen Autonomie im Bekasi Bezirk betreffend anzustellen, verschiebt sich anschließend auf die Mesoebene der industriellen Cluster in Jababeka, um letztendlich Herunterzufahren auf die organisatorische Ebene der Hochschulen.

Das zentrale Argument dieser Dissertation ist die schwindende Verbindung zwischen Hochschulen, Industrie und Regierung welche das Fördervermögen des indonesischen Wissenschaftssystems in der Lokalisierung von eingebrachtem Wissen (global und implizit) aus der Lieferkettenverknüpfung lähmt und behindert. Die ausgeübte Kontrolle (oder der Einfluss) zersplittert und divergiert die Verknüpfung, jedes Element der „triple Helix“ weiter auseinander spreizend: Akademisches Wesen, Industrie und Regierung. Erstgenannt stehen die Faktoren der Liberalisierung und Bürokratisierung, welche den Wissenserwerb und das Teilen von Wissen im akademischen Wesen erschweren. Zweitens wird das indonesische Wissenschaftssystem, wie in der Analyse der staatlichen Wissenschaftspolitik veranschaulicht, zentralisiert. Und drittens zeigt die Clusterstudie wie implizites Wissen verwaltet wird, sowie die Signifikanz der Lokalisierung- die Gesamtheit ist von der Verknüpfung mit der Lieferkette geformt. Diese drei verschiedenen Pole

reißen am Steuerelement und blockieren die Verbindung zwischen akademischen Wesen, Industrie und Regierung. Angesichts dessen scheint es mühselig, wenn nicht unmöglich, Wissen zu lokalisieren welches vom Netzwerk der Versorgungskette eingespeist wird. Die folgenden Abschnitte bieten einen kurzen Einblick in die Kapitel meiner Dissertation.

Kapitel 1: Einleitung in die Studie zur Wissensverwaltung in Indonesien

Kapitel eins soll die Erörterung eröffnen indem reflektiert wird welche allgemeine Gültigkeit das Konzept der „triple Helix“ im Diskurs der Gesetzgeber Indonesiens hat. Wissen als Kapital zirkuliert in Indonesien nur ungleich und wird so auch verteilt. Es ist nicht einfach ein Problem des Macet (Verkehrsstillstand), als auch eine Frage nach dem abfälschenden Einfluss der die Verbindung zwischen Regierung, akademischen Wesen und Industrie im indonesischen Wirtschaftssystem behindert. Die Untersuchung konzentriert sich auf das Jababeka Industrie Cluster im Bezirk Bekasi. Die Legitimierung des Terrains ergibt sich aus dem Fehlen empirischer Forschung in Bezug auf die Fragestellung des Wissensflusses in diesem Gebiet, der Vielzahl an Unternehmen welche sich in diesem Cluster angesiedelt, der Notwendigkeit mich von einer mir bekannten Forschungsinstitution zu distanzieren und der Tatsache, dass auf dieses Cluster als potentielle „triple Helix“ (gebildet von Industrie, akademischen Wesen und Regierung) verwiesen wurde.

Kapitel 2: Das indonesische Wissenschaftssystem & die Rahmenbedingungen der Analyse

Dieses Kapitel stellt die Basis für die Auseinandersetzung mit der Verwaltung des Wissens im indonesischen Wissenschaftssystem. Dies gelingt aufgrund einer Veranschaulichung des aktuellen Standes der Wissenspolitik in Indonesien, der Industrialisierung, des wissensbasierten Clusters und des Wissensflusses zwischen akademischen Wesen, Industrie und Regierung. Schlüsselbegriffe welche in der Abhandlung verwendet werden definiert und die Rahmenbedingungen der Analyse umrissen. Die vorgegebenen analytischen Rahmenbedingungen erlauben es mir mich von dem „triple Helix“ Lehrsatz zu distanzieren.

Kapitel 3: Wissenspolitik in Indonesien; Normative und soziale Aspekte

Dieses Kapitel enthält eine Erörterung die die erste empirische Ebene in Bezug auf das Thema der Wissensverwaltung, vom Standpunkt der Wissenschaftspolitikanalyse aus, vorstellt. Dabei wird konzentriert auf Gesichtspunkte eingegangen wie die Tatsache, dass die Regierung evident in die Facette der Normative eingreift (verdeutlicht in der Analyse der Normativen Politik), oder die Sichtbarwerdung der ausgeführten/praktizierten Politik, erkennbar aus dem Muster des Wettbewerbs und der Zusammenarbeit in der sozialen Facette. Aufbauend auf der Analyse der Normativ Politik sowie der praktizierten Politik, behaupte ich, dass das System der Wissenschaften in Indonesien zentralisiert ist. Also werden die institutionellen Räume durch die

sich ein Staat manifestiert aufgezeigt, welche eine Phobie (hinsichtlich der Kontrolle einer thematischen Forschungsagenda) aufzuweisen scheinen. Die Zersplitterung der Politik erlaubt die Kollaboration des akademischen Wesens und der Industrie. Um wirtschaftliches Wachstum zu sichern werden politische Allianzen mit anderen Ländern gebildet, namentlich mit Japan. Der soziale Raum sowie die praktizierte Politik festigen Jakartas Rolle als Zentrum, welches die Kontrolle an sich reißt. Dabei treten Begleiterscheinungen auf wie die Ausnutzung von Ressourcen (insbesondere Humankapital und Forschungsförderung), die Bevorzugung kleinerer Projekte (da diese die Struktur ergänzen), billige Arbeitskräfte und noch billigere natürliche Ressourcen und letztendlich Jakarta als Zentrum, die Wissensproduktion des akademischen Wesens kontrollierend. Das Ergebnis enthüllt das reale Wesen der Zentralisierung der Wissenschaftssystems Indonesiens.

Kapitel 4: Die Wagnisse der *Pemekaran* im Bezirk Bekasi: Die regionalen Aspekte

In diesem Teil der Dissertation wird die Fragestellung des dritten Kapitels durch die Beobachtung der Trajektorie der regionalen Autonomie des Bekasi Bezirk ergänzt. Um die Spaltung der Verwaltungsregion zu beobachten beschränke ich mich auf die sozialen Aspekte. Die Regierung des Bekasi Bezirk lässt sich als Produkt des Post-Pemekaran-Prozesses betrachten. Einst ein Teil der Stadtregierung von Bekasi, spalteten sie sich ab und formten 2004 eine neue Region. Ich behaupte, dass die Pemekaran das Ausnutzen geographischer Fläche, im Zuge des Wettstreits um Ressourcen unter der bürokratischen Elite, ermöglichen und fördern. Dies wiederum formt und stärkt den Prozess der Zentralisierung des indonesischen Wissenschaftssystems.

Kapitel 5: Die Merkmale des Jababeka-Industriecluster

Der Sachverhalt der Lokalisierung der Jababeka-Industrieclusters wird in Kapitel 5 erläutert. Ich verbinde in diesem Abschnitt die qualitative Analyse (Archivdaten) mit der Kartenanalyse der Unternehmen. Mit Blick auf die interne Struktur, Lage und die industrielle Funktion der Forschung und Entwicklung werde ich aufzeigen, dass das Cluster bedeutend von der Versorgungskette geformt ist und somit das Fördervermögen eine Wissenscluster fehlt. Destotrotz bildet die ungleichmäßige räumliche Entwicklung Strukturen einer Kernperipherie, sowie die Existenz eines „geschachtelten Cluster“. Mehr auf die Funktion der Unterstützung der Versorgungskette eingeschränkt, ist das vom Cluster erzeugte Produkt keine neue Produktentwicklung oder eine neue Erkenntnis, sondern implizites Erfahrungswissen aus dem Prozess der Wissensproduktion. Dieser Herausforderung- der Entwicklung hin zum Wissenscluster- muss sich das Cluster stellen.

· *Pemekaran* kann als das Erblühen von Regionen oder administrativen Einheiten übersetzt werden. Oder Regionen die sich in separate Regionen/administrative Einheiten abspalten

Kapitel 6: Zusammenarbeit des akademischen Wesens und der Industrie oder die Verbindung mit der Versorgungskette?

Kapitel 6 vertieft sich weiter in die Frage der Verwaltung von Wissen. Es wird an Erkenntnisse vorhergehender Kapitel, dem Zentralisierten Wissenschaftssystem Indonesiens und der Bedeutung der geographischen Lage und der Versorgungskette, angeknüpft. Ich behaupte, dass das implizite Wissen für Produktionsprozesse kontrolliert wird und von der hierarchischen vertikalen japanischen *keiretsu*[‡]-Verbindung abhängig ist. Dies Cluster stellt implizites Experimentalwissen. Die horizontale Zusammenarbeit zwischen Staat und akademischen Wesen ist eingeschränkt und begrenzt. Dennoch beruht die Dynamik des Clusters in der eingebetteten horizontalen Verknüpfung zwischen den Industrien in einem „eingeschachtelten Cluster“ in einer räumlichen Peripherie. Die Erzeugung eines soliden Wissenscluster verlangt nach einer Stärkung der horizontalen Zusammenarbeit zwischen Unternehmen und der engeren Verknüpfung von akademischen Wesen und Industrie.

Kapitel 7: Liberalisierung und Bürokratisierung des akademischen Wesens: Die Fälle PU & ATMI Polytechnic Cikarang

Kapitel sieben nimmt einen Umweg zurück zu der Frage der Liberalisierung und Bürokratisierung der Hochschulen in Indonesien. Dies geschieht mit Hilfe von Nachforschungen bezogen darauf wie die Wissenschaft (in diesem Fall Präsident der Universität und ATMI Polytechnic Cikarang) Wissen mit der Industrie produziert, teilt und austauscht. Die Ethnographische Studie zweier Hochschulen im Jababeka Industriecluster zeigt auf wie der Präsident der Universität (PU) zur Bürokratisierung angetrieben wird. Daraus ergeben sich zwei Tatsachen: Zum einen hat der PU keine Kontrolle über die zur Verfügung stehenden Ressourcen. Zweitens stellt sich das Problem der Erhaltung des akademischen Anstands im täglichen Geschäft der Leitung einer Universität ein. Die Untersuchung der ATMI Polytechnic Cikarang enthüllt wie die Bemühung ein auf Produktion basierendes Bildungssystem zu schaffen, sich Umlagern zu einem bildungsorientierten Produktionssystem. Der unternehmerische Aspekt subsumiert den Gedanken der Wissensproduktion und –teilung, die in ihrer Funktionsweise jener einer Industrie ähnelt. Die Bürokratisierung und Liberalisierung verhindert die wissenschaftliche Wissensproduktion und –teilung des akademischen Wesens.

Kapitel 8: Analytische Typologie des akademischen Wesens: Unternehmerische & Bürokratisierte Organisation

Das achte Kapitel geht tiefer in die Analyse des Kapitel Sieben ein mit der Fragestellung (unter Berücksichtigung der Dominanz der vertikalen Wissensflusses auf Clusterebene): Wie und

[‡] *Keiretsu* bezeichnet japanische Zusammenschlüsse von Unternehmen, auch „wirtschaftliche Verbundgruppen“ genannt (Hatch and Yamamura 1996:69).

inwiefern kann das akademische Wesen die Wissensbasen anzapfen? Zwei analytische Typologien von Wissenschaft, d. h. die bürokratisierte und die unternehmerische Wissenschaft, sind folglich angesprochen. Es ist das unternehmerische Akademische Wesen welches darauf vorbereitet ist auf die Problemstellung der Räumlichkeit der Industrie-Hochschulen Zusammenarbeit einzugehen. Das Bürokratisierte Hochschulwesen steht dennoch hartnäckig für einen Wissensaustausch mit der Industrie. Die vorherrschende Bedrohung ,beider Typen der akademischen Welt, stellt der abnehmende wissenschaftliche Charakter des akademischen Wesens im indonesischen Wissenschaftssystem dar.

Kapitel 9: Die Zusammenarbeit zwischen akademischen Wesen, Industrie und Regierung im indonesischen System der Wissenschaft: Konvergent oder divergent?

Das letzte Kapitel schließt die Fragestellung der Wissensverwaltung in Indonesien ab. Die Wissenszirkulation oder der Wissensfluss zwischen akademischen Wesen, Industrie und Regierung ist divergent. Dies ist der Fall aufgrund der Einflüsse von Bürokratisierung, Liberalisierung, sowie dem Einfluss zweier Machtzentren, namentlich Jakarta und den großen Unternehmen der Versorgungskette. Zudem werden Auswirkungen für zukünftige Forschungsarbeiten bemüht, sowie Empfehlungen für Gebiete zur Forschung ausgesprochen.

Chapter 1

Prelude to the Study of Knowledge Governance in Indonesia

“Researchers are lacking of skills to market (their results) because they are focused on producing something (research results). Due to the lack of linkage with industries, the products we develop are not visible in the society”

RISTEK Minister Opening Speech on the Triple Helix Conference
2012.

Academia-Business-Government (ABG or ‘triple helix’) is a popular buzzword in the discourse of science policy in Indonesia. The current Minister of Research and Technology reiterated this concept in the opening speech of the 12th Triple Helix Conference in Bandung, Indonesia in August 2012. As stated above, the researchers are deemed lacking in the skills needed to market the product of their research. Furthermore, due to a lack of linkage with industries, the products being developed by Indonesia’s science system are not visible in society (Indra 2012). With the current policy, RISTEK is attempting to connect this linkage between academia-industry-government to promote innovation in Indonesia (RISTEK 2011).

ABG is not the only buzzword. Promoting economic growth policy is also at the top of the government’s to-do list. The government of Indonesia has been keen on pursuing economic growth-oriented policies at the macro level, as marked in the Economic Development Master Plan 2011-2025 (Menko-Perekonomian 2011), requiring capital demands of around USD 400 billion (Manning and Purnagunawan 2011). This is pursued through, among other things, labour policies. This pressure on labour policies creates tension between labourers and business entrepreneurs in Indonesia. This was strikingly depicted in the strike move carried out by the labour force in the industrial cluster areas of Cikarang and Cibitung on 27th January 2012, leading to a *macet total* situation (traffic gridlock).

On the one hand, there is a growing surge of FDI (Foreign Direct Investment) in 2010-2011 (BKPM 2010a; BKPM 2010b; BKPM 2011) concentrated primarily in West Java and in Banten, Indonesia and an economic growth oriented policy; on the other hand, knowledge producing organisations (Lukman 2010) and industrial clusters (Irawati 2012) are mostly located in Java Island, Indonesia. Bearing this in mind, it is valid to question to what extent the global knowledge flowing in along with the influx of FDI due to the economic growth policies (on the macro level) can be localised in the Indonesian science system. It remains contentious as to how, amid

liberalisation of the market and bringing foreign capitals in the country, the collaboration between academia-industry-government is possible in Indonesia.

Every thesis has a story to tell to its reader. This thesis tells the story of Indonesia, which is struggling to localise the knowledge imported from abroad (abroad in the sense of being brought in from the supply chain linkage-production network) within the science system¹. Specifically, the story is focused on how and why there persists a divergence of the linkage of academia-industry-government in the Indonesian science system.

The research is set against this backdrop of discourse of ‘triple helix,’² the flow of knowledge in the supply chain, as well as the circulation of knowledge as capital in Indonesia. The main question asked in this research is: *how is knowledge produced, shared, and governed between academia, industry and government in Indonesia?*

Knowledge governance research in Indonesia that takes a multilevel approach of macro, meso and micro has yet to be thoroughly carried out. This gap is evident in two strands. First, science policy related work (Samadikun 1998) in Indonesia tends to be treated as a ‘black box’ emphasising implementation. Second, studies of knowledge flow and sharing between different organisations in Indonesia, namely industry-academia in the cluster level, have yet to be carried out conclusively. Existing exceptions include several studies that look at knowledge flow from knowledge management (Tjakraatmadja, Martini et al. 2008) and a general overview of Jababeka Industrial Cluster and Solo Techno Park, which is lacking in empirical robustness (Zulhamdani, Laksani et al. 2009). Thus the bulk of research has focused on knowledge transfer through the supply chain (Layton and Rustandie 2007; Irawati and Charles 2010; ITB 2010; Irawati and Rutten 2011; Tambunan 2011), where the concern is vertical linkage. The horizontal linkage between companies and company-academia that enables such interaction was not adequately addressed in these studies. Consequently, this issue of knowledge governance in Indonesia is under-researched.

The research itself is mainly exercised from the discipline of sociology. Due to its disciplinary stance the study is limited to economic terms in regard to the optimisation of the input-output of goods on the cluster level. It is also limited in elucidating whether the cluster as a whole functions as an enclosure, in terms of providing stable occupations for the surrounding people (society) living near or in the industrial cluster. Furthermore, the study is also limited in terms of the industries with which it deals. When I observe industries, the focus is on the manufacturing

¹ By system I refer not to the theory of social system (Luhmann 1995), but to the ‘totality of structure’ (see: Giddens 1979), see also chapter two, particularly the analytical framework in part e.

² As stated later in chapters two and eight, I have started the research with the theory of ‘triple helix’ (namely of academia-industry-government collaboration of knowledge flow), but later I found myself refuting this social system inspired theory.

industries, specifically the automotive supplier industries in the supply chain linkage located in the cluster. I do not discuss in specific terms the manufacturing basis of the industrial sector, thus this also creates the next limitation, namely I preclude discussions as to how (tacit) knowledge contributes to parts or product development. Nonetheless, this thesis built its strength on shedding light on the various characters of linkage between the academia-industry, supply chain, and the inter-firm linkage in industrial cluster level. My background of studying law contributes when discussing science policy and looking at the state. The research utilises an extended method (Burawoy 1998) of participatory research. The macro site is the science policy level, whereas the meso level looks at the Jababeka Industrial Cluster, and the micro level investigation considers the process of liberalisation and bureaucratisation of academia by taking the case of President University and ATMI Polytechnic Cikarang (both of which are located in the cluster).

a. Science Policy, Cluster and Academia's Knowledge Production as Research Objectives

Generally speaking, the research focuses on a threefold objective in an effort to answer the main research question:

1. It intends to examine how science policy is carried out in the institutional, social and regional facets in Indonesia.
2. It aims to show the existing rubrics of linkage enabling knowledge flow in the industrial cluster level as well as the importance of location.
3. It seeks to provide an understanding of how academia produces and shares knowledge, including the process of knowledge exchange with industries.

b. Contribution of the Study

Following the past work of scholars on knowledge society and post-industrial society (Bell 1999; Knorr-Cetina 1999; Evers 2003; Hornidge 2007; Menkhoff, Evers et al. 2011), I take knowledge as one of the important factors of production. I situate my study on the debates of knowledge for development (Gerke and Evers 2006; Bauer 2011; Menkhoff and Evers 2011; Menkhoff, Evers et al. 2011) in the Indonesian science system. In this respect, I focus on how the 'global' knowledge brought by the supply chain linkage is being localised by the collaboration between academia-industry-government. The study intends to provide two kinds of contributions. The first is in terms of empirical contribution to the empirical body of work on academia-industry-government collaboration in Indonesia, which, as previously highlighted, is lacking. The empirical contribution provides an avenue to understanding the existing capacity and challenges of the Indonesian science system in localising knowledge from the supply chain linkage. The second contribution is in terms of a theoretical contribution, by proposing the analytical typology of academia, as shall be

explained in chapter eight, that there is the bureaucratised and entrepreneurial academia. The analysis presented in this chapter provides an insight into which type of academia is able to tap into the knowledge base of industrial cluster amid the backdrop of liberalisation and bureaucratisation of the science system in Indonesia.

c. Research Location: Jababeka Industrial Cluster, Bekasi District

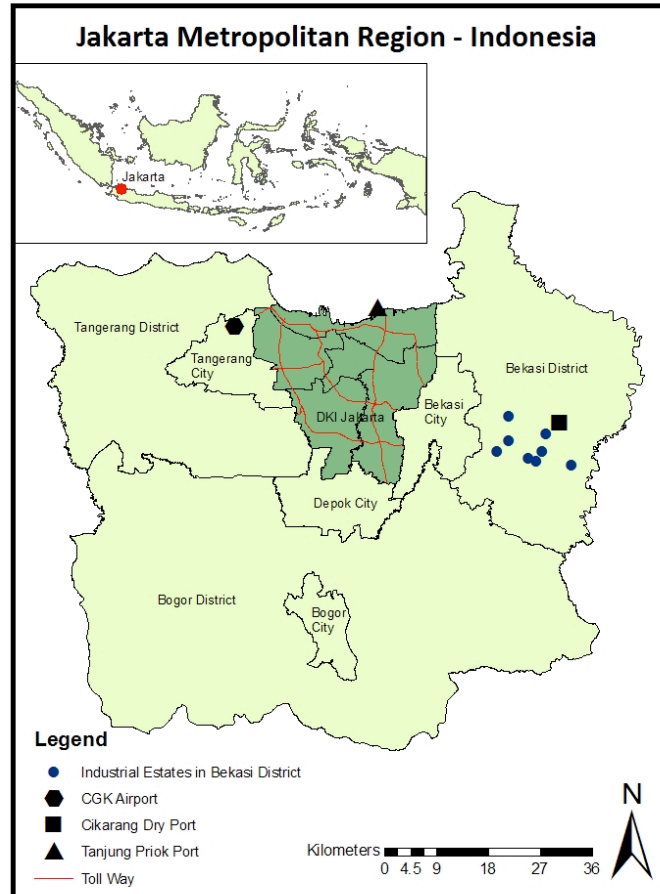
The research is located in Bekasi, a part of the Jakarta Metropolitan Region. Jakarta itself is the capital of Indonesia. Indonesia had a population of over 237.6 million in 2010, the fourth largest in the world (Manggiasih 2011). Rapid urbanisation is an issue in Indonesia, with 53% of the population living in urban areas in 2010 (Menko-Perekonomian 2011), and by 2025 it is predicted that those inhabiting urban areas will reach 65%. This will set in motion various interrelated issues of increasing patterns of movement, production structures and changing patterns of consumption (Menko-Perekonomian 2011).

As urbanisation increases, there is the peril of ‘urban involution’, namely that ‘complexity increases without evolutionary change, let alone revolutionary change’ (Evers and Korff 2003; Evers 2007). This may explain the ‘capsule lifestyle’ of some of the middle class (Gerke 2000) in Jakarta. As one author put it, it is capsule-like, due to the movement of people between air-conditioned apartments, cars, malls, gyms and night clubs (Petersen 2011). This is a lifestyle designed to isolate oneself from the chaos, pollution and congestion in Jakarta (Petersen 2011). This reality is far removed from the labour (*buruh*) workers in Bekasi, who live in the *kampung* (villages) between the high walls of the industrial clusters.

The Jakarta Metropolitan Region (JMR) is the capital of Indonesia, whereby Jakarta is the core and the peripheral surroundings consist of Bogor, Depok, Tangerang and Bekasi. It is often abbreviated as ‘Jabodetabek’, and is the largest urban concentration in Indonesia (Firman 1998). The JMR was home to 26.6 million people in 2010 (Wie and Negara 2010). In the core there are 9.6 million inhabitants, which is indeed an overload in terms of the capacity of the city to provide services for its inhabitants (Triyono and Budiman 2011). Based on the 2000 census, Javanese is the major ethnic group, making up 35.16% of the population, followed by Betawi (27.65%) and Sundanese (15.27%). There are 5.53% Chinese living in Jakarta, and the Batak ethnic group is fifth place, with 3.61% (Suryadinata, Arifin et al. 2003; Evers 2007). However, a glance at the top ten richest businessmen in Indonesia depicts a different view, with the top ten Forbes list in 2011 highlighting six Chinese, one *Batak*, and *Minahasan* (Kroll 2011). The top ten-businessmen’s total wealth amounts to USD 52.5 billion.³

³ Some of these tycoons are also actively financing scholarship and supporting funding for private universities. For example, the Eka Tjipta Foundation and PT Sinar Mas Company have provided assistance for Paramadina University to

The map of JMR and the location of the industrial clusters in Bekasi that host the highest FDI (Hakim and Parolin 2009) in the outer part of JMR can be seen in Map 1.1.



(Source: Author's own map based on fieldwork)

Map 1. 1 Jakarta Metropolitan Region & Industrial Clusters

At the cluster level one could see the rapid conversion of land use from paddy fields to factory sites usually managed by the industrial estate companies. Once principle approval (*persetujuan prinsip*) is in hand, land acquisition by estates is possible under the Government Regulation No. 24 Year 2009 on Industrial Estate (*Kawasan Industri*). The manufacturing sites are attracted to these outer regions, due to relatively inexpensive land, good transport access (Hakim and Parolin 2009)

construct a new building on its campus in Jakarta (source <http://ekatjpta.org/2011/03/smart-dan-etf-dukung-pembangunan-kampus-paramadina/>). Sampoerna Business School was established by the Putera Sampoerna Foundation (source: <http://www.ssb.ac.id/en/about.php>). An expert has thus questioned the capacity of these universities that receive funding from rich businessmen to be critical and neutral in stance, especially with regards to the typical business being managed, such as palm oil, and patronage pattern as the backdrop of Indonesia's economic development (Informal discussion, Jakarta, 29.09.2010).

and high concentration and access to mass markets, apart from accessibility to the decision makers (Firman 1998).

In Bekasi there are eight industrial clusters, which include MM2100, EJIP, Jababeka, Lippo Cikarang, Hyundai, Delta Mas, Gobel and Bekasi Fajar. The Tanjung Priok Port is located in the north and is the main port in Indonesia, functioning as the backbone for national development (Kementrian-Perhubungan 2011). The Tanjung Priok Port faces several shortcomings due to, among others, the physical barriers and the long waiting period to unload goods⁴ (Kementrian-Perhubungan 2011; Investor-Daily 2012) but the revitalisation plan is an on-going effort to compete internationally with other Southeast Asian ports. The Cikarang Dry Port was initiated by the Jababeka Group⁵, and caters to the needs of industries in the Bekasi district area. The connection between the Cikarang Dry Port and the Tanjung Priok Port is 50 kilometres via the toll-road or railway (Jababeka 2012). The Cikarang Dry Port commenced operation in 2010.

The research location of the Jababeka Industrial Cluster in the Bekasi District, Indonesia is justified for four reasons. Intensive empirical research in an industrial cluster level that critically examines the knowledge base and knowledge flow has yet to be conclusively studied in Indonesia. Furthermore, the Jababeka Industrial Cluster is one of the largest industrial clusters in Indonesia, and as a site is particularly interesting in terms of its diversity of companies. One can find more than 1,000 small, medium and large companies in and immediately surrounding the industrial cluster. The ownership structure of the companies extends beyond domestic capital, including foreign capital emanating from countries on four continents: Australia, Asia, Europe and North America. In addition, as a researcher working in the Indonesian Institute of Science (LIPI), distancing myself from a site with which I am familiar and becoming part of the system (such as the PUSPIPTEK Science Park located in Tangerang JMR) is vital. However, I was later involved in the day-to-day ethnographic work of two organisations located in the cluster. This decision necessitates that I adopt a personal, critical stance towards the research process. Finally, at the policy discourse level, the Jababeka Industrial Cluster has been frequently mentioned at government meetings concerning a potential site of 'triple helix' models in Indonesia (Observation, Jakarta, 25-26.05.2010). The extent to which this yields the expected outcome of industry-academia linkage has not yet been investigated.

⁴ As reported in the Investor Daily Indonesia, these limitations are due to infrastructure and other related barriers. First is the physical barrier: there is only one entrance within and outside the area of the Tanjung Priok Port servicing international and domestic commercial ships. Second, there is a long waiting period to unload goods, up to 20-25 days. Third is the uncertainty of costs and issues relating to inefficiency (Investor-Daily: 2012). Revitalisation, however, is ongoing. PT. Pelindo II, a company managing the Tanjung Priok Port, has started to extend the depths of the port and to modernise the facilities, and it will then yield results. The export-import containers from Indonesia to Singapore have decreased from 70% to 18%. It is no longer busy harbouring commercial feeder ships for ports in Hong Kong, Malaysia or Singapore (Investor-Daily: 2012).

⁵ Information and analysis on the role of the Jababeka Group particularly in managing the Industrial Cluster of Jababeka can be found on chapter five.

d. Argument & Outline of The Thesis

*The main argument of the thesis is that there is a fragmenting linkage between academia-industry-government that paralyses the capacity of the Indonesian science system in localising the (global, tacit) knowledge brought from the supply chain linkage. The linkage is fragmenting and diverging due to the exercise of control (or the pull) straddling away each element in the ‘triple helix’: academia, industry and government. The first one is the liberalisation and bureaucratisation disrupting scientific knowledge production and knowledge sharing in academia; second, the science system in Indonesia is centralised, as shown in the state science policy analysis; and third, the cluster study untangles how tacit knowledge⁶ is governed and the importance of location - all of which are shaped by the supply chain linkage. These three different poles are pulling the control and disabling the linkage in academia-industry-government. It makes it arduous, if not impossible, to localise the ‘global’ knowledge flowing in from the supply chain network. At this point it is worth asking: why is this the case in Indonesia, even after the *reformasi* back in 1998?*

The chapters that follow explain why the science policy and regional autonomy reinforces the centralisation of the science system, how the supply chain linkage is affecting the cluster and the control of tacit knowledge flow, as well as the impact of the process of liberalisation and bureaucratisation⁷ towards academia.

Chapter two provides the basis for the discussion of how knowledge is governed in the Indonesian science system. It does so by providing a state of the art of science policy in Indonesia, knowledge-based cluster and industrialisation, and the knowledge flow between academia-industry-government. Key terms used in this thesis are defined and the framework guiding the analysis is also outlined in this chapter. The analytical framework provided allows me to distance myself from the ‘triple helix’ theorem.

Chapter three will provide a discussion of science policy in Indonesia. This is the first empirical level of analysis on the issue of knowledge governance from the standpoint of science policy analysis. It concentrates on how the state is manifested in the normative facet (as shown in the normative policy analysis), and the manifestation of policy as practices as shown in the pattern of competition and collaboration in the social facet. Building on normative policy analysis and policy as practices, I contend that the science system in Indonesia is centralised. The institutional spaces where the state manifests itself depict a phobia (in controlling the grip of the thematic research agenda), fragmentation of policy enabling academia-industry collaboration and active alliance building with other countries, namely Japan, to pursue economic growth. The role of Jakarta as

⁶ The term of tacit knowledge is defined in chapter two of the thesis.

⁷ The terms of liberalisation and bureaucratisation are explained in chapter seven of the thesis.

the centre pulling the control is reified in the social space as manifested in the policy as practices. The features are resources (particularly human capital and research funding in the science system) being scattered, the structure reinforces preferences for small projects, cheap labour and natural resources, and Jakarta as the centre, controlling (through the funding allocation and bureaucratisation process) academia's production of knowledge. The result unravels the reality of centralisation of the science system in Indonesia.

Chapter four complements the discussion in chapter three by observing the trajectory of regional autonomy in Bekasi District. I focus on the regional facet to observe the splitting of the administrative region (or *pemekaran*). The Bekasi District Government is an output of post-*pemekaran* process. It was formerly a part of the City Government of Bekasi before separating itself and establishing a new region in 2004. The *pemekaran*, I assert, is enabling the utilisation of geographical space for the competition of resources among the bureaucratic elites. In turn this shapes and reinforces the centralisation process of the science system.

The issue of location of the Jababeka Industrial Cluster is taken up in *chapter five*. Within this chapter I combine the qualitative analysis, archival data with the map analysis of the companies. Looking at location, internal structure and industrial R&D capacity, I argue that the cluster is shaped by the supply chain linkage and thus, lacks the capacity of a knowledge cluster. Despite this, there is an uneven spatial progression forming a core-periphery structure and existence of 'nested clusters'. As it functions more in terms of its location to facilitate the supply chain, the cluster output is not a new part or product development, but tacit experiential knowledge for the production process. This provides a challenge for the cluster to develop into a knowledge cluster.

Chapter six inquires further into the knowledge governance question. It follows up on the findings of chapters three and four, i.e. that the overall science system in Indonesia is centralised, as well as chapter five's findings on the importance of location and supply chain. I contend that the tacit knowledge for the production process is controlled by the hierarchical vertical Japanese *keiretsu* linkage.⁸ The cluster produces tacit experiential knowledge. The horizontal collaboration between academia-industry is restricted and limited. Nonetheless, the dynamic of the cluster rests upon the embedded horizontal linkage among industries in the 'nested cluster' in the spatial peripheries. Building a strong knowledge cluster thus calls for strengthening the horizontal linkage between companies and in the academia-industry collaborations.

Chapter seven takes a detour back to the issue of liberalisation and bureaucratisation of academia in Indonesia. It does so by probing how academia (in this case President University and ATMI

⁸ The character of the Japanese *keiretsu* linkage of the automotive industries in Indonesia is explained in chapter six.

Polytechnic Cikarang) produces, shares and exchanges knowledge with industries. The ethnographic study of the two academia located in the Jababeka Industrial Cluster shows how President University (PU) is propelled into a bureaucratisation process. This yields two outcomes: first, PU has no control over its resources, and second, the emphasis on maintaining academic decorum in the everyday business of running a university. The investigation of the ATMI Polytechnic Cikarang divulges how the intended production-based education system shifts into an education based on the production system. The entrepreneurial facet of the organisation subsumes the logic of the knowledge production and sharing, making it function as an industry. The liberalisation and bureaucratisation hampers the scientific knowledge production and sharing of academia.

Chapter eight goes further into the analysis in chapter seven by posing the question, with the dominance of the vertical knowledge flow in the cluster level, how and which academia can tap into the knowledge base? Two analytical typologies of academia, i.e. the bureaucratised-entrepreneurial academia, are consequently argued for. It is the entrepreneurial academia that is equipped to respond to the issue of space in the academia-industry collaboration, the bureaucratised academia due to the bureaucratised space remains adamant for a knowledge exchange with industries. The prevailing threat of both types of academia is the decreasing scientific character of academia in the Indonesian science system.

Chapter nine then concludes the issue of knowledge governance in Indonesia. The circulation or flow of knowledge between academia-industry-government is diverging. This is due to the pull of bureaucratisation, liberalisation, as well as the pull of two power centres, namely Jakarta and the upper stream companies of the supply chain. The implications for future research endeavours and areas of research as well as recommendations are also outlined in this chapter.

Chapter 2

The Indonesian Science System & Framework of Analysis

The aims of this theoretical chapter are twofold: first, to provide a critical overview of science policy, knowledge-based cluster development and knowledge exchange between academia-industry-government in Indonesia, all of which are contextualised as the elements of governing knowledge in this thesis. The second purpose of this chapter is to equip the reader with the analytical framework and to provide clarification of the key terms used in this thesis. By pursuing these two aims, I intend to provide a grounding context for the capacity of the Indonesian science system in governing and localising knowledge.

The term 'knowledge governance' itself warrants clarification. Michailova and Foss argue that the knowledge governance approach is an attempt to think systematically about the intersection of knowledge and organisation (2009: 8). Here they refer to the work of Williamson, stating that governing knowledge processes means choosing governance structures, i.e. markets, hybrids and hierarchies, and governance and coordination mechanisms,⁹ which in a way benefit the process of the knowledge transfer, sharing, integration, usage and creation (Michailova and Foss 2009). This view is mainly from the angle of organisation. Menkhoff et al. (2011: 4) provide a working definition of knowledge governance: '(It is) both an administrative process and a structure of authority relations. It involves the channelling of resources in building up knowledge management capabilities and improving the competitive advantage of a country in the world market by utilising knowledge as a factor of production.'⁷ Utilising the insights of Menkhoff et al. (2011) into the scholarly work of knowledge governance, I investigate the question of knowledge governance in Indonesia through: 1) science policy defined as the norms and policy practices that drive and perpetuate the order of science system,¹⁰ 2) the control of knowledge flow in the industrial cluster either via the vertical or horizontal linkage,¹¹ 3) the organisational change¹² faced by academia, especially in the context of knowledge production, sharing and flow with industries. The literature review parts (i.e. parts a, b, c) of this chapter thus provide the basis for the discussion of the three said levels of analysis of knowledge governance.

⁹ The coordination mechanisms are, for example, contracts, directives, reward schemes, incentives, trust (Michailova and Foss 2009: 8).

¹⁰ Chapter three explicates in detail the argument of science policy in Indonesia.

¹¹ Chapter six explains in depth the process of knowledge flow via the academia-industry linkage, inter-firm linkage, as well as the supply chain linkage.

¹² The organisational change is due to the process of liberalisation and bureaucratisation. This is explained in chapters seven and eight, respectively.

This chapter will discuss the following issues: How is science policy analysed in current literature? What are the current debates about knowledge-based cluster development and industrialisation in Indonesia? How does knowledge flow between different organisations (academia-industry-government)? Subsequently, several key terms will be defined and an analytical framework outlining the different units of analysis in the fieldwork will be outlined. Finally, a summary will be provided.

a. Science Policy

Science policy will be the first entry point in this thesis to understanding how knowledge is governed. In the coming passages, I will provide a brief review of science policy, policymaking and policy implementation, including the conceptualisation of the state in Indonesia, and the discussion of the analytical premise of science policy, in which I situate this in the context of 'order' to see the working of the science system and the materialisation of the state through the science policy.

Before asking what is science policy, it is important to clarify the term. It builds upon two stances: first is science-based policymaking, namely integrating science, which feeds into the mechanism of decision or policymaking. Second is policymaking as an effort to steer science and thus knowledge made by the state. Both are interrelated in the context of building competence in the organisation and science communication; however, each has distinct frames. The former is often coined as the science-policy interface (Jones, Jones et al. 2008; Jones, Jones et al. 2009) or evidence-based decision-making (McDonald, Yoganingrum et al. 2009). Also ingrained in this concept is the reliance and/or competition between policymakers for updated scientific knowledge, in order to attain a legitimising power (Weingart 1999). The latter involves policies aimed at steering or governing knowledge (Menkhoff, Evers et al. 2011) at the state level. According to Grundmann and Stehr (2003), this domain of science policy is concerned with the stimulation of knowledge, including its applications. They further specified the factors as conducted by government to 'manage' science, namely the formation of scientific knowledge, the personnel producing the knowledge, the social contexts in composing the epistemic machineries, wide ranging incentives such as tax policies and tariffs, and the various advantages that science might bring to society (Grundmann and Stehr 2003: 184). The study engaged herewith is more concerned with the latter, considering efforts made by the state qua policy to steer knowledge.

A social theorem standpoint on policy might yield a different interpretation. Science policy or the study of policy steering may well be dependent upon the distinct optics used. I will briefly present some of them, but this is not an exhaustive list. The viewpoint is often from policymaking to implementation (Smith 1973; Sutton 1999) by the state. Policymakers are often viewed as rational

agents. From a market/transaction cost lens (Williamson 1975), this scholarship builds the support for the principal agent schemata. Braun introduced this schemata of research policymaking from the relation of principal-agent, with the different agencies receiving funding as the agent and the policy makers as the principal (Braun 1993; Braun and Guston 2003). Actors are perceived as rational individuals who endeavour to optimise their interests according to their priorities (Braun and Guston 2003). The relationship between the principal and agent is framed as having both selfish and collaborative motives, thus producing a 'mixed-motive' game.

The seemingly rational actor was also portrayed from public administrative work carried out by Lipsky (1980). The street-level bureaucracy functions as a window into problems of policymaking and implementation. Street-level bureaucrats are public service-based employees such as teachers and policy officers (1980:4). They may allow access to government supported programmes and exert considerable discretion in doing so. Hence policy analysis in this respect begins by first comprehending the conditions of work and preferences of these bureaucrats in delivering policy. Second, it looks at the restrictions surrounding these jobs, at the same time recombining the punitive action and incentives (1980:25). However, it must be noted that Lipsky's work has been largely based in the U.S.

Scholarly analysis of policymaking from the system theory tradition attempts to move away from the standard model of policy implementation. Teubner and Paterson (1998: 220-221) summarise this standard as ranging from the political definition of objectives and issues to the development of legislative programmes, and finally to the programme implementation by the regulators before the societal outcome is achieved. The autopoiesis stance moves away from this standard, and replaces it with a number of autonomous yet interfering fields of action, in a casual and parallel manner whereby there are recursive processes of change in each of the different fields or sites (Teubner 1983; Paterson and Teubner 1998).¹³

There is other scholarly work attempting to shift from the linear policy towards implementation and thus the state. Such a focus is carried out by David Mosse (Mosse 2004; Mosse 2005) in reflecting on his experience working as a consultant for the Indo-British Rainfed Farming project in India. Rather than observing how the gap between policy and practice can be ameliorated through improvement of policy implementation, he suggested that it would be more viable to observe the coherent representation as projected and practices by the actors in development (Mosse 2004). Policy does indeed provide 'an authoritative framework of interpretation', but in the *ex post facto* sense. He argued how development projects achieved their aims owing to the

¹³ According to Teubner, a reflexive law would neither authoritatively dictate the social function of other subsystems, nor regulate the capabilities in terms of input and output. Instead it would generate mechanisms that systematically push the development of reflexion structures with other social subsystems (Teubner 1983:277).

policy model that yields a substantial interpretation of events (Mosse 2004: 664-665). At this point *it is reversed*, i.e. practices feed into the policy. This ethnographic approach allows one to delve into the practices of individuals in the order, including the science system. Simply put, the practices of policymakers, researchers or knowledge workers in the science system enabling collaboration also represent a policy to a certain extent.

The study of science policy has often been linked with the study of policymaking by state or government (Gibbons, Limoges et al. 1994; Bora and Hausendorf 2006; Braun 2008). Dietmar Braun reviewed the governance frame from the 1980s to provide a lens for the ‘age of innovation’ (Braun 2005; Braun 2008). His reviews essentially pinpointed three governance models linked with the state. The first is the ‘steady state’, whereby actors cannot solely rely on available resources, and hence are required by conditions to deal with minimal resources. The second is the ‘efficiency state’, which is linked to the transaction cost theorists, arguing for public organisations to conform flexibly in accordance with changing conditions without having total discretion. The third is the ‘network state’, which emanates from the global governance theorem. In this network state the modern organisations, including those in the public sector, must capitalise on collaboration and competition. This collaboration is a key notion in the survival of organisations within a complex and interdependent world (Braun 2005: 17-19).

Shifting to the Indonesian state, history noted that the 1998 *reformasi* in Indonesia brought down the authoritarian regime of Soeharto. One way of looking at the state post *reformasi* is from Weber’s (1978)¹⁴ patrimonial state (Webber 2005; Kuhonta 2008). Kuhonta views the state in Indonesia (and generally in Southeast Asia) from a Weberian framework, ranging from the rational-legal bureaucratic to patrimonial. However, subsequent analysis focused on Indonesia falls short in observing change after *reformasi* by adopting a rather sceptical tone. Here he conforms to studies carried out by, among others, Malley (2003), fearing that Indonesia might be disintegrating (Kuhonta 2008).

From a socio-legal optic, Tim Lindsey brings forth the concept of *preman* state or the criminal state (Lindsey 2001; Cribb 2011). He takes *preman* as a paradigm and argues that the New Order state methods of operation via violence and blackmailing bear greater resemblance to the criminal gang or *preman*. After the *reformasi* the *preman* has returned, as shown in the lack of ability to punish violence or corruption by means of legal or political measures. Although this paradigm is based on a sound analysis, it provides an unsettling mental picture. The problem lying in wait behind the

¹⁴ In the patrimonial state as described by Weber, the most crucial obligation of the subjects would be to provide for the material maintenance of the ruler. The officialdom of this patrimonial may have bureaucratic features along with the rationalisation and expanding functional sections. Weber further added that this patrimonial office is lacking the bureaucratic separation of the ‘private’ and the ‘official’ space (Weber 1978: 1014, 1028-1029).

portrayal of bureaucracy as *preman* is the collective consciousness in the machine of bureaucracy to accept *preman* as a guide of individual action.

An ethnographic attempt at viewing the state by considering what it does rather than what the apparatuses say was developed by Barker and van Klinken (2009). They look at two prongs, phrased as the practical and the ideological, intending to capture both the production and circulation of images of the state and the actual state practices themselves. Here one has to look at the 'local strongmen', sometimes phrased as *jago* (Barker 2009), and struggles in distinct arenas. They appeared to cultivate the two prong stance from Migdal's account of studying the state (Migdal 2001). The picture then is ripe with competition between actors. However, it does not explain how these two prongs internalise certain institutions to the extent that they could drive actors to collaborate in addition to competing. Furthermore, the shift from the 'micro' level of interaction to generalising the state images was not thoroughly discussed.

Naturally there are other optics used, such as the Foucauldian governmentality work (Li 2007) or the weak state (Wanandi 2002). What is not sufficiently explored after the *reformasi* are the continuities of political economy perspectives whereby the state is in flux. 'In flux' is a term I used to characterise the inundation of bureaucratisation and patterns of conflict or collaboration that could be associated with opening up to anti-authoritarian possibilities. Higgott, Robison (1985) and as illuminated by King (2007), indicate how the dominant class makes up a significant proportion of bureaucratic sectors (among others), and this might utilise the power of the state, using it productively to serve their own interest, or the domestic and international capital (Higgott, Robison et al. 1985; King 2007). Has the increasing expansion of state units following the logic of decentralisation brought forth increasing numbers of bureaucratic elites? Here it is vital to determine the socioeconomic groups (Evers 1980a), how they are linked to the state, the character of power relations, and the pattern of the mobilisation of resources (King 2007). Their work prompts the notion that it might be conceptually contentious to observe the state as a singular notion.

Most of the insights into science policy in Indonesia were provided in a 'black and white' manner with a firm emphasis on implementation (Samadikun 1998; Taufik 2007). A review of socio-cultural practices and science policy was also carried out as part of the PERISKOP study (Schoen, Muenkel et al. 2002). Nonetheless, this study is rather abstract and fails to focus on a clear cut administrative area. Another important intellectual discourse is the *Habibienomics* versus *Widjojonomics* debates. The innovation policy and strategy contested between two regimes of *Habibienomics* and *Widjojonomics* in Indonesia has been widely discussed (Juoro 1993; Amir 2008; Leksono 2009). The contestation is between competitiveness based on natural resources versus

human capital. The currently reigning Susilo Bambang Yudhoyono holds the view that a combination of both is required. For research and development, this means that the government would reorient the research towards a more applied basis rather than basic research, as indeed this represents the present scenario (RISTEK 2006; RISTEK 2011).

Evers observed that in the 1980s, Indonesia once stated four of its universities to be the 'Centres of Excellence', with additional financial support given to them. To no avail the ones created are isolated centres that were not sufficiently networked (Evers 2003; Menkhoff, Evers et al. 2011) with other production and knowledge hubs. Since the 1998 economic crisis, the government of Indonesia has carried out reforms, bestowing State-owned Legal Entity (BHMN) status to several state universities: Bogor Agricultural Institute, Gadjah Mada University, Airlangga University, University of Indonesia, Sumatera Utara University, Bandung Technology Institute, and Indonesian Educational University (*Universitas Pendidikan Indonesia*, Bandung) (Napitupulu and Mulyadi 2011). At the outset, this BHMN status might give more autonomy in the management of finance, human resources, organisation, decision making and increased accountability (Soejatminah 2009). Nonetheless, this budget cut calls for state universities to collaborate and work with other partners, such as local governments and industry. However, this status stalled after the Constitutional Court Decision annulled the legal basis of BHP (Educational Legal Entity).¹⁵ A transition phase has been called for until the end of 2012, during which the management of BHMN shall be returned to the campus (Napitupulu and Mulyadi 2011). The idea of 'Centres of Excellence' of these state universities evaporates along with the rising harbingers of liberalisation of higher education in Indonesia.

During the New Order regime the state was too interventionist in steering the higher education system (Nugroho 2005). What happens after *reformasi*? Nugroho (2012) argues that there is autonomy; however, this comes at a high price. In reality, higher education system in Indonesia is still under the control of the state (Nugroho 2012) as well as of the market (Nugroho 2005). Bureaucratisation is partly due to the exercise of control by the state through research budgets. Noting the illustration of the research grant from DIKTI, the resources and energy of lecturers are geared more towards fulfilling the cumbersome administrative tasks of the bureaucratic financial system. As a consequence research funded by the state is oriented towards achieving the output of administrative conditions and the realisation of a set of activities, rather than focusing on the quality of the research itself (Nugroho 2012).

These aforementioned observations have highlighted the lack of science policy study in the state beyond the standard lexicon of policymaking and policy implementation in Indonesia. I have also

¹⁵ Chapter three on science policy provides further discussion on this matter.

described the social theories' approaches to policymaking and the conceptualisation of the state in Indonesia. Exploring different conceptions of the state in prior paragraphs are of use in providing the foundation of the science policy discussion. The first reason is that through exploring these different conceptions of the typology of the state in Indonesia, one might be able to present avenues other than the linear teleological policy formulation to policy implementation. A further reason is that insights into science policy state should also shed light on the *paradigm* or *structure*. It may be at times woven by means of social relations or informal linkage that allow communication and the channelling of resources, as made by the state apparatuses. The practices coined by Mosse (2004) might hint at the rule structuring the interaction between actors. Thus, *science policy in this work will look at the norms and practices of the policy that drive and perpetuate the order of the science system.*

The problem of order came up in Thomas Hobbes' scholarly work, calling for the prevalence of a strong central force to tame people's destructive behaviour, namely the Leviathan (Hobbes 1962, as cited in Mielke forthcoming). Indeed, within the social sciences, the problem of order has been discussed primarily under two conceptions (Mielke forthcoming): the first one refers to the normative concept of order commonly defined as the opposite of chaos, disorder and fuzziness and describing a certain status, second is the constructivist conception of order whereby it forms the basis of the cognitive level of the observer's minds and hence denotes the subjective meanings.

The Indonesian science system, particularly higher education, has been characterised as having liberalism without order (Nugroho 2012), due to the strong administrative emphasis on research projects (a process which I later characterise as a bureaucratisation process as explicated in chapters three, seven and eight). The question is, what drives and perpetuates it to work? This is where the question of order enters the picture. I look at state science policy in the context of order as a lens to 1) explain what drives the working of the science system, how things are assembled in practices, and 2) examine how the state materialises itself (in terms of the written norms of the science policy) in the control of resources (i.e. research funding, knowledge workers).¹⁶ I conceptualise the ordering of the science system into three facets: the *normative facet*, which are the written norms (the regulatory framework) steering knowledge in Indonesia; the *social facet*, which deals with the practices of the actors¹⁷ in competing and/or collaborating in the science system; and the *regional facet*, which observes the progression of decentralisation in the

¹⁶ My approach thus differs from Mielke in her conceptualisation of social order (see Mielke forthcoming, Mielke Schetter et al. 2011). She suggests that the 'structuring and structured character of social order is determined by the interoperation of institutionalised practices ('institutions') and cognitive factors, which can make up a certain 'worldview' (Mielke forthcoming: 11). The underpinning assumption is that human interactions are the empirical focal point in the social order, the 'institutions' and 'worldview' are both mutually dependent on each other and enforcing. I do take insight from the human interactions when looking at policy practices, but I differ in that I look at the state as materialised in the norms (written ones) in this case written science policy.

¹⁷ In this regard I restrict actors to policymakers, researchers and engineers in the Indonesian science system. See chapter three for this analysis.

Bekasi District. These interrelated facets are discussed respectively in chapter three and chapter four.

b. Knowledge-based Cluster & Industrialisation

How knowledge is controlled in the industrial cluster level will be the second entry point of understanding how knowledge is governed. I provide a discussion about why companies cluster, a brief review of the study of industrial clusters in Southeast Asia, and then move on to the industrial cluster development as well as industrialisation in Indonesia. I specifically focus on industrial cluster studies in the Bekasi-Karawang area, as this research is primarily located in Bekasi District, Indonesia. The concept of the knowledge cluster is used to observe the linkages of knowledge flow in the cluster level, as well as the industrial R&D capacity of the cluster. This study explicitly focuses on the manufacturing sector¹⁸ when discussing industrialisation.

Why do companies cluster despite the increasing use of the information communication technology (Evers 2008) and as the world becomes increasingly borderless (Ohmae 1990)? One reason is that innovation might arise from the geographical clustering activity (Asheim and Gertler 2006). Innovation may be conceptualised as a complex, interactive and non-linear learning process (Lundvall and Johnson 1994; Isaksen 2001). It may be an output of the interaction between different firms or organisational units with different complementary knowledge and competencies (Nooteboom 2003). One angle from which to look at the performance of cluster in terms of innovation is by observing the process and patterns of sharing and the exchange of knowledge. Knowledge exchange either by the means of technology spillover, the mobility of human capital or informal exchange would be critical in defining the functioning of the regional cluster (Tallman, Jenkins et al. 2004). The typology of knowledge transferred in the cluster is not only confined to patent (Zucker and Darby 1996) or trade patterns (Feldman 1999), but also tacit knowledge. This transfer of tacit knowledge requires face-to-face interaction (Howells 2002; Morgan 2004; Asheim and Gertler 2006; Evers 2008).

Geographical proximity and location are contended to be further reasons why industries cluster or agglomerate, as transaction costs are low within a cluster (Sonobe and Keijiro 2006; Rianto, Zulhamdani et al. 2009). Being located in an industrial estate as well as being in close propinquity with the customer companies may reduce the various costs and enhance the mobility of manpower. In the former, the industrial estates partake in providing services, as well as ensuring that some of the uncertainty in the production process is reduced. This includes ensuring the secure appropriation of land certificates, the establishment of factory buildings, and the construction of roads within the estate. In the latter, this mobility enables an individual expert to

¹⁸ I refer specifically to the automotive sector when discussing manufacturing sector in this thesis.

travel from the automaker factory to the supplier company's shop floor in order to check or engage in any problem solving activities of their supplier companies.

I will now shift the discussion to the Southeast Asian industrial cluster development. The industrial cluster emergence in Vietnam appears to be clearly influenced by the availability of access to land and the search for nearby infrastructure (Appold and Nguyen 2009; Nguyen 2009). The scientific community in Vietnam is typified by bureaucratic knowledge sharing and a high culture of secrecy, which proves to be a barrier to an emerging knowledge cluster in Ho Chi Minh and Mekong Delta (Evers and Bauer 2009). Thailand developed a different cluster concept, namely the classical-community based cluster that is geographically defined, and the cluster of high tech industries that appear detached from the geographical-historical dimension (Gutty, Figuiere et al. 2009; Intarakumnerd 2009). The development of the Cyberjaya cluster in Malaysia follows a different logic, with the physical development appearing to favour the elites. In contrast, the knowledge flow does not follow 'polycentric' physical development, instead following a core-periphery logic (Nordin 2012). In this core-periphery distinction, universities located in Cyberjaya are in the periphery, whilst the large industries are at the core.

The growth and proliferation of industrial clusters in Indonesia is a 'natural' response to the rise of capital flowing in from foreign investment (Dahrul and Raybould 2011). A designated area of this industrial agglomeration is then managed by an industrial estate company in Indonesia, offering plots of areas to be sold and services provided to tenants, i.e. companies located in the industrial estate. These patterns of selling plots and providing services are shown in Table 2.1.

Table 2. 1 Industrial Land Prices & Maintenance Costs in Areas Near the Capital of Jakarta in 2008

INDUSTRIAL LAND PRICES AND MAINTENANCE COST						
REGION	LAND PRICE (/SQ M)			MAINTENANCE COST (/SQ M/MONTH)		
	LOWEST	HIGHEST	AVERAGE (Rp)	LOWEST	HIGHEST	AVERAGE (Rp)
Bekasi	Rp 400,000	Rp 750,000	Rp 597,905	US\$ 0.05	US\$ 0.07	Rp 592
Karawang	Rp 300,000	US\$ 50.00	Rp 379,753	US\$ 0.05	US\$ 0.06	Rp 489
Bogor	US\$45.00	Rp 650,000	Rp 580,923	US\$ 0.06	Rp 600	Rp 566
Serang	Rp 300,000	Rp 500,000	Rp 461,421	Rp 220	Rp 300	Rp 269
Tangerang	Rp 600,000	Rp 1.26 mill	Rp 614,769	US\$ 0.04	Rp 1,000	Rp 530

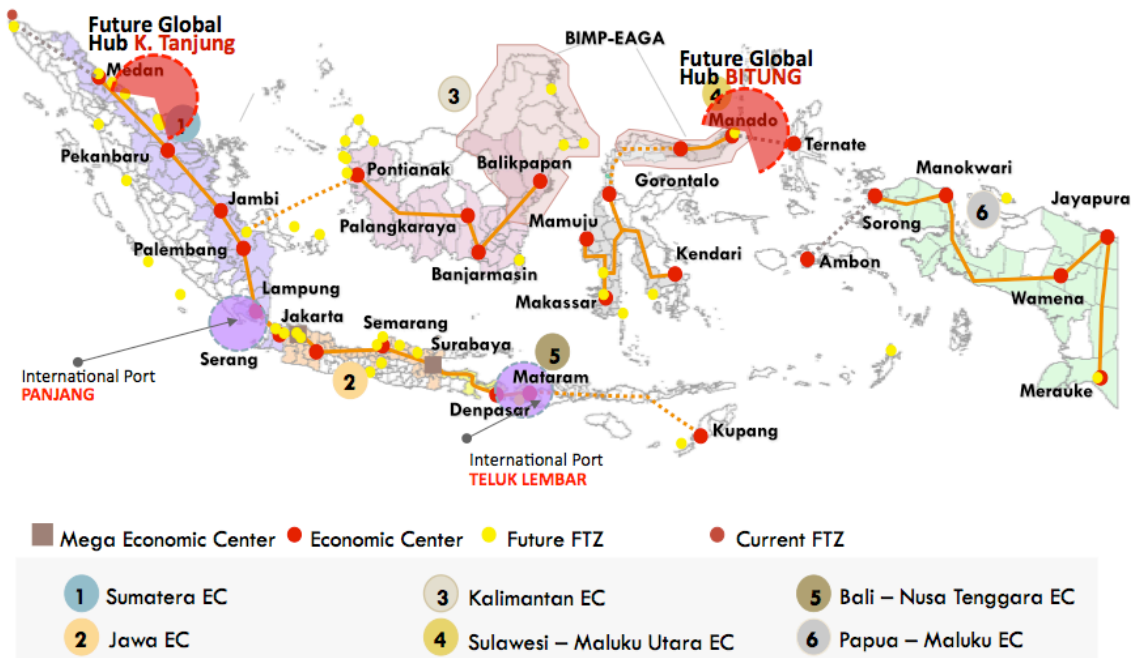
(Colliers 2008)

The small companies are normally peripheral in this area, as they are not formal members in terms of location, but are located close to the formal cluster as delineated by the industrial estate. Also, they cannot afford to pay the maintenance costs and services charged by these large industrial

estate companies. The formation of these industrial clusters, consequently, is not driven by the development planning of the district, province or central government of Indonesia. Thus the distinction made by Gordon and McCann (2000) between pure agglomeration, the industrial-complex model and the social-network model do not capture the formation of industrial clusters in Indonesia. Instead, it is a crosscutting combination of industrial agglomeration, privatised by an industrial estate managed by companies (or cluster developers). Lands in areas surrounding the industrial estate are appropriated to be sold to companies later on. This is visible in the industrial clusters located in Bekasi District.

The next question would be how does this industrial cluster, which may be formed as a process of agglomeration, take knowledge as capital; what is the knowledge base and knowledge flow existing in this cluster? Knowledge as capital is still a relevant scholarly inquiry in cluster studies in developing countries, in this case in Indonesia. Most parent companies are located in the north or developed countries, yet the companies in the south are mainly suppliers within the global supply chain. Bearing this in mind, how do the companies located in the cluster (in Indonesia) internalise knowledge towards the aim of upgrading (Humphrey and Schmitz 2002; Humphrey 2004; Purwaningrum, Beckhanov et al. 2010)? Upgrading thus denotes the importance of acquiring knowledge (Purwaningrum, Beckhanov et al. 2010), allowing the companies to move up the ladder of the supply chain and export in the global market.

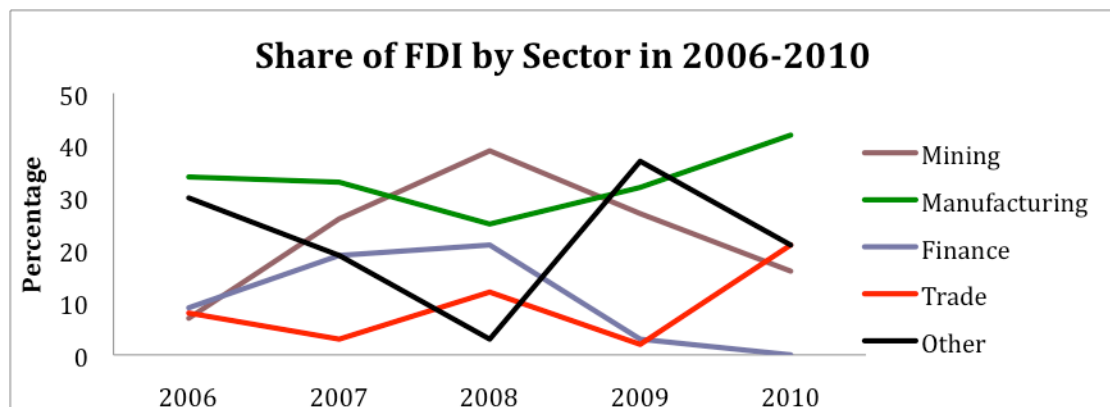
Industrial cluster development in Indonesia is inseparable from the process of industrialisation. The manufacturing sector (which is part of the industrial sector in Indonesia) is still largely built on cheap labour and natural resources (Wie and Negara 2010). The industrial development plan sketched out in the Economic Development Master Plan 2011-2025 indicates the reliance on natural resources for economic development for economic corridors in Sumatera, Kalimantan, Sulawesi and Papua. Java remained an exception with an orientation of industrial planning geared towards services and national industry (Menko-Perekonomian 2011). This is shown in Map 2.1.



(Menko-Perekonomian 2011)

Map 2. 1 Economic Corridors in Indonesia’s Economic Development Master Plan

Foreign and domestic capitals both play a role in terms of investment in the industrial sector. Domestic capital in 2010, as shown by the data in BKPM, was IDR 60.626 billion (ca USD 6,5 million) for 875 projects in the primary, secondary and tertiary industries. Foreign capital, i.e. Foreign Direct Investment (FDI), in 2010 brought 3,081 projects in the primary, secondary and tertiary industries, totalling a sum of USD 16.214 million investment (BKPM 2010a; BKPM 2010b). The share of FDI per industrial sector has fluctuated in the past five years, as depicted in Figure 2.1.



(Manning and Purnagunawan 2011)¹⁹

Figure 2. 1 Share of FDI in Indonesia by Sector in 2006-2010

¹⁹ Data from Bank of Indonesia (see Manning and Purnagunawan 2011).

The flow of FDI pushed *inter alia* the growth of investment in manufacturing as indicated in the Figure 2.1. The current investment law²⁰ in Indonesia allows full ownership up to a 100% share of industrial entities through FDI. Thus, although the BKPM data does not present the names of the companies, it is likely that the projects funded via the FDI capital and the share brought in the industrial structure would integrate them as part of the global production network. The latest data by BKPM in January-March 2011 indicates the uneven distribution in the location of FDI projects. The location of capital is concentrated in the West Java and Jakarta Metropolitan Region. These two regions account for 45% of the top five projects in January-March 2011. The influx of capital has increased the agglomeration of industries located in industrial estates (Irawati 2008; Kuncoro and Wahyuni 2009; Dahrul and Raybould 2011), particularly the urban area of the Jakarta Metropolitan Region. Hence, the manufacturing industries in the industrial cluster in Indonesia would likely be part of the global production network.

Wie, for instance, has reviewed whether FDI has been an effective channel for the transfer and dissemination of product knowledge and technological process to local firms in regions of Indonesia (Wie 2001; Wie 2005). His analysis suggests that Indonesia has not yielded success in utilising FDI to promote the local industrial and technological capabilities.²¹ Indonesia has embarked on the path of industrialisation by importing knowledge (brought in from this FDI) rather than developing the requisite knowledge base (HAQ 2003; Wie 2005). These studies might reflect the reality of knowledge flow processes in the manufacturing sector.

Indonesia's industrialisation has not been a smooth process, especially in terms of human capital. To start with, Indonesia was a latecomer to the industrialisation process (Wie 1999; Wie 2001; Aswicahyono, Hill et al. 2011). In the past there was a distorted policy changing from a hostile stance towards FDI in the 1950s, to a liberal approach in the 1980s (Wie 2001). Furthermore, a strong workforce is predicted for the period 2010-2020, which, according to one of the DIKTP's Director, is a bonus of the productive age of the demographic conditions in Indonesia (personal communication, Bonn, 10.03.2012). However, in 2010, 50.4% of Indonesian workers had a background in education merely at the elementary level (personal communication with one of the Directors of DIKTI, Bonn, 10.03.2012). The manpower at the R&D in the manufacturing industries in Indonesia is 61% composed of Vocational High School or Polytechnic (SMK/D3) graduates. Undergraduate level graduates make up 37%, with the remainder at postgraduate level

²⁰ This is evident in the Act No. 25 year 2007 on Investment (*Penanaman Modal*), Presidential Regulation No. 77 Year 2007 *Juncto* Presidential Regulation No. 111 Year 2007 on Negative List of Ownership.

²¹ According to Wie (2001: 592) Indonesia's lack of success in taking advantage of FDI is attributable to the following factors: high facilitation payments required to realise an FDI project; the steep costs for infrastructure services and in leasing land; the cumbersome process of approval as well as minimum transparency; not taking a more pro-active stance in bringing in the FDI that Indonesia needs to strengthen the industrial technological base; and the existing lack of skillful labour force.

(Grace 2010). This workforce is large in quantity, yet unfortunately not so in terms of the quality of education. Finally, the process was not at ease due to the issue of patronage and the economic-political interests of key state managers, large domestic business capitalists, and state political bureaucrats (Robison 1988), which in the past formed a part of the authoritarian regime.

The challenge faced by industries in Indonesia to access the global market is evident in the export and import activities of industries between the years 2006-2010 (see Figure 2.2). The top three sectors in this period making up a greater proportion of non-oil and gas importing activities were steel, metal and automotive related industries, at 42.74%. Second were electronic industries, with 14.02%, and basic chemicals representing 11.31% (Pusdatin 2010). The non-oil and gas exporting activities are in reverse to this, whereby the exporting of natural resources (namely coconut and palm for processing) marks the main propellers of economic activity.



(Pusdatin 2010)

Figure 2. 2 Export of Goods in Indonesia in 2006-2010

Figure 2.2 depicts that although the manufacturing sector revived in 2011 (Manning and Purnagunawan 2011), it is still relatively restricted from accessing the world market through exporting. Furthermore, it indicates its reliance on natural resources and the challenges faced in the restrained knowledge base of the industries. However, reasoning based on statistical inferences should be treated with caution, with particular empirical observation of the knowledge base at the regional level, such as in the industrial clusters in Indonesia.

Studies of industrial clusters in Indonesia have shown them to be mainly located on Java Island (Kuncoro 2002; Tambunan 2005; Kuncoro and Wahyuni 2009). This concentration of

manufacturing activities is driven by access to export nodes, better access due to the availability of infrastructure, historical patterns and the centralisation of financial and governmental organisations (Henderson and Kuncoro 1996; Kuncoro 2002). However, these scholarly investigations have a different standing from their disciplines in the study of clusters.

The first standing is the perusal of clustering from the viewpoint of urban planning (Prabatmodjo and Micklin 1991; Firman 2009; Hudalah and Firman 2011). Hudalah and Firman (2011) aim to explore whether urban transformation and industrial development on the outskirts of the urban area of Jakarta has been successful in creating new urban centres. Based on their analysis of the Jababeka Industrial Cluster development, they illustrate how there is no adequate government planning, in addition to the societal divide reflected in the physical fragmentation between industrial clusters. Furthermore, as the core of the metropolitan region, Jakarta can no longer handle the global competition inviting and capturing the flow of FDI (Hudalah and Firman 2011).

The second standing is the study of SME (small and medium enterprise) clusters, which are mainly located in rural Java (Sato 2000; Sandee and Rietveld 2001; Tambunan 2008; Tambunan 2009; Ismalina 2011; Tambunan 2011). For example, Tambunan²² looked at the existence of inter-firm linkages in the metalworking cluster in Tegal, Java. The producers in this cluster have a long tradition of cooperation in production, as well as marketing and the procurement of materials. The personal networks, which at times are conditioned by competition, facilitate knowledge sharing (Tambunan 2011). Ismalina's empirical work in the three rural clusters in the Yogyakarta Province suggests that transactions in clusters are not solely mediated through market mechanisms, but are also based on the social tie of trust and reciprocity. This simultaneity of market relations and embeddedness has a positive and vital impact on the industry's performance (Ismalina 2011). Such works on SME clusters also cemented the possibility that even clusters in rural areas have an element of self-organising capacity.

The third standing is the examination of industrial clusters from an econometrics perspective (Henderson and Kuncoro 1996; Kuncoro 2002; Sjoberg and Sjoholm 2004; Kuncoro 2007; Kuncoro and Wahyuni 2009). By using the data of BPS in the years 1980, 1991 and 1996, Sjoberg and Sjoholm (2004) illustrate how trade liberalisation does not decrease the concentration of manufacturing. Kuncoro (2002) observes the pull of agglomeration and spatial concentration in Java using pooled time series and panel data by using the BPS data from 1976-1995. His analysis

²² Tambunan (2009) differentiates four types of clusters in Indonesia: the first type is *artisanal*, showing that the process of clustering is still at an 'infant' stage. The second type is *active*, indicating that it has developed rapidly in terms of skills improvement, technological upgrading, and the relatively successful penetration of domestic and export markets. The third type is *dynamic*, indicating the essential role of leading firms, typically those larger and faster growing, to manage a large and differentiated set of relationships between firms and institutions within and outside the clusters. The fourth type is more advanced, developed and complex than the previous types (2009:41).

demonstrates, *inter alia*, that the manufacturing companies tend to seek a location in a densely populated area to attain efficiency through localisation and urbanisation. His work further provides an empirical contribution, that the structure of market in Java tend to obstruct competition, thus providing the pull for companies to agglomerate (Kuncoro 2002; Kuncoro 2007). The contribution of this work is significant in terms of nation-state or macro level analysis showing pulls of agglomeration remain ever strong in Java. However, analysis of the inter-firm linkages between industries and other organisations at the meso and micro level of analysis is beyond the ambit of this mode of review.

The study of industrial cluster (as explicated in chapter five and six) is located in the Bekasi district. There have been scholarly inquiries in this district (in addition to the Karawang area) focusing on industrial clusters as well as supply chains. One prominent study was carried out by the Bandung Technology Institute on the Programme of Added Value for Production Supply Chain through the Development of an Integrated Zone (ITB 2010), with a second study being conducted by the BPPT team on Small and Medium Enterprises Outsourcing for an Industrial Cluster. A third study was carried out by Irawati, focusing on the knowledge transfer of two automotive companies (Honda and Toyota) located respectively in Karawang and West Java (Irawati 2008; Irawati 2010). The focus of each of these studies is different, despite the fact that they concentrated on the same issue of industrial cluster development.

In regards to the first study, i.e. the ITB baseline study (2010), it focused on supply chain linkages between small and medium enterprises (SMEs) located outside or inside the cluster with industries in the first tier. They understand the term 'cluster' as a privately managed industrial estate. They argued that there is potential for these suppliers in the automotive sector to develop linkages in the supply chain, either in the form of input-output, supporting components or services (2010: IV, 20-21). This is in contrast with the electronics sector, from which most of the components are exported. However, knowledge is dealt with in a minimal manner in terms of the qualification of human resources, and capital is viewed purely as financial capital (2010: VI-3).

The second study of the outsourcing region conducted by the BPPT team was halted in August 2010 before its completion, but focused on supply chain mapping and intended to produce an outsource map for the SME industrial cluster that was formally included in the legal prescription of Government of Indonesia Regulation No. 24 Year 2009 on Industrial Cluster (Observation, Cikarang, 24.06.2010).

The third study carried out by Irawati focused on the knowledge transfer process within Toyota and Honda (Irawati and Charles 2010; Irawati 2012), and the influence of Japanese *keiretsu* in the

development of cluster. The work finds, *inter alia*, that spatial proximity does harness interaction, as this spatial proximity enables the Just In Time/JIT in Toyota *keiretsu* to be more effective and cost efficient (Irawati 2008; Irawati and Charles 2010).²³ Herein, knowledge being transferred is regarded in terms of modernisation skills and experience relating to method of standardised production (Irawati 2008). From the activities of knowledge transfer, this view, however, does not explain the learning process and knowledge absorption, nor does it explain the knowledge internalisation of the supplier industries (which is located in tier one supplying these Japanese automotive industries, and the tier two supplying to tier one companies). The Japanese *keiretsu* promotes interaction between Honda and Toyota, with each of their suppliers leading to that of an automotive cluster (Irawati and Charles 2010). The research is limited to answering the question of how knowledge is produced and transferred for companies in the supply chain linkage but outside of the Japanese *keiretsu*, and whether proximity²⁴ fosters interaction for knowledge sharing between the companies outside or within the Japanese *keiretsu*.

The exercise of the cluster studies in Indonesia has thus been enriched by the contribution of different academic disciplines. However, this becomes contentious when one is looking at the possibility of observing the horizontal linkage between different organisations such as academia-industry that are beyond the scope of cluster analysis. Therefore, in order to come to grips with this issue one has to deal with the concept of space (or proximity). Scholars have argued that geographical proximity in itself is not the sole requirement or a necessity for learning to materialise and distinct modes of proximity can be taken into account (Boschma 2005; Torre and A 2005; Bocquet and Coraline 2010). The exchange of tacit knowledge, for instance, requires face-to-face interaction (Howells 2002; Morgan 2004; Asheim and Gertler 2006; Evers 2008), thus reifying the importance of spatial proximity.

The term 'cluster' or 'estate' used in this study does not consider the administrative scale as defined by the government, nor the normative boundary set by the industrial estate company that would typically manage a cluster in Indonesia. Cluster itself should be subject to empirical research (Schmitz 1999). Moreover, the notion of whether knowledge is exchanged at ease in this cluster should be verified by empirical work (Evers 2011). *The term industrial cluster in this study will refer to the industrial agglomeration in a (bounded)²⁵ geographical space.*

²³ The topic is approached from an economic geography and international business perspective, and it essentially provides 'a view from above' of how two Japanese automotive industries transfer their knowledge in relation to learn manufacturing and production related tools.

²⁴ In the work of knowledge transfer in the Honda and Toyota supply chain in Indonesia, Irawati argues that spatial proximity is vital for knowledge transfer (Personal communication, 28.12.2010). I refer specifically to the notion of space and scale that will have an implication for how proximity is conceptualised by the actors.

²⁵ The term 'bounded' is used to refer to the limit of the research area of Jababeka Industrial Cluster. The research area includes Jababeka Phase I, Jababeka Phase II, *Ruko Bernang* area, and Jababeka Education Park. For the general description of the cluster see chapter five part b.

This study will look at the trajectory from industrial agglomeration to a knowledge cluster. Knowledge clusters can be conceptually defined as: “agglomerations of organisations that are production oriented in which their production is primarily directed to knowledge as output-input” (Evers 2008; Evers 2011; Menkhoff, Evers et al. 2011). I utilise this concept in chapters five and six of this thesis by examining: 1) the industrial R&D capacity of the cluster,²⁶ and 2) the knowledge flow in the industrial cluster²⁷. My approach²⁸ is thus aimed at the question of what are the realistic mixtures of organisations (namely industries and academia) in emerging knowledge clusters to enable knowledge flow and provide a robust knowledge base? The question thus includes the typology of knowledge produced by academia and/or industries, also including whether knowledge tied to social interaction is treated in a restricted manner and/or whether embedded social relations play a role in the knowledge exchange process.

c. Knowledge Flow between Academia-Industry-Government

The third level of inquiry of the knowledge governance question lies in the organisational change faced by academia in Indonesia. I discussed this in this chapter in the context of knowledge production, knowledge sharing and knowledge flow between academia-industry-government, the historical backdrop of academia in Indonesia, the recent ‘triple helix’ scholarly work in Indonesia and the framework of organisational analysis. It should be noted that this research takes inspiration from the ‘triple helix’ as it observes knowledge production, sharing and flow between academia-industry-government. However, as I will later show in this chapter as well as chapter eight, I intend to distance myself from (and towards the end refute against) the social system theory analysis. I did this by incorporating the notion of structure and agency (as elucidated in the analytical framework of this chapter) as well as the two prongs of engagement in the organisational level of analysis.

The involvement of the private sector, i.e. industries for public sector research funding, can be traced back to the history of Kaiser Wilhelm Society in Germany, which was a precursor to the Max Planck Gesellschaft in the 1930s (see Heim 2005). The structure of the society broke with its convention and tradition, it is financially supported by the private and public sector (Max-Planck-Gesellschaft 2012). This move pioneered the academia-industry-government collaboration.

There are several approaches to observing the flow of knowledge between industry and academia, as well as the role of the government in facilitating this flow. The first approach is the ‘triple helix’; a model or metaphor for innovation to observe the knowledge sharing/exchange processes

²⁶ This is the analytical point of departure in chapter five.

²⁷ This is the analytical foci elaborated in chapter six.

²⁸ Consequently my approach differs from the previous analysis of knowledge cluster emergence in Ho Chi Minh and Mekong Delta, Vietnam (Evers and Bauer 2009, Bauer 2011), or in Cyberjaya, Malaysia (Nordin 2012).

and governance within a cluster. It is grounded in the separate academic, industrial and governmental spheres, and the knowledge flows among them. Helices that make up the boundary of academia, industry and government 'represent specialisation and codification in function systems which evolve from and within civil society' (Leydesdorff and Etzkowitz 2003). In triple helix I there is a specific historical condition whereby the nation-state encompasses academia, industry and thus controls the relations between them. The division of the institutional spheres between the three organisations includes the delineation of relations marked by the *laissez-faire* triple helix II. The triple helix III exhibits trilateral networks and hybrid organisations across the three organisations. There is an inception of knowledge infrastructure through overlap between the institutional areas, with each playing the role of the other with the creation of hybrid organisations at the tip of the interface (Leydesdorff and Etzkowitz 1998; Etzkowitz and Leydesdorff 2000; Leydesdorff and Meyer 2006).

The argument of the 'triple helix' is that academia can play an improved role in innovation within an increasingly knowledge-based society (Etzkowitz and Leydesdorff 2000; Etzkowitz and Zhou 2008). The authors of 'triple helix' theory focus on universities. The triple helix approach focuses on the network overlay of communications and expectations that restructure the institutional order between universities, industries and government agencies (Etzkowitz and Leydesdorff 2000). Thus, it is a biologically informed (Leydesdorff and Dubois 2004) communication process between university-industry-government, as well as an evolutionary model (Leydesdorff and Etzkowitz 1998). This theory draws heavily on the social system theory of Luhmann (1995). Limitations of this triple helix exist in observing history²⁹ and the micro level of social interaction that may play a role in knowledge production at the organisational level. Their approach is valuable, and warrants merit in informing that the linear process of transfer from origin to application is no longer considered as decisive (Leydesdorff and Etzkowitz 1998). Furthermore, as a research matter it opens up the possibility of a social system having a self-organising capacity beyond even government intervention or involvement.

Recent attempts have been made to expand the 'triple helix' theory to a 'quadruple helix' (Carayannis and Campbell 2009; Carayannis and Campbell 2010), adding that the fourth helix will represent media and culture-based public media/creative industries/culture and/or lifestyles. This quadruple helix refers to structures and processes of the *glocal* knowledge economy and society, resting on 'multi-level systems of knowledge' (Carayannis and Campbell 2009).³⁰ The

²⁹ As pointed out by Leydesdorff and Etzkowitz (1998), historical analysis is useful to the extent that one can reconstruct on the basis of existing comprehension how the actors included can learn to control the prevailing contingencies. They then argue that 'evolutionary models do not focus on the historical contexts *per se*, but rather on the operation of the emerging systems of innovation'.

³⁰ There exist two axes, the spatial axis that works in differing levels of spatial aggregation and non spatial geographic metaphors, namely of education and research (Carayannis and Campbell 2009: 214).

validity and possible (re-) construction of both the triple helix and quadruple helix theory, however, should be subjected to empirical investigation.

The second approach is the notion of Mode 1 and Mode 2 forms of knowledge production (Gibbons, Limoges et al. 1994). Mode 1 consists of the traditional disciplinary scholarship of discipline-based knowledge production, carrying a distinction of what is fundamental and applied. Knowledge being produced is authenticated through the sanction of a clearly defined community of experts/specialists in accordance with their discipline (1994: 22). In Mode 2 there is a movement beyond the structure delineated by the boundary of the discipline within the constitution of intellectual agenda. This includes the manner in which resources are utilised, the means by which research is organised, communication and the evaluation of the result (Gibbons, Limoges et al. 1994).

In the dynamics of the Mode 2 knowledge production increasingly there are individuals involved in the genesis of knowledge who remain socially distributed (Gibbons, Limoges et al. 1994: 11-14). Thus the process of heterogeneous growth of knowledge exists, where communication assumes a central role. There is also the breaking down of older delineation lines and the separation, for example, between universities and industry. The combination of norms and values in different parts of society is an element of the process of diffusion. This also enables further communication by the manufacturing of similar culture and language. Hybridisation³¹ is highlighted by Gibbons et al. as an example of an output of Mode 2 knowledge production. The argument proposed by Gibbons et al. is that the parallel expansion of potential knowledge producers combined with the growing requirements of specialist knowledge are producing conditions for the birth of a new mode of knowledge production. However, there are criticisms of the distinction between Mode 1 and Mode 2, with Fuller arguing that these two modes of knowledge production are ‘virtually joined at the hip of birth’ (Fuller 2000; Scott and Harding 2007).

Before discussing the Mode 1 or Mode 2 knowledge production in Indonesia, it is essential to consider the historical backdrop of Indonesian higher education organisations. It transcends the pre-colonial and Dutch colonial eras, the Japanese occupation and the post-independent era (Buchori and Malik 2004). Pre-colonial Indonesia was characterised by non-formal, less structured, Islamic education. Formal higher education was developed in the Dutch colonial era to fulfil the requisite need for the professional human capital of the colonial administration. The focus was oriented more towards training than academic research. When the Japanese took over

³¹ This hybridisation can be seen as “the emergence of new hybrid communities, consisting of people working who have been socialised in different subsystems, disciplines, or working environments, but who subsequently learn different styles of thought, modes of behaviour, knowledge and social competence that originally they did not possess” (Gibbons et al. 1994: 37)

the stratified school system was eliminated, with degradation in overall quality and school participation.³² After independence, limited infrastructure, the poor quality of academic staff, rapid expansion and the nationalisation of the education system represented additional pressures for the education system in the 1950s (Buchori and Malik 2004). The concept of *Tri Dharma* for higher education was also introduced post-independence (Buchori and Malik 2004). Indonesia has a dualistic educational and science system, with the Ministry of National Education managing general education and the Ministry of Religious Affairs (*Departemen Agama*) controlling Islamic higher education (Kinoshita 2009). Additionally, governmental research institutes exist, including the Indonesian Institute of Sciences/LIPI (formerly LEKNAS) and the Agency for the Assessment and Application of Technology (BPPT), which has a coordination link with the Ministry of Research and Technology (RISTEK). There have recently been an increasing number of R&D units (BALITBANG) at the Ministry level, and therefore the key players in knowledge producing organisations are R&D institutes/units and universities.

Research on this ‘triple helix’ in Indonesia seems to neglect knowledge as an outcome of social processes and the culture of knowledge production, treating both as a side effect of technological progress or innovation (see for example the work of Zulhamdani, Laksani et al. 2009). Even if knowledge is taken up from the ‘triple-helix’ collaboration such as the study of academia-business-government collaboration in the Bandung Knowledge Innovation Zone (Tjakraatmadja, Martini et al. 2008), the emphasis would be on knowledge management. Yuliar and Syamwil (2008) looked at Bandung Technology Institute and Satya Wacana Christian University, focusing on how the members of the faculty responded to the policy alteration of a more ‘economically driven steering mechanism’ of autonomous universities. The examination provides hints as to how universities internally respond to the liberalisation, in this case how they respond to the market system. In addition, Beerkens’ analysis (2010) showed that, among other factors, low knowledge demands from the private sector affect the lack of opportunities for industry and academia cooperation in Indonesia. From an angle of political economy, Nugroho (2005) demonstrated how the pressure of markets on higher education in Indonesia may have had a detrimental impact, possibly leading to an intellectual involution. However, such studies do not provide an adequate answer as to whether and how a university is connected to a locality (i.e. cluster), the modes of knowledge exchange with industry, and under which typicality of space, i.e. geographical and/or social space, knowledge is being exchanged between academia-industry.

Polytechnics, which are a part of academia, have been overlooked in most scientific work in Indonesia. There is a great emphasis on universities as organisations within the sphere of higher education (see for example Tjakraatmadja, Martini et al. 2008; Yuliar and Syamwil 2008).

³² This is due to the prohibition of Dutch (language based) books, which destroy the modern source of knowledge as well as imposing political surveillance on the teachers and intellectuals (Buchori and Malik 2004: 254).

Discussion of vocational education in Indonesia has been relatively limited in explaining the process of knowledge production, sharing and knowledge exchange with industries. Tilak (2002), in reviewing the progress of the vocational academic system in Asia, argued that Indonesia (along with other countries, namely Malaysia, Philippines, Thailand and Sri Lanka) has ‘moderately developed’ vocational and technical academic systems. There is, however, a lack of prestige attached to vocational education in Indonesia, among other countries. It is regarded as second-class and may imply a less significant class or lower caste, taking away chances in academia as well as access to work with more status and better pay (Tilak 2002). Yet this study focuses more on access to academic and curriculum building than knowledge management and linkages with external organisations. Recent work on ‘triple helix’ and science and technology assessment in Indonesia did observe vocational academia. An assessment of the Solo Techno Park in Indonesia showed that the ATMI Polytechnic in Solo initiated the Surakarta Competency Technology Center (SCTC), which satisfies the human resource training requirements of industries (Rianto, Zulhamdani et al. 2009). It started with the SCTC in 2003, and then expanded to the concept of a Techno Park (Triatmoko 2009). The techno park was initiated by the ATMI Polytechnic Solo in cooperation with the City Government, Central Government and business sectors (Triatmoko 2009). In addition, the *Fraunhofer Gesellschaft* and RISTEK study in 2002 provides a macro overview of the Indonesian Academic and Training System, including a brief assessment of the vocational education (Schoen, Muenkel et al. 2002).³³

Thus I have shown that the aforesaid studies discussing ‘triple helix’ specifically university and polytechnic’s knowledge exchange with industry in Indonesia are lacking in empirically explaining the notion of knowledge as an outcome of social processes and epistemic culture. It does not cast light on how academia is linked with a cluster and how it responds towards space, especially taking into account the academia and industry collaboration. Despite this at the outset, there are an increasing number of knowledge-producing organisations in Indonesia, particularly in higher education in the year 2005-2010. This is shown in Figure 2.3.

³³ It stated the challenge of implementing dual apprenticeship training, which was initiated by the Ministry of Manpower (MoM) and German Technical Cooperation (GTZ) in 1994, was due to the refusal of industries to cooperate with MoM.

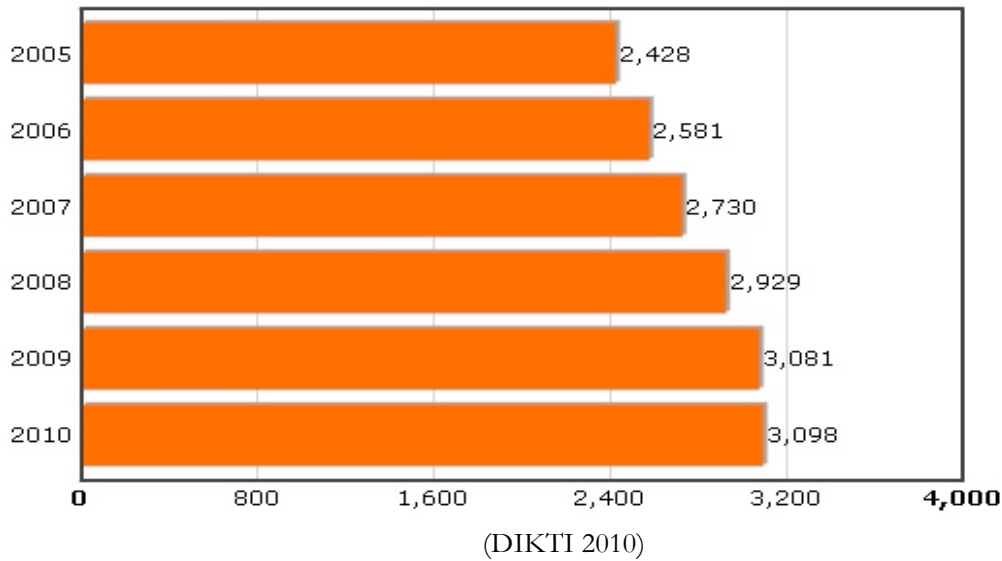


Figure 2. 3 The Growth of Higher Education Institutions in Indonesia

It remains subject to debate whether the increasing number of knowledge-producing organisations in Indonesia (as indicated in Figure 2.3) brings a strong knowledge base to an industrial cluster. This analysis requires two prongs of engagement in order to exercise distance from the system theory (in the ‘triple helix’ conceptualisation). The *first prong* is the analysis of the epistemic culture (Knorr-Cetina 1999) of the organisation itself, *how it produces and shares knowledge, and how the existing social structure of the organisation governs such production*. This level of micro-sociology approach has been criticised as an ‘internalist history of company’ (Weingart 1988). However, it does not and should not stop there. The *second prong* is *how academia responds to the reconfigurations of the notion of space and scale* as one of the main propellers of socioeconomic transformation (Perry and Harloe 2007). This translates in the field to the notion of not only geographical space, but also the social and cultural space that actors in industries enact to foster the knowledge exchange processes.

The roles of academia (particularly universities and polytechnic) in knowledge production, knowledge exchange with industries, as well as the organisational changes they face, are discussed in chapters seven and eight.

d. Key Terms Defined

I will define the key terms used throughout the thesis before proceeding to the overall framework of analysis.

Academia-Industry

Academia is used as a technical term referring to knowledge-producing organisations in the Indonesian science system. This term includes universities, R&D institutes and polytechnics. Industry itself will be used in the context of manufacturing industries, specifically automotive industries. Unless otherwise stated, the term industries will be limited to automotive supplier industries located in the Jababeka Industrial Cluster.

Knowledge

The term knowledge in this work refers to tacit knowledge and human capital. Tacit knowing as suggested by Polanyi encompasses: (i) valid knowledge of a problem, (ii) the scientist's capacity to pursue it, guided by his or her sense of approaching its solution, and (iii) for a valid anticipation of the yet indeterminate implications of the discovery arrived (Polanyi 2009: 24). The process of interaction between tacit and explicit knowledge is the origin of knowledge creation (Nonaka, Toyama et al. 2008). The term tacit knowledge will be utilised to refer to: 1) the tacit know-how pertaining to the process of manufacturing, 2) the set of techniques relating to organisational practices and routines, especially in implementing quality control and delivery (QCD) of parts produced³⁴ and 3) tacit knowledge related to the vocational education, in this case: "the know-how on techniques of processing and techniques of assembling" (Informal discussion, Cikarang, 01.02.2011). The typology of knowledge in this assembling area is similar to the work process knowledge, which is vital to the vocational education and training (Boreham 2002; Rauner 2007; Fischer 2011). The idea is to generate a real work environment in the production process for the students and at the same time for the process of production. Points 1) and 2) are associated with the tacit knowledge in the industry, whilst point 3) relates to the tacit knowledge in vocational education (which will be explicated in chapter seven).

Human capital plays a role in knowledge sharing (Chaminade and Vang 2008), apart from social capital (Chay, Menkhoff et al. 2005). In this thesis 'human capital' will incorporate the knowledge workers in the automotive supplier company and in academia. Knowledge workers or knowledge-based occupations are a worthy illustration of the embodiment of competence (Stehr and Meja 2005). Included within the knowledge workers conception is the construction of what makes an expert an expert in academia and the supplier industry. As the research is ethnographic, I focus on the day-to-day activity of the production of knowledge of the knowledge workers. In this thesis, I limit the term "knowledge workers" to the following notions: 1) the background of education for the knowledge workers both in the supplier industries and in academia are minimum at the high school level (i.e. either at the public high school or at the vocational high school), and 2) the

³⁴ These techniques may incorporate but are not restricted to the following: *kanban*, standardised work, production lining, *poka yoke*, just-in-time system, on the job training, engineering/expert visit, *heijunka* (Interview, Cikarang, 05.11.2010).

lecturers, researchers and instructors working in the academia in Indonesia.

Knowledge Sharing

Knowledge sharing itself may be defined as “individuals sharing organisationally relevant information, ideas, suggestions and expertise with one another” (Bartol and Srivastava 2002). As identified by Chay Menkhoff et al. (2005), both voluntary and involuntary knowledge sharing may occur between actors. Involuntary knowledge sharing may take place when there is enforcement mechanism through appraisals and incentive systems for employees to share knowledge, and the risk of not sharing knowledge might take the form of penalisation and difficulties in career progression (Chay, Menkhoff et al. 2005). Knowledge sharing in this thesis will be used to point out the process of knowledge sharing internally within an organisation.

Knowledge Exchange

When knowledge functions as a resource, the more strategic the knowledge becomes, the more likely it is not shared but rather exchanged in a *quid pro quo* nature (Cowan and Jonard 2004). In this thesis, however, the term exchange is used to designate the process of non-linear transfer of knowledge between organisations such as between academia and industry.

Horizontal and Vertical Linkage of Knowledge Flow

As an effort to investigate the capacity of the knowledge base of the cluster as well as the advantages of the industries being located in the cluster (Bathelt, Malmberg et al. 2004), I examine the linkages enabling the flow of knowledge. I distinguish two linkages in this examination, drawing from insights of scholarly work on industrial clusters (see Maskell 2001; Bathelt, Malmberg et al. 2004). The vertical linkage connects the industries that are ‘complementary and interlinked through a network of supplier, service and customer relations’ (Bathelt, Malmberg et al. 2004: 35-36). Conversely, in the horizontal linkage, the industries are engaged in ‘the process of learning and continuous improvement’ (Maskell 2001: 929). The necessity is that many industries engaging in similar activities are situated in conditions by co-locating whereby the industries can observe their counterparts continuously, in close distance and with hardly any cost or endeavour (Maskell 2001: 930). In this thesis, vertical linkage of knowledge flow will be used to allude to the supply chain linkage of the automotive sector. In the supply chain linkage, customer will be used to refer to the Japanese automakers, the first tier is the supplier companies providing parts for the customer, and the second tier is the supplier companies supplying parts to the first tier (and in some cases to the customer).³⁵ The horizontal linkage of knowledge flow will be utilised to refer to 1) the academia-industry collaboration, and 2) the embedded horizontal linkage between industries (or often termed as inter-firm linkage).

³⁵ There are also third tier companies supplying to the first tier and/or the second tier companies. These third tier companies are also part of the supply chain linkage.

Core-Periphery

The term core (or centre) and periphery is indeed a rather loose one and a better differentiation in the development areas would be useful (Friedmann 1963). Classical core-periphery concepts, models as well as indicators, are pushed almost predominantly by the cost of distance (Copus 2001). Core and periphery will be used as a terminology to specify firstly the (internal) spatial organisation of the industrial cluster, and secondly the control of knowledge as resource. The former relates more to physical geography, which is expounded in the analysis of the spatial distribution of companies in the Jababeka Industrial Cluster (respectively in chapter five). The latter relates more to social geography, which is analysed in terms of how the centres of power control knowledge (in chapters three and six). Specifically for the latter, I examine how science policy allocates and regulates resources for academia's knowledge production in the Indonesian science system. In addition, I analyse how tacit knowledge in the supply chain is controlled by the upstream level companies.

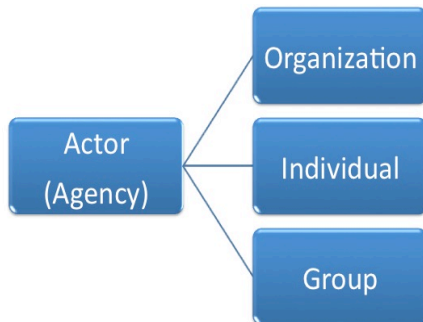
e. Analytical Framework

The overall research draws its analysis from a reflexive stance (Bourdieu and Wacquant 1992) in observing social interaction and action, following the actors on the shop floor or within academia. Apart from the quantitative analysis derived from descriptive statistics, I focus on day-to-day realities to tension as exhibited from the collaboration or competition that pattern the interaction. There are times when I ask the respondent or key informant why he/she opted for a certain action, such as participating in an informal meeting for production or having more than one name card, but by way of a response I occasionally did not get a satisfying answer, and sometimes just a nod. This is when I realised that using individuals as the only unit of analysis would not suffice. There are also groups in the sense of hybrid class formations (Evers 1980a) dictating the logic of resource allocation. Organisations such as polytechnics or research units can maintain their collectivity by acting as an 'agent' in the agency-structure. Thus, the key question is, if the social structure is fluid, unstable and may change over time, why should one continue to observe a stable unit of analysis? In this study I observe unit as being a social unit (Schwartzman 1989; Bourdieu and Wacquant 1992). My units of analysis are individuals, groups and organisations, which are referred to as 'actors' (see Figure 2.4).

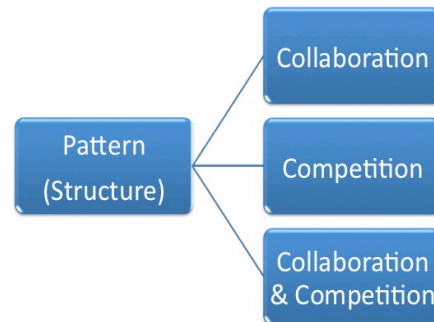
I frame my analysis in the continuum of agency-structure in sociology (for an illustration see Figure 2.4). Several scholars cemented the basis for this approach of the thesis. The work of Bourdieu (as conceptualised in *habitus*) helped me to make sense of the macro, micro and beyond the actor-oriented approach (see Long 2001). Evers' work in class formation, strategic group and loosely structured social systems provides an analytical facet for me to look at the possibility of

the birth of new elites, unmasking the rubrics of relationality between actors, and taking into account that the group may play a role in resource allocation. I reflect on their work after my fieldwork. Consequently, the term of actor and structure is utilised *ex post facto* during the analysis of the data. The notions of agency and structure are incorporated within this work, alluding to a different set of social units for the former and a set of patterns for the latter. This is shown in Figure 2.4.

On the notion of agency



On the notion of structure



Author's own construction (Derived from Bourdieu 1980; Evers 1980a; Bourdieu 2007)

Figure 2. 4 The Notion of Agency & The Notion of Structure

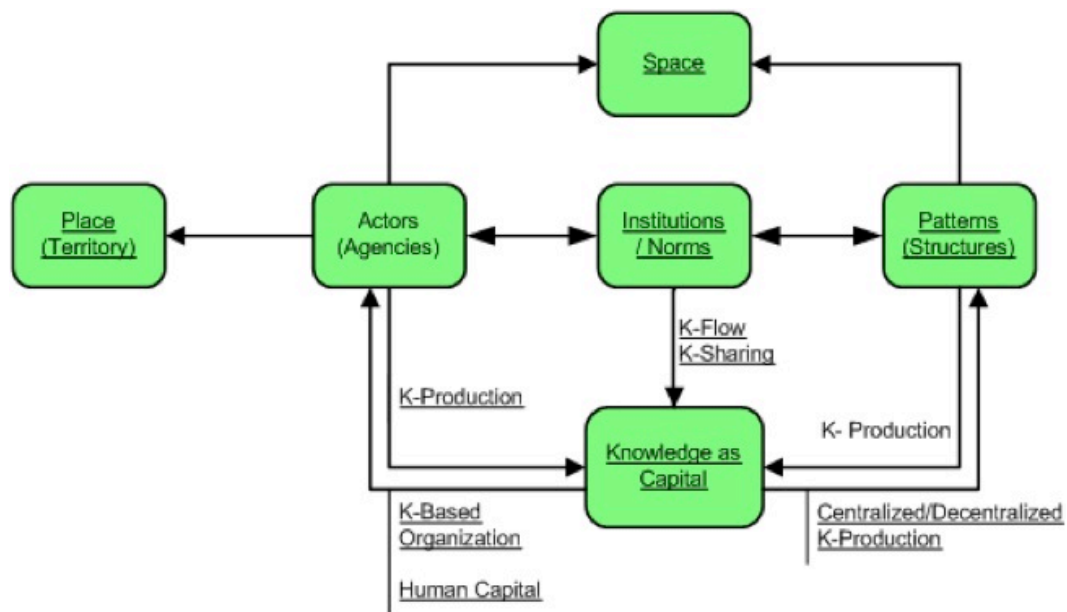
The term ‘actor’ may be broken down into three different units in this study: individual, group and organisation. When the site is the micro or in this case organisation, the individuals and group are the nuclei of analysis, sometimes exhibited through meetings. As the site changes to the cluster or meso level, then organisation is the unit, with the group remaining as a unit.³⁶ In the discussion of social structure Bourdieu (1980) looks at *habitus*, which are the ‘structure of relations between groups, the sexes or the generations, or between the social classes’. *Habitus*³⁷ can be understood as structured structure and structuring structure (Bourdieu 1980; Bourdieu 2007; Mielke, Schetter et al. 2011). This structure that acts as a guidance but is also reinforced in highly internalised practices, as underpinned in *habitus*, provides the basis for me to understand actions beyond economic motives. I look at the patterning *structure*³⁸ of collaboration, competition and the combination of both in appropriating knowledge as a capital. The term *system* (as used in the Indonesian science system) refers to the totality of the structure, to which this definition I derive

³⁶ Take the case of supplier companies that attached themselves to two groups; the group of companies that manage the company affiliates and the supplier group of a certain customer. This supplier group is loosely defined as the Honda or Toyota group. The supplier meetings organised by each of the customer companies reinforces the membership of this Honda or Toyota Group. The macro is grasped through meetings arranged by government organisations and interviews with individuals, apart from the reflection of findings of meso and micro.

³⁷ According to Bourdieu, *habitus* is the ‘principles that generate and organise practices and representations that can be objectively adapted to their outcomes without presupposing a conscious aiming at ends or an express mastery of the operations necessary in order to attain them’ (Bourdieu 1980: 57). *Habitus* provides a contextual and constitutive aspect to a norm or institution for actors. As stated by Bourdieu, ‘*habitus* is what enables the institution to attain full realisation’ (1980: 57).

³⁸ I also use social interactions to refer to the social structure, as a term I use these two interchangeably.

from the work of Giddens (1979). Thus from here I will move to the genesis of the framework, which is explained in Figure 2.5:



Author's own construction (Drawing insights from the work of Evers 1980a; Bourdieu 1989; Evers and Korff 2003; Meusburger 2008)

Figure 2. 5 Framework of Analysis

I look at the pattern of cooperation, competition or both in producing knowledge as practiced by the actors in various sites, with the interaction taking place in the period 2010-2011. The institutions or norms are produced and reproduced by both the structure and actors, which may in turn harness or restrain knowledge sharing at the organisational level, as well as knowledge flow at the cluster level. Actors also produce knowledge as encapsulated in scientific reports, publications, increasing numbers of students, patents, and tacit knowledge. In turn, these also shape the actors through knowledge-based organisations, often termed as learning organisations. The implementation of lean manufacturing at an organisational level makes the company more adept to changes, as indicated by being predisposed to learning. Individuals and groups embracing knowledge through activities such as on the job training, working experience or research activities would also benefit from an increased capacity. This is also the case with epistemic groups of quality control circles within supplier automotive companies, or community of practice in the project meeting for production process at the ATMI Polytechnic Cikarang.

Space is not stagnant, and it is different from location (coined as territory or place in Figure 2.5). A cluster may be located in the periphery of the urban area, such as the case of the Jababeka Industrial Cluster, but the flow of knowledge encompasses a different conceptualisation of space that facilitates the linkage. The existing pattern, even without the consciousness or active subjects

in regards to their conduct and interaction, produces a cultural space³⁹ (Meusburger 2008). This is based on a similar point of reference, including the use of languages such as Japanese, Sundanese or Javanese. On the contrary, when such consciousness of the actors is present in regards to the importance of geographical proximity, such as the case in the ‘nested cluster’ and entrepreneurial organisations, the geographical space is actively utilised. Social space⁴⁰ (Bourdieu 1985; Bourdieu 1989; Evers and Korff 2003) is created at the policy level, enabling coordination between actors based on alumnaeship or past work experience. This typology of space sometimes reinforces a patronage structure of coordination. The differing conceptualisations of space, actors, places, institutions, patterns of collaboration/competition and knowledge are sketched in the Table 2.2.⁴¹

³⁹ Meusburger’s (2008: 66-67) account of culture as a system that is not stable comprises signs and interpretations that also incorporate processes and take place in a constant motion. This occurs in an area that may act as an enclosure and thus exclude other groups. I differentiate between cultural and social space. Cultural space is manifested between actors with their active language usage ranging from Javanese, Japanese, or Sundanese. Hybridisation may be exhibited in the interaction and flow of information. The sign system for parts movement used is transplanted from the Japanese lean manufacturing system. The discussion accompanying the problem solving on the shop floor is in Japanese, and incorporated in the lean manufacturing. This exhibited a certain cultural space not defined by geographical proximity, but rather by the importance of face-to-face interaction or ‘being’ (i.e. the physical presence) in the sharing of knowledge.

⁴⁰ Bourdieu explains his conceptualisation of space in the theory of field or field of forces. Agents and group of agents are characterised by their relative positions within space. Field of forces is ‘a set of objective power relations that impose themselves on all who enter the field and that are irreducible to the intentions of the individual agents or even to the direct interaction among the agents’ (Bourdieu 1985: 724). Evers and Korff (2003) consider social space in the context of urbanism, and the symbolic universe as manifested in the usage and meaning of signs such as those in city buildings or street names.

⁴¹ As elaborated in the Table 2.2, this framework enables me to study the industrial area of the Jababeka Industrial Cluster, and to make sense of the complexity of the field. There are indeed possible limitations: for instance, the table does not explain resources beyond knowledge, and the economic side is not sufficiently considered. However, it is intended to function, as a heuristic tool in observing complex situations.

Table 2. 2 Framework & Empirical Result of Fieldwork in Indonesia

Time - Temporality in 2010-2011						
Site	Space	Actors	Place/Territory	Institutions/ Norms	Pattern	Knowledge
Macro	Institutional Space	Policymakers, experts at various Ministries	National level	Centralised and overlapping normative policy. Liberalisation of higher education and industrial sector	Competition-centralisation	Centralisation and centralised concentration of knowledge producing organisations in Java
	Geographical (spatial) Disparity	Policymakers, experts at various ministries, academia.	National level	(Internal) selection of grant proposal in the Ministry. Accreditation of national scientific journals by the State (DIKTI&LIPI)	Competition-centralisation	
	Social space	Policymakers, experts at various Ministries, and local governments	National level- Jakarta Metropolitan Region	Patronage, friendly relations based on alumni/previous work.	Collaboration	
	Administrative-bureaucratic space	Officials- bureaucratic elites.	New administrative unit (<i>pemekaran</i>) in Bekasi	Patron-client	Competition for resources	Knowledge likely to be lost due to bureaucratisation
Meso	Geographical Space (Location)	Companies located in the Cluster & Cluster Developer (Jababeka Group)	Jababeka Industrial Cluster	Profit oriented (in cluster development)	Competition and exclusion	Lack of new product development in the cluster
	Cultural space	Companies in Tier I	Jababeka Industrial Cluster	<i>Keiretsu</i> membership culturally defined in Toyota, Yamaha, Honda group	Limited collaboration e.g. heterogeneous companies	Tacit experiential knowledge pertaining to lean manufacturing
	Social space	Companies in Tier I & II, universities	Jababeka Industrial Cluster and beyond Bekasi (Depok, Bandung)	Trust, alumni/previous work	Restricted collaboration e.g. in technical advice and material testing	Expert advice, testing information and training through internship
	Geographical space	Companies in Tier II	Nested cluster' in Jababeka Industrial Cluster	Trust, previous work relations, alumni/previous work	Embedded collaboration for daily problem solving	Tacit knowledge for production process
Micro	Entrepreneurial space	ATMI Polytechnic including epistemic groups	Organisation	Trust, <i>pedagogy ignasiens</i> , good relations based on previous work, alumni/previous work	Embedded collaboration through job order and fluid epistemic group	Tacit embodied knowledge pertaining to the manufacturing of parts
	Bureaucratised space	President University	Organisation	Trust, alumni/previous work, personal linkage	Competition for administrative positions, 'bureaucratic' collaboration.	Knowledge for teaching, bureaucratisation

Source: Author's own empirical result based on fieldwork in Indonesia 2010-2011.⁴²

f. Summary

In this chapter I have discussed the current approaches of science policy, industrial clusters and knowledge flow between industry and academia. Science policy has been mostly captured as a rational model of policymaking. Here I have emphasised the key importance of complementing

⁴² Despite the fact that the fieldwork ended on 5th of March 2011, I still maintain active correspondence with my key informants. Upon returning to Bonn, I also had the chance to collect extra data through informal discussions and contact via email.

the analysis beyond the normative strand, looking at the state as practiced by the bureaucratic elites or policymakers. Rather than policymaking to policy implementation, science policy analysis should also uncover the norms and policy practices that drive and perpetuate the order of science system. I situate this in the context of 'order' to see the working of the science system and the materialisation of the state through the science policy. This represents the direction of the study of science policy in chapter three.

Furthermore, industries cluster or agglomerate due to innovation, geographical spatial proximity and location within an industrial estate. The surge of FDI in Indonesia has brought an increasing number of companies to industrial estates. However, despite both these increasing FDI in Java and the trajectory of industrialisation, Indonesian companies face difficulties in gaining a strong share of exports to the world market. This might signify that knowledge has not been fully capitalised for the upgrading process of companies at the macro level. I look at the typicality of cluster studies in Indonesia, grouped in various approaches ranging from the SME cluster, econometrics-based investigations, and urban planning. Used in this thesis, the term cluster will refer to 'industrial agglomeration in a (bounded) geographical space.' I venture to the concept of knowledge cluster in looking at the linkages within the cluster and in between organisations within the cluster.

The research takes insight from the 'triple helix approach' but later on distances itself from the social system theory underpinning approach. Knowledge flow between organisations is situated in two models, the first of which is the Mode 1/Mode 2 knowledge production, and the second is the 'triple helix approach'. This 'triple helix' observes the knowledge flow and sharing between academia, government and industries. Attempts have been made to extend this model to include a fourth helix comprising creative industries and media, to incorporate the geographical *glocal* axis beyond the nation state. I situate my work in two prongs, to enable the necessary distance with the system theory; first is an ethnographic investigation of knowledge production and sharing at the organisation level, and second is an observation of how academia reacts to the question of space.

In addition, I have provided clarifications of the key terms used in the thesis. Academia is a technical term referring to universities, R&D institutes and polytechnics in the Indonesian science system. Industry refers to automotive supplier industries located in the Jababeka Industrial Cluster. Knowledge will be used to point to tacit knowledge and the day-to-day knowledge producing activity of the knowledge workers. On the one hand, knowledge sharing is restricted to the process of knowledge sharing in an organisation. On the other hand, knowledge exchange is the non-linear transfer of knowledge between organisations. Two types of linkages of knowledge

flow are differentiated. The horizontal linkage will be used to refer to academia-industry collaboration and (the embedded) inter-firm linkage. Vertical linkage will be utilised to point out the supply chain linkage in the automotive business sector. In addition, there is also a core-periphery distinction used. I use this term to specify the internal spatial organisation of the industrial cluster and to the control of knowledge as resource.

Pertaining to the issue of unit of analysis, the unit that I adopt is not strictly defined as individuals or companies, as I also analyse groups. The pattern of competition, collaboration or a combination of both is used to grasp the question of structure. As the work is sociological, I take the agency-structure continuum to frame my analysis. Based on this continuum, I outlined the methodological framework of analysis, with foci including space, institutions, actors, patterns (i.e. structure), place (i.e. location) and the typology of knowledge taken as a capital. This framework provides the grounding to break from the social system theory. It cemented the basis for the subsequent empirical chapters, namely chapter three on science policy, chapter four on the perils of the splitting of administrative units (*pemekaran*) in Bekasi District, chapter five on the characteristics of the Industrial Cluster of Jababeka, chapter six on the vertical and horizontal knowledge flow in the cluster and chapter seven on the liberalisation and bureaucratisation of academia.

Chapter 3

Science Policy in Indonesia: The Normative & Social Facet

The research budget in Indonesia is relatively low, an average of 0.8% of the yearly Gross Domestic Product (RISTEK 2012). Indeed, there have been discussions about how the research budget allocation is underfunded (Jaitner, Mashudi et al. 2002; Simamora and Aiman 2006; RISTEK 2012). The following questions, however, remain valid: what perpetuates and drives the working of the science system in Indonesia? What are the existing (state) science policies, which focus on governing knowledge? These are the central questions of this chapter, which by looking at state science policy will look at (attempts as to) how knowledge is governed and steered.

As stated in the theoretical discussion in chapter two, this study will consider the science policy (or *Wissenschaftspolitik*) as ‘norms and policy practices that drive and perpetuate the order of science system’.⁴³ Science policy is posited in a broader context, not only in terms of normative policies in steering scientific knowledge production, but also to incorporate the industrial policy.⁴⁴ This is to ensure that the issue of collaboration between academia-industry-government is captured in the analysis. To focus on the question of the ‘order of the science system’, I gauge how the state science policy is manifested in the normative and social facets. The investigation, consequently, is aimed towards the direction of how science policy works in Indonesia in two interrelated facets: 1) the manifestation of the state in the *normative facet*, as demonstrated in the normative (legal) policy analysis, and 2) policy as practices as shown by the actors in the terrains of competition and collaboration in the *social facet*.⁴⁵ The discussion of these two interrelated facets is in the context of academia-industry-government collaboration. By looking at these facets within such context, one could infer how the state science policies attempt to steer knowledge and whether they enable academia and industry collaboration at the national and the industrial cluster level.⁴⁶

Past work such as the PERISKOP study also looks at science, research and technology policy in terms of normative analysis of various licensing, investment and science related laws inclusive of entrenched socio-cultural practices. Nonetheless, it does not base its analysis on an intensive empirical observation, and does not assess the authority relations in Indonesia (Schoen, Muenkel

⁴³ This is discussed in chapter two of this thesis.

⁴⁴ The analysis presented will include a study of industrial cluster policy and automotive policy.

⁴⁵ The territorial facet that is the third facet of the question of the order of the science system will be reserved for chapter four.

⁴⁶ Hence, the study presented here deliberately abandons the approach of policy in its emphasis towards implementation, and the enforceability of written policies.

et al. 2002). Empirical work on science policy has been dealt with rather minimally. A fairly comprehensive empirical analysis comes from the SMERU team, exploring the factors that feed and shape the knowledge use of higher level policymakers from the executive and legislative branch in Indonesia (Datta, Jones et al. 2011). These studies do not investigate the essential question in the Indonesian science system, bearing in mind that Indonesia has been mainly importing knowledge (Jaitner, Mashudi et al. 2002; HAQ 2003) or technology from industrial countries (Wie 2001; Wie 2005) as part of its industrialisation strategy (as discussed in chapter two), how does the state science policy govern and steer knowledge?

My study shows how the science system in Indonesia is centralised. A lesser state role in the higher education financial support as well as industrial cluster is visible with the embrace of economic liberalisation agenda. These are reinforced by the state (normative) policy in the normative facet. The social facet also exhibits how the practices and the authority relations (of the actors) augment the centralisation process. The central role (of the ministries) in Jakarta is reified with the spatial disparity of the allocation of research grants that primarily circulate in Java. Strong associations and/or linkages with the state are needed for collaboration between actors to take place. The ingrained practices in the science system have caused resources to be deflected and dispersed. The tendency of resources to be scattered and the process of centralisation contributed to the lack of linkage between academia and industry.

The remainder of the chapter is divided into six parts: the first part discusses how the science policy in Indonesia is centralised. The second part examines the liberalisation process taking place in the industrial cluster policy, automotive policy, as well as the higher education sector. This leads to the fragmentation of the policy gearing up for academia-industry collaboration. Then the manifestation of the state role in the normative facet as prescribed in the normative policies is reflected in the third part. The fourth part will discuss the spatial disparity as exhibited in the research grant distribution. The fifth part will focus on the competition and collaboration between the actors in the science system. The significant role that Jakarta has as the centre in the social facet will be outlined in the sixth part. The last part will summarise the findings.

a. Centralised Science Policy

The main inquiry of this part is the existing state policies in the research and scientific knowledge production in the Indonesia's Ministry of Research and Technology (RISTEK). The analysis of the national journal accreditation as well as the regulation of profession shows that the state plays a dominant role. The thematic research agenda financed by the government of Indonesia through RISTEK is by large determined by the central government. The Indonesian science system is centralised in its normative facet.

The RISTEK-endorsed thematic research themes indicate the centralised system of research in Indonesia. Research policy at RISTEK is geared towards the production of knowledge in seven areas: food security, energy, technology and transportation management, information communication technology, defence and security technology, medicine and health technology, and advanced material (sciences) (RISTEK 2011). These seven areas are the focus of the national research agenda (*agenda riset nasional*) for the period 2010-2014 (DRN 2010). An expert to the Minister in RISTEK explained the rationale of the seven areas. These areas are deemed to be pressing issues where the (central) government, in this case RISTEK, must be involved through research funding (Interview, Jakarta, 03.06.2010).

Before asking to what extent the national research agenda is being decentralised, it would be of worth to examine who or which organisation designed it. According to the President Regulation No. 16 Year 2005, the National Research Council (DRN) assists RISTEK in formulating the direction and main priority of R&D (Oey-Gardiner 2011). The DRN has eight technical committees in each area, namely food security, energy, transportation, ICT, defence and security, health and medicine, basic science, humanity and social science, with Regional Research Councils (*Dewan Riset Daerah/DRD*). However, from my observations, not every regional government has DRD. Even when it has a separate DRD, the organisational link between DRD and the BAPPEDA itself is non-existent. This is the case with the Jakarta Province Government (Informal discussion, Jakarta, 16.08.2010). Membership of DRN itself is still dominated by the government, with appointments depending on the network of current members. Oey Gardiner discusses this in her research report:

“On procedure of appointment, the new potential members are identified and discussed during Commission meetings and then are proposed to the chairs during leadership meetings... Identification of new members for the technical committees tends to be from one own network of existing members. Thus when most members come from academia, they tend to nominate others with academic backgrounds and/or affiliations. Some of whom may also hold bureaucratic positions at the time of their appointment to DRN membership” (Oey Gardiner 2011: 11).

Of the 100 members of DRN, only 19 are from BALITBANG at the regional government level (Oey-Gardiner 2011). I concur with Mayling Oey’s analysis that DRN acts more as a unit of RISTEK (Oey-Gardiner 2011), with the appointment of members, responsibilities and organisational lines of command being connected to RISTEK.

The overall structure of DRN itself is not decentralised, however this is not the only issue pertaining to the decentralised research system in Indonesia. There is a lack of capacity for regional governments to perform and engage in research itself. For the BAPPEDA in local governments, what is of urgency is not research, as stated by an expert in Coordinating Ministry

for Economic Affairs, but human capital (training), and planning capacity (Interview, Jakarta, 03.06.2010).

The current research and development framework afforded by the Ministry of Home Affairs (MoHA) differs significantly from the seven issues. This is regulated in the Ministry of Home Affairs Regulation No. 20 Year 2011 on the Guideline of Research and Development in the Ministry of Home Affairs and Regional Government. According to articles 5 & 6, the issues to be researched by the units of the regional government encompass issues of public administration, regional autonomy, administration and management of government, local politics and nations unity, regional management, civil registration and population, village administration and community empowerment, management of regional development, regional finance management, training and education of civil servants, policy on regional public administration, and other areas of related issues according to the needs in the frame of authority of the regional government. However, consideration of this range of issues in research and development is missing when it comes to budgeting, as this is not given particular attention when budgeting for *belanja langsung* (direct expenditure) in the Ministry of Home Affairs Regulation No. 22 Year 2011 on the Guideline of the Local State Budget Revenue and Expenditures Year 2012. This regulation does not make reference to the national research agenda, as it has its own sectoral purview. Thus, with the existing centralised national research agenda, the matter of research and development substantially depends on the regional government commitment, which can be restricted by the limited local state budget.

National journal accreditation is also carried out by state agencies, namely DIKTI and LIPI. It is vital to note that the growth of national scientific journal publications in Indonesia does not necessarily mean there is a growth of professional groups or professional associations. An illustration is the case of International Sociological Association, which manages journals such as *Current Sociology* and *International Sociology*. Conversely, scientific journal management and accreditation in Indonesia is closely associated with the state rather than professional associations. By publishing in scientific journals, a researcher or engineer could gain credit points for the non-administrative rank promotion process. Two key agencies managing the accreditation process are DIKTI and LIPI.⁴⁷ This has caused quite a complicated process in unifying the accreditation of the two organisations. The leading project manager of the Indonesian Scientific Journal Database airs his concerns of the difficulty of integrating the two accreditation systems in an interview:

⁴⁷ A key informant who has worked with DIKTI for quite some time, informs that the accreditation members in LIPI and in DIKTI are in some instances the same person. They take the accreditation as part of the project/*proyek* whereas the incumbent will be given a certain set of tasks and be given sum of money as a reward for the work (Informal discussion, Jakarta, 19.05.2010).

“This is complicated, for accreditation there are two, from DIKTI and LIPI. DIKTI still give A, B mark, whilst LIPI give A, B, C mark. There is a different recognition. I hope they would lower their (sectoral) ego a bit” (Interview, Jakarta, 19.05.2010).

The papers sent and published in these national journals will be compensated with credit points (*angka kredit*) needed for promotion. Hence national journal accreditation process is conducted by the state.

It is the state that regulates the profession of researchers and lecturers in Indonesia. There are two ministries overseeing, managing and governing (at least by formal means) educational and research organisations in Indonesia, namely RISTEK and MENDIKNAS.⁴⁸ At the professional level however, each of the ministries has its different style. In terms of being a researcher as a profession in the civil service, the management and regulation is dealt with by PUSBINDIKLAT (Training and Education Center) LIPI. The regulation of credits given for the promotion to the rank of researcher is jointly established by LIPI and BKN/National Civil Service Agency. The Joint Decree of the Head of the Indonesian Institute of Sciences and the Head of National Civil Service Agency No. 3719/D2004 *Juncto* No. 60 Year 2004 prescribes this regulation. For social engineers (*Perekayasa*), they are subject to the BPPT & BKN regulation No. 267/Kp/BPPT/VIII/2009 *Juncto* No. 15 Year 2007. At the outset, there is a delegation to LPNK from RISTEK. For the lecturer DIKTI regulates this as stipulated in the Joint Decree between MENDIKNAS & BKN No.61409/MPK/KP/99 *Juncto* No.181 Year 181 on 13th of October 1999. They are to carry out teaching, research and community service (*pengabdian masyarakat*) as part of the *Tri Dharma* of Higher Education (DIKTI 2009). The state thus regulates the certification and rank of the profession, instead of the professional associations. Information on the trend of the policy sometimes only circulates in Jakarta, during the meetings held in Sudirman Street, Gatot Subroto Street in Jakarta, or in Cibinong Science Center (in the offices of LIPI or MENDIKNAS). For instance, the recent policy introduced in 2011 by DIKTI is that for every application made by *Dosen* for the position of *Guru Besar* (Professor), the applicant will need to already have their name in the Scopus website. This means international journal publication becomes obligatory for all universities regardless of the challenges they might face (Informal discussion, Aachen, 12.11.2011). The state thus exerts considerable power in the regulation of the profession of researchers and lecturers.

What unravels thus is the control of the state in the thematic research agenda of the academia, with scientific knowledge production in the national journal accreditation and the researcher and lecturer profession certification conducted by the state agencies.

⁴⁸ The accreditation of scientific journals also has two ‘doors’. DIKTI will provide accreditation for the journals published by the universities, whilst LIPI will assess the accreditation for the journals published by the LPNK/ R&D Offices (BALITBANG or LITBANG) at the Province, District and Ministry level (Interview, Jakarta, 19.05.2010). Although the guidelines may be different, in some cases the personnel who carried out the assessment are the same person. From the assessment activities, a per diem is usually given as compensation.

b. The Hype of Liberalisation

The government of Indonesia is also actively pursuing liberalisation agenda. This is apparent in higher education, industrial cluster policy, and automotive policy in Indonesia. Yet what are the salient characteristics of the policy mechanism in the higher education sector as well as the industrial sector? How are they attempting to steer knowledge? These are the underpinning inquiries in the coming paragraphs.

Liberalisation of the higher education sector

Ostensibly the policy for higher education indicates that it may be postponing the steps towards liberalisation. At its current guise, this is depicted in the format of Public Services Organisation (*Badan Layanan Umum/BLU*) for the state universities, whilst in reality liberalisation is ongoing. Private higher education organisations have been dependent on the market. In principle, access to education is guaranteed by article 31 of the 1945 Constitution and article 5 of Act No. 20 year 2003 on the National Education System. Furthering this commitment to educational access, the second amendment in 2002 of 1945 Constitution in article 31 subsection 4 makes clear that the state will prioritise its budget towards education, committing a minimum of 20% from the central and local state budget in order to fulfil the needs of national education. This legal commitment was also reiterated in article 49 of the National Education System Act. At the central level, the state budget has proven to be restricted in terms of apportioning its allocation for education⁴⁹ (Departemen-Kuangan 2010).

The lack of funding for the education sector brings typical consequences, with the liberalisation of higher education becoming inevitable. The current privatisation of the state universities in Indonesia captures this process. In 1999, the government privatised four state universities in Indonesia, namely ITB, UI, UGM and IPB (Susanti 2011); subsequently three more state universities were privatised. The government also enacted the Government Regulation No. 61 Year 1999 on the Designation of State Universities as a Legal Entity, and the Act No. 9 Year 2009 on Educational Legal Institution (*Badan Hukum Pendidikan/BHP*). This move towards the liberalisation of higher education was brought to a standstill when the Constitutional Court annulled the BHP Act.⁵⁰ To avoid a legal vacuum, the Government Regulation No. 66 Year 2010 on the Amendment of Government Regulation No. 17 Year 2010 on the Management & Organisation of Education was enacted. The model is no longer a BHMN as accorded by the

⁴⁹ This is evident in the data of the Ministry of Finance from 2006-2009. In 2006, the education budget was 10.30% of the total budget, however this portion dropped to 10.08% in 2007, and 7.98% in 2008. In 2009 it increased slightly to 12.55% of the overall budget allocation (see Departemen-Kuangan: 2010).

⁵⁰ The controversial decision No. 11-14-21-126-136/PUU-VII/2009 specifies that there is a juridical lack of harmony (*keselarasan*) of the BHP Act. Furthermore, the Act is based on the assumption that the educational administrators/organisations (*penyelenggara pendidikan*) have equal capacity to implement the conditions in the BHP Act, and that not all state universities (*Perguruan Tinggi Negeri/PTN*) have the same capacity. Moreover, it states that according to the 1945 Constitution the state has placed education as a public rather than private good.

previous Act, but BLU, which according to article 58 G is in principle a non-profit. There will be a 'transition period' for the seven universities, were previously accorded the BHMN status, up to 31st December 2012. Post enactment of the Government Regulation No. 17 Year 2010, these seven universities emphasise the significance of autonomy in terms of human resources, assets, academic and finances (Pikiran-Rakyat 2011). Nonetheless, to what extent the format of BLU can contain the entrepreneurial and profit seeking character amid the liberalisation in the higher education sector persists to be a contentious issue.

The oversight as well as management of private universities and polytechnics is managed by KOPERTIS (*Koordinator Perguruan Tinggi Swasta*/Private Higher Education Coordinator). This has been the case since 1975. In 1990, from seven KOPERTIS regions, five additional KOPERTIS regions were established (Kopertis-Wilayah-IV 2012). This was in line with the Decision of the Minister of Education No. 0135/O/1990. Each of them is located in different geographical locations ranging from Aceh (KOPERTIS Wilayah I), to Ambon Maluku and Irian Jaya (KOPERTIS Wilayah II) (Kopertis-Wilayah-IV 2012). These private higher education organisations make up a greater proportion of numbers in Java Island, where one can find a significant concentration of knowledge producing organisations. Data from DIKTI shows that in 2010, there were a total of 88 state universities and 3,010 private universities (including polytechnics) in Indonesia (DIKTI 2010). From a total of 3,098 universities in the year of 2010: there were 1,475 private universities and polytechnics located in Java Island, and 33 state universities (DIKTI 2010). These 1,475 organisations cannot rely on state funding to cover their operational costs. They have to find other means to survive, which may be in the form of fully depending on the tuition fee charged to the students and/or becoming entrepreneurial in providing services to the industries. Maintaining a good tie (*bubungan baik*) with the Head of the KOPERTIS is of essence, including for purposes of accreditation process of a study programme (Observation, Cikarang, 07.06.2010, 08.10.2010). Private universities and polytechnics in Indonesia are indeed dependent on the market to cover their operational costs.

Reliance on fiscal policies & import of knowledge from the Japanese automakers

The state, through its policies, depicts its commitment to economic liberalisation through 1) reliance on fiscal policies rather than integrating investment related policy with the standardisation norms, and 2) dependence on knowledge transfer from abroad brought about by the process of foreign capital flowing in from the investment as reflected in the automotive policy.

Further liberalisation agenda is pursued in the investment related laws by a greater reliance on fiscal policy through tax incentives and absence of the usage of technical standards. This absence is noted in the manufacturing sector. The tax incentives currently offered by the government of

Indonesia are corroborated by the Government Regulation No. 52 Year 2011 on Second Amendment of the Government Regulation No. 1 Year 2007 on Income Tax Facilities for Regional Investment in Certain Business Lines and/or in Particular Regions. Article 2 Section (d) provides tax allowance in the form of compensation for loss (*kerugian*) longer than five years but no more than 10 years with certain conditions for these specified 77 business lines (*bidang usaha tertentu*).⁵¹ Article 2 further states that the Ministry of Finance will later decide on the tax incentives given, based on the recommendations of the Indonesia Investment Coordinating Board (BKPM). When discussing the non-fiscal policy, I refer specifically to the absence of reference in the regulation pertaining to the usage of technical standards. The explicit references made to non-fiscal policy used by the government are labour policy and licences (Menko-Perekonomian 2011). The various regulations pertaining to thematic clusters as incorporated in the roadmap for cluster development in Indonesia (Ministry-of-Industry 2009) do not make direct reference to nationally developed standards of SNI (*standar nasional indonesia*) or other technical standards. Regarding technical standards, my findings in the cluster analysis suggest that there is a vacuous space of engineering standards for materials for automotive parts. This space appears to be regulated more by the customer companies such as Toyota, Honda and Yamaha. The drawing of parts to be manufactured on the shop floor usually incorporates the technical standards of engineering, which are outputs of the standardisation process. Standardisation and its legitimacy depends on expert knowledge (Jacobsson 2000; Borraz 2007). There is a lack of development of technical standards for materials to be processed. This was acknowledged by one of the Directors dealing with R&D and Industry in the National Planning and Development Agency (BAPPENAS) in an interview. He emphasised how the standard in Indonesia focuses more on products (*produk jadi*), and makes less a priority the materials that come prior to the product (*produk setengah jadi*), (Interview, Jakarta, 31.05.2010). The lack of integration of the standardisation norms with the overall industrial policy may infer a constrained use of the 'local' knowledge base.⁵²

As stated beforehand, the focus of industry in the collaboration between academia-industry-government will be the manufacturing industry, specifically the automotive sector. The MoI is also in charge of the policy regime for the automotive component/supplier industry. I briefly review the policy from 1977 with the intention of providing context before moving to the current policy in 2011.

It has been said that automotive policy in Indonesia lacks efficiency due to a highly distorted past policy regime (Aswicahyono, Anas et al. 1999; Feridhanusetyawan, Aswicahyono et al. 2000). The

⁵¹ This includes: "An extra one year should cost be borne for research and development in the country (Indonesia) to develop a product, or efficiency of production at least 5% from the 5 year investment."

⁵² By local I refer to the standards developed by R&D institutes or other agencies in Indonesia.

initial policy was a deletion programme in 1977, intended to encourage domestic car producers to use domestically produced components and provide incentives to industry. However, this policy never fulfilled its intended aim, and was replaced by an incentive programme in 1993 (Feridhanusetyawan, AswicaHyono et al. 2000), aiming at the usage of domestic components as stipulated in the Ministry of Industry Decree No. 114/M/SK/6/1993 (Feridhanusetyawan, AswicaHyono et al. 2000). In 1995, a package was introduced to deregulate investments in the automotive industry for the production of new cars, and also set a target for lower import duty in 2003 (Feridhanusetyawan, AswicaHyono et al. 2000). However, what was seen to be a significant liberalisation in 1990s was later turned into a different version of business patron. The Soeharto family entered the business in a rather spectacular manner by introducing ‘national car’ or *mobil nasional*⁵³ (AswicaHyono 2000). After a case filed in the WTO Panel by Japan, the European Union and the U.S. against Indonesia’s plan, the government lost and subsequently backed down (Tarmidi 2001). The incentive system based on local content fulfilment was then erased, and in 1999 no specific formal industry policy was endorsed (Tarmidi 2001). It is visible, however, that the government relies more on import duty in its automotive policy from 1999 to present. The policy in 2011 as stipulated by the Minister of Finance Regulation⁵⁴ is based on import duty for sedan-based cylinders for complete-knock-down (CKD) range of 10%, and for complete-built-up it is set at 40%. The luxury tax was set in 2011, ranging from 30-74% based on the cylinders. It is possible that the process of knowledge transfer from the customer or the principal to the supplier relies more on FDI, or in other words relies on the customers of the major automakers such as Honda and Yamaha.

An important milestone for the automotive sector policy was the Indonesia-Japan Economic Agreement for an Economic Partnership, signed by both parties in November 2007. Both countries recognise that the driver sectors of interest are the automotive, electrical and electronic, heavy tools and construction machines, and energy sectors (Atmawinata, Irianto et al. 2008). The Manufacturing Industry Development Centre (MIDEC) organisation was established by the MoI to upgrade the manufacturing industry’s industrial capacity in Indonesia (Atmawinata, Irianto et al. 2008), working on three main aspects: basic study, training and technical assistance. However, based on the fieldwork, it is the Indonesian Mould and Dies Association (IMDIA) rather than MIDEC that facilitates the automotive sector knowledge transfer.⁵⁵ My fieldwork demonstrates that trainings organised by IMDIA are often linked with JETRO (Japan External Trade Organisation) and receive the support from the Japanese experts in mould and dies (Interview,

⁵³ This programme is aimed to lead to an accelerated local content target for car. It is bestowed a ‘pioneer status’ entailing full exemption from all import duties, the waiving of the luxury car tax and financial assistance (AswicaHyono 2000: 224).

⁵⁴ Ministry of Finance Regulation No. 241/PMK.011/2010.

⁵⁵ The role of IMDIA in the automotive sector is explained in length in chapter six part b on tacit and experiential knowledge.

Cikarang, 29.10.2010). This shows that whilst the automotive policy supports knowledge transfer from major automakers, the knowledge base itself reflects the continuous support (and interest) from Japan.

Indonesia is consequently embarking on its liberalisation agenda by a reliance on its fiscal policy through tax incentives, rather than resorting to nationally developed standardisation norms. The automotive policy reinforces the usage of incentive-based fiscal policy, and thus, welcomes the process of knowledge transfer from the Japanese automakers. The automotive knowledge base was supported not by the organisation set up by the Government of Indonesia, but by IMDIA, which receives support and reflects the interest of Japan.

Industrial cluster policy: 35 thematic clusters & master plan

What are the features of the industrial cluster policy, amid the backdrop of economic liberalisation in Indonesia? This is the central question in this section. Cluster development strategy is stipulated in the Government Regulation No. 28 Year 2008 on National Industrial Policy. There are three existing categories in the regulation regarding the priority of industrial cluster development. The *first* category is core industries, which are denoted as industries that become the base in the development of national clusters. The *second* category is supporting industries, which adopt a supporting role in the development of core industries by integrative and comprehensive means. Finally, the *third* category is priority industries, referring to both the industrial clusters that have high prospects of being developed based on their capacity to compete in the international market, and industries in which the production factors are sufficiently available in Indonesia. There are six priority industries focused on within this cluster development: manufacturing, agro-industry, transportation, electronics and ICT, creative and supporting creative, and specific small and medium enterprises. The road map of cluster development 2010-2014 is thus geared towards developing these six priority industries. There are 35 industrial clusters attached with the six priority industries. They are prescribed in the existing normative laws, which are shown in Table 3.1.

Table 3. 1 Cluster Development in Indonesia According To The 2010-2014 Roadmap

No	Priority Industry	(Thematic) Industrial Cluster
1	Manufacturing industry basis ⁵⁶	Steel, Cement, Petrochemical, Ceramic, Electricity Machines and Electricity Equipment, General Tooling Machine, Textile and Textile Related Products, and Footwear (8 clusters).
2	Agro Industry ⁵⁷	Palm processing, rubber and rubber group, cacao, coconut processing, coffee processing, sugar, tobacco, fruit processing, furniture, fish processing, paper, milk and dairy processing (12 clusters).
3	Transportation ⁵⁸	Automotive, shipping, aerospace, train (4 clusters).
4	Electronics and ICT ⁵⁹	Electronics, telecommunications, computer and its related parts (7 clusters)
5	Creative and Supporting Creative ⁶⁰	Software and multimedia content, fashion, art and handicraft (3 clusters).
6	Small and Medium Enterprises ⁶¹	Precious stone and jewellery, salt, pottery and ornamental ceramics, essential oil, snack (5 clusters).
		Total 35 clusters

(Ministry-of-Industry 2009)

By embarking on a normative analysis of these cluster-related policies it becomes evident that these 35 clusters specified hitherto do not point to a bounded area of cluster, either in a specific area where there are agglomeration of companies (like in Ceper, Central Java) or in industrial estate (*kawasan industri*) such as in the Jababeka Industrial Cluster. Some of the thematic clusters indicate areas shaped around the administrative level scales, namely province and district. The 15 clusters with implementation in district and/or province areas are salt, essential oils, snacks, automotives, trains, petrochemicals, ceramics, textiles, footwear, palm, coffee, tobacco, fish processing, and milk and dairy products (Ministry-of-Industry 2009). Thus the analysis suggests that the normative policy pertaining to cluster remained abstract, as it lacks the detailed character in appointing (*menetapkan* or *beschikking*) certain designated areas.

Furthermore, the bottom-up planning envisaged for the development of clusters (from district/city to province to the central government) does not seem to work. This is owing to the varying capacity of the regional governments. In addition, the transition of regional autonomy was patchy in Indonesia. Communication is easier with staffs in the regional government who had worked with the members of the ministry at the central government level. An expert to the

⁵⁶ Each of these are specified in the Ministry of Industry Regulation No. 103-110/M-IND/PER/10/2009.

⁵⁷ This is stipulated in the Ministry of Industry Regulation No. 111-122/M-IND/PER/10/2009.

⁵⁸ This is specified in the Ministry of Industry Regulation No. 123-126/M-IND/PER/10/2009.

⁵⁹ This is specified in the Ministry of Industry Regulation No. 127-129/M-IND/PER/2009.

⁶⁰ This is included in the Ministry of Industry Regulation No. 130-132/M-IND/PER/2009.

⁶¹ This is stipulated in the Ministry of Industry Regulation No. 133-137/M-IND/PER/2009.

Minister in MoI explained the patchy transition that resulted in a missing link in the following interview excerpt:

With this decentralisation, the link is disconnected (*wis putus blas*). No connection by organisational means. No linkage. We used to have people in the province. Now, there are regional people (*orang daerah*). You know how we can communicate? With those who used to work a lot with us, people who are historically connected. But this might be eroded with the rapid rotation in the regional government” (Interview, Jakarta, 10.08.2010).

The efficacy of bottom-up planning for cluster development is thus subject to debate, with the communication route better between those who have been previously connected in terms of work.

In addition, the cluster policy appears to be sectoral and not linked with the thematic research agenda in RISTEK. The industrial cluster policy does not correspond with other related policies, such as the national innovation policy of RISTEK in 2010, which established Business Technology Centers throughout Indonesia (Interview, Jakarta, 21.05.2010, 25.05.2010). An expert in industrial cluster in the MoI voiced a strong criticism, stating that the MoI preferred to embark on the 35 thematic clusters as opposed to working in a ‘naturally agglomerated cluster’ area with other ministries (Expert Interview, Jakarta, 04.10.2010).⁶² A lack of coordination between ministries in the central government also contributes to this sectoral approach.

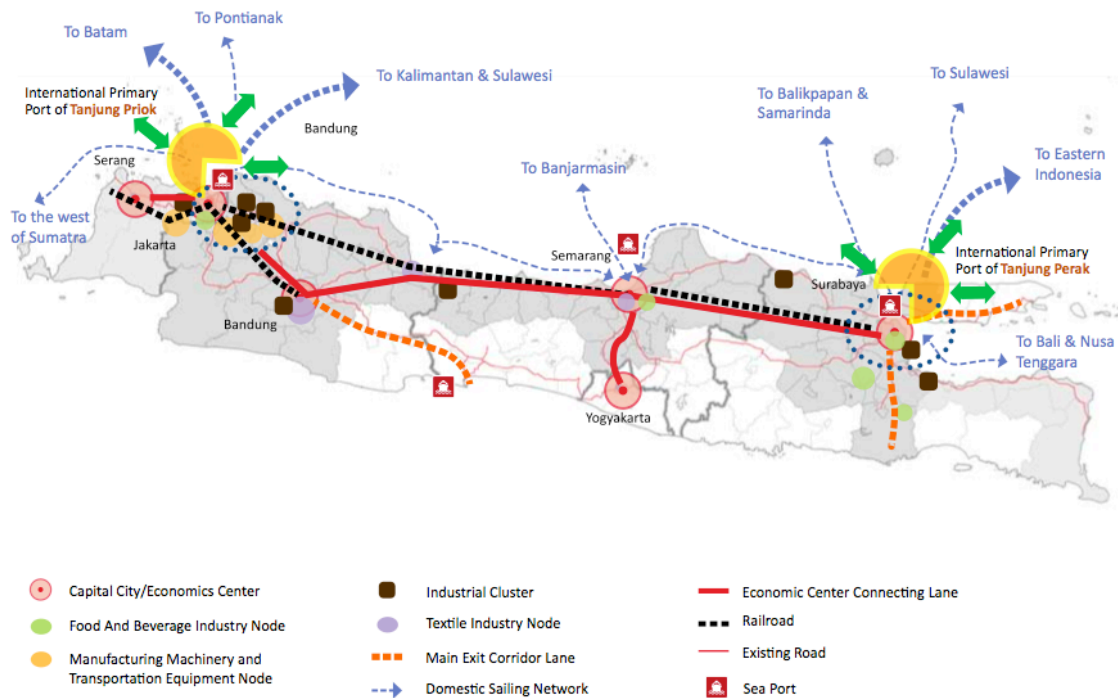
The aforesaid thematic cluster policy, however, is linked with the national policy of the 2011-2025 Master Plan for the Acceleration and Expansion of Indonesia Economic Development, noted as MP3EI (*Masterplan Percepatan & Perluasan Pembangunan Ekonomi Indonesia*). The key strategies of MP3EI are threefold: developing economic potential through economic corridors, strengthening national activity, and strengthening the capabilities of national human resources, science and technology (Menko-Perekonomian 2011). The overall aim of the economic development master plan is ultimately an increase in Indonesia’s economic growth⁶³ (Menko-Perekonomian 2011).

The cluster development will support the corridors of the Economic Development Master Plan (MP3EI). The enhancement of the centre of excellence, as marked in the blueprint, will be expected to integrate with the industrial clusters (Menko-Perekonomian 2011). There are 22 economic activities to be promoted to have links with primary industries, including in the outer islands (Manning and Purnagunawan 2011). Six economic corridors (EC) are spread throughout

⁶² An expert interviewed in BAPPENAS indicated that he cannot rely on the cluster policy developed by the MoI as it arises not from an in-depth study but from a subcontracting of the project that later was carried out by a Consulting Office (Informal discussion, Jakarta, 31.05.2010). The historical backdrop of the policy was explained by an expert in the MoI. The policy was also based on advice from an expert asked to assist the MoI, whereby experiences are mostly taken from the Italian experience (Informal discussion, Jakarta, 04.10.2010).

⁶³ The implementation of this master plan, according to the brief (see Menko-Perekonomian 2011), will raise the annual national GDP to 12.7%, with the regional growth within the corridors predicted to reach 12.9%. There will be a spillover effect outside the corridor, thus bringing growth of 12.1%.

Indonesia, with each having been assigned its own provision (Menko-Perekonomian 2011). The Sumatera EC, the Kalimantan EC, the Sulawesi EC, the Bali-Nusa Tenggara EC and Papua EC are largely based on natural resources, whilst the Java EC's emphasis is on services (Interview, Jakarta 10.08.2010). The Java EC has two main urban poles, in Jakarta and in Surabaya. These two urban poles are depicted in the Map 3.1.



(Menko-Perekonomian 2011)

Map 3. 1 Java Economic Corridor in Indonesia's Economic Development Master Plan

Yet, who plans the master plan? A spatial planner expert who has participated in the stakeholder discussion process held by the Boston Consulting Group (BCG) shares his experience being involved in early parts of the master plan in an informal discussion:

“The project and report itself is carried by the Boston Consulting Group (BCG) who won the tender project. The master plan unfortunately does not take into account the spatial planning of Jabodetabek-Punjur (Jakarta, Bogor, Depok, Tangerang, Bogor & Puncak Cianjur). The initiative of the master plan came from Coordinating Ministry of Economic Affairs (*Menko Perekonomian*) who later received a grant from JICA (Japan International Cooperation Agency) to do the study. This study is performed by BCG who won the tender” (Personal communication, March 2012).

The impetus to conduct the study is driven not by the *Menko Perekonomian* itself, but also by JICA through the grant bestowed by it. The call for tender was not managed directly by JICA, but by

the Economic Research Institute for ASEAN & East Asia (ERIA).⁶⁴ The BCG, which won the tender, then produced the project study. One of the non-conforming views of this master plan came from Medco Ethanol Lampung President Director, who reiterated that although it is good to involve the private sector, this does not remedy the industries' concerns.⁶⁵ Furthermore, he questioned the level of commitment required for this long-term type of government plan (Baskoro 2011). It seems there is the issue of local ownership (Manning and Purnagunawan 2011) apart from differing interests behind the hype of the master plan that one should take into account in terms of its implementation.⁶⁶ It was, unfortunately, a term used by the spatial planner, that later on this study was given a legal basis in the President Regulation No. 32 year 2011 on Economic Master Plan 2011-2025. Ambitious plans have been initiated to lure sufficient investment to finance the projects, including from Japanese companies (Baskoro 2011). By allying with other organisations that funded the study, namely JICA, the state through the master plan pursues the economic liberalisation and building up an 'investment-friendly' environment.

What is being portrayed consistently through the higher education liberalisation, investment related laws, and industrial cluster policy is a 'hype' of liberalisation. The state is liberalising, i.e. providing less financial support for the state universities, whilst it may have been the case that the private higher education organisations have been relying on the market to cover its operational costs. The state is also ensuring the economic liberalisation as demonstrated in the investment friendly policies as well as the master plan, which integrate the industrial cluster policy to promote economic growth on a national basis. This leads to the fragmentation of the policy enabling the academia-industry collaboration. This is due to 1) the industrial sector is propelled towards economic liberalisation, 2) reliance of the academia to the market system, and 3) sectoral policy and the difficulties of coordination.

c. The Role of the State in the Normative Facet

How then is the state manifested as reflected through its science policy in the normative facet? It should be cautioned that I did not carry out the policy study based on the hierarchy of norms (Kelsen 1966) in the Kelsenian or Neo-Kantian tradition. Kelsen once argued that the law has the coercive order within the normative order, as it attempts to conform human behaviour to comply with rules (Kelsen 1966). In an effort to capture a more sociological level of analysis what is presented thus far has been content analysis (Perry 2007), navigating between the analysis of laws and qualitative interviews to make sense of how the state attempts to regulate (through normative

⁶⁴ Further information on the tender of the project: http://www.eria.org/pdf/Call_for_Tender_final.pdf. ERIA is a think-tank proposed by Japan in 2007 <http://www.eria.org/history/index.html>.

⁶⁵ The concerns raised are land acquisition issues, overlapping bureaucracies, fiscal or monetary incentives, and the availability of access particularly of infrastructure (see Baskoro: 2011).

⁶⁶ The latest development of the materialisation of the master plan has been the involvement of regional chambers of commerce, and a regional leaders for implementation committee set up in September 2011 (see Manning and Purnagunawan 2011: 329).

policy) the institutional space. The normative policy provides the following output as depicted in Table 3.2.

Table 3. 2 Output of Normative Framework in Science & Industrial Policy in Indonesia

Policy Stream	Sub Stream	Output of Policy
Science Policy	Research	<ul style="list-style-type: none"> - National research agenda- 7 main themes - National journal accreditation
	Education	<ul style="list-style-type: none"> - Education Budget aimed at 20% at the Central & Regional Level. - BLU as a non-profit legal entity for State Universities
Industrial Policy	Cluster Development	<ul style="list-style-type: none"> - 35 Thematic Clusters, no definite bounded area
	Investment	<ul style="list-style-type: none"> - Tax Holidays, Tax Incentives, Labour Policy
	Automotive Industry	<ul style="list-style-type: none"> - Import duty & luxury tax

What has the institutional space in the normative facet revealed in terms of the manifestation of the state? *First*, the state is centralising its grip in terms of science policy by centralising the thematic research in national research agenda, regulation of the profession, as well as national journal accreditation. The centralised science system in Indonesia was diagnosed by Geertz 38 years ago (Geertz 1974). Even now this still persists. The centralised science policy pictures a certain *phobia* that the state has, not to relegate its control in the science system. *Second*, the state is liberalising its higher education sector and is embarking on incentive-based policy mechanisms (as visible in the investment related laws as well as in the automotive policy). Less reference at the normative policy level is made to technical standards. This suggests that there is a lack of usage of technical engineering standards developed on a national basis. Thus, the industrial policy is not sufficiently integrated with the science policy, which then concomitantly depicts how collaboration between academia and industry is *fragmented* on the policy basis. It is fragmented due to the sectoral interests that the ministry has. *Third*, the incentive-based policy through import duty may encourage the transfer of knowledge from the automakers, of which Japanese automakers are the key player in the Indonesian market (Global-Business-Guide 2011). The penetration extends to the automotive knowledge base, which is supported by Japan through the linkage it has with IMDIA. The ‘hype’ of liberalisation also reveals another factor, how the state embarks upon an abstract, sectoral industrial cluster policy and how the state is *building alliances* with another party (or country), namely Japan, to induce and restart the engine of (national) economic growth. The state thus manifested itself in its phobia, fragmentation and actively building alliances with other country. These three aspects earmark the institutional space of (normative) science policy in Indonesia.

d. Spatial Disparity

What are the practices of the allocation of resources in the science system, especially taking into account the research grants bestowed? I focus on the *Insentif*⁶⁷ RISTEK research grant, which is an initiative created to build a strong IPTEK base in Indonesia. My findings, based on the quantitative and qualitative analysis, lead me to posit that there is a spatial disparity. Most of the research grant circulates in Java Island. In fact, in 2010, more than half of the grant recipients were organisations based in Jakarta. The opportunity to attain research grants is open to any agency and organisation, as long as the topic falls under one of the seven themes pursued in the National Research Agenda as previously mentioned.⁶⁸ The scheme was jointly managed by the National Research Council (*Dewan Riset Nasional/DRN*) and RISTEK; however in 2011 the management of *Insentif* RISTEK was handed back to RISTEK (Oey-Gardiner 2011). Grant applications are submitted online. Prior to this, the screening and selection process is carried out by an assessment team from different disciplines (RISTEK 2010). There is no information regarding the selection of the assessment team, whether it is based on professional organisations, or the recommendation of DRN. In an informal discussion with one of the deputy assistants in RISTEK, I was informed that there is a tendency for the process of appointing the selection team to be retained within the locus of RISTEK (Informal discussion, Jakarta, 25.05.2010).

A review of the organisations that have managed to secure funding from the *Insentif* RISTEK grant during the period 2008-2010 will be provided in this thesis. The focus will be on the spatial location, where are these knowledge producing organisations mostly located? Furthermore, what are the main knowledge producing organisations that are recipients of these grants?

From 2008 to mid-2010, the minister i.e. Kusmayanto Kadiman⁶⁹ often emphasised the academia-business-government collaboration. However, at the end of 2010, the Suharna Surapranata⁷⁰ period began to focus more on the National Innovation System. In 2011, there was a reshuffling of the ministerial cabinet in Indonesia, with Susilo Bambang Yudhoyono appointing Gusti Muhammad Hatta to head RISTEK.

⁶⁷ *Insentif* can be translated into English as ‘incentive’; it is meant to give incentives to research-based organisations. Based on the information from the website, the funding started in 2007. In the fiscal year 2010, the initiative of this grant was divided into four types of research: Basic Research *Insentif*, Applied Research *Insentif*, Increase of the IPTEK Capacity for Production System, and Diffusion Acceleration and IPTEK Usage. This has been the general pattern from 2008-2010.

⁶⁸ The distribution of the grant in these seven areas can be found at this website: <http://km.ristek.go.id/index.php/chart/bidangFokus/> (Accessed on January 8th, 2012).

⁶⁹ Kusmayanto Kadiman is a former Chancellor of ITB.

⁷⁰ Suharna Suraparanata has a background as an academic scholar, and is also a politician from the *Partai Keadilan Sejahtera/Justice Welfare Party (PKS)*.

Based on the data available from the RISTEK website⁷¹ I analysed quantitatively the top ten highest recipients and the organisations' locations from 2008- 2010. The top ten recipients in 2008 and 2009 are demonstrated in Figures 3.1 and 3.2, respectively:

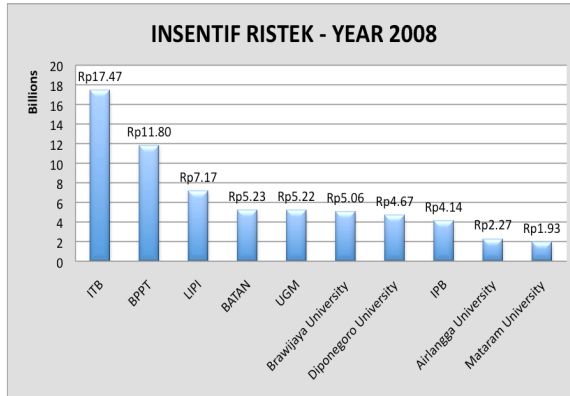


Figure 3.1 *Insentif* RISTEK Grant in 2008⁷²

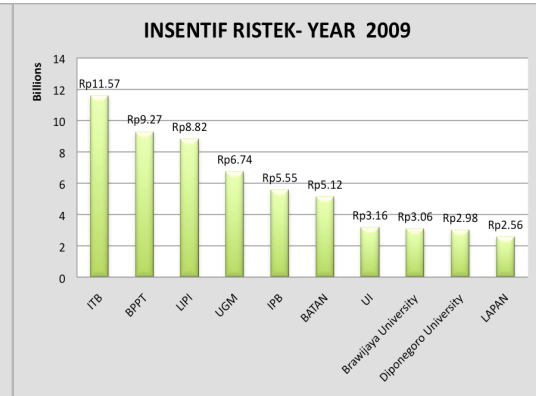


Figure 3.2 *Insentif* RISTEK Grant in 2009⁷³

Figures 3.1 and 3.2 both showed that a university (in this case ITB) is the highest recipient of the *Insentif* RISTEK grant. The figure from 2008-2009 also depicts that universities are dominating the top ten *Insentif* RISTEK grant beneficiaries. In 2008, there were three LPNK, namely LIPI, BATAN and BPPT. In 2009, the portrayal is similar with the addition of LAPAN.

The sum of money disbursed in the fiscal year of 2008 was around IDR 97 billion (ca 8 million Euro). Universities made up the majority of the grant's recipients in 2008, accounting for 82%. LPNK followed next with 6%, and non-profit agencies recorded 5%. However, closer consideration suggests that the universities in Java compose the more than half of the grant's awardees. Of 64 universities, 37 are located in Java.

In 2009 the funding available from RISTEK was IDR 90 billion (ca 7.5 million Euro). In terms of type of organisations, the majority of organisations receiving the grant were universities (75%). The LPNK comprised 12%, with the Local Government and R&D Office in Ministry's BALITBANG accounting for 5%. Similar to the previous year, 34 of 49 the universities that received the grant were based in Java.

⁷¹ Website: <http://insentif.ristek.go.id/> accessed on 4th January 2012.

⁷² First Appendix of the Decision of Minister of Science and Technology No.97/M/Kp/XI/2007 Date on 27 of November 2007 (*Lampiran 1 Keputusan Menteri Negara Riset dan Teknologi No. 97/M/Kp/XI/2007 Tanggal 27 November 2007*).

⁷³ First Appendix of the Decision of Minister of Science and Technology No. 194/M/Kp/X/2008 Date on 03rd of October 2008 (*Lampiran 1 Keputusan Menteri Negara Riset dan teknologi No. 194/M/Kp/X/2008 Tanggal 03 Oktober 2008*).

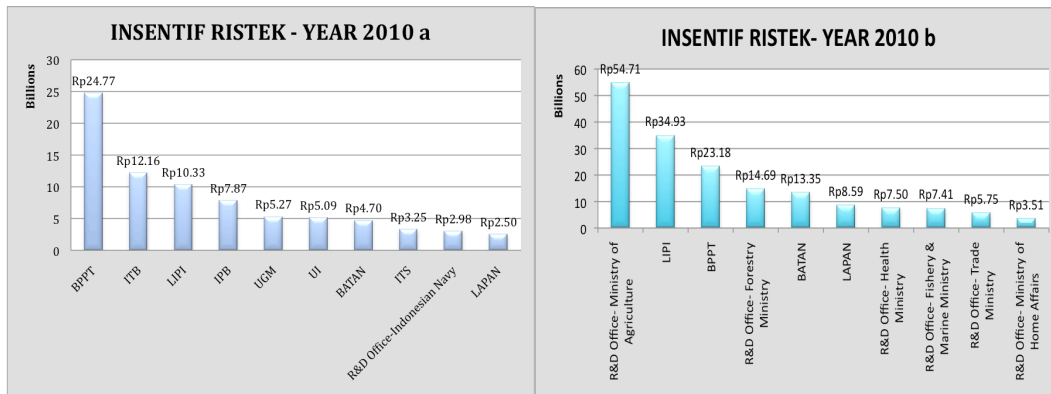


Figure 3. 3 *Insentif*RISTEK Grant in 2010a⁷⁴ Figure 3. 4 *Insentif*RISTEK Grant in 2010b⁷⁵

A marked change is noted in 2010 (as highlighted in Figure 3.3 and Figure 3.4), during which a new minister was appointed. Figure 3.3 is based on the decision made by Kusmayanto Kadiman, while Figure 3.4 represents the decision under the leadership of Suharna Surapranata. Both were aiming to target the fund disbursement in 2010.

A sum of approximately IDR 110 billion (ca 9.1 Million Euro) was provided for the first wave of the fiscal year 2010 as demonstrated in Figure 3.3 The major recipient of the grant was BPPT, followed by ITB. Four of the top ten recipients were LPNK, with half being universities (all of which are located in Java). Universities were still the key beneficiaries of the grant with 74%, with the Ministerial R&D accounting for 12% and LPNK for 8%. The geographical disparity remains perverse, as most of these universities who are receiving the grant are located in Java (30 out of 44).

Rather than remedying the issue of regional disparity, the second wave of funding in 2010 concentrates on the LPNK, and (perhaps inadvertently) targets the R&D Office of the Ministries in Indonesia. The allocated money for this period in 2010 was IDR 196 Billion (ca 16 Million Euro), as shown in Figure 3.4. All of the BALITBANG/R&D Offices of the Ministries listed in Table B are located in Jakarta, with the one exception of the R&D Office of the Ministry of Health (which has one unit in East Java). The R&D offices of various ministries comprised more than half of the recipients with 64%. The LPNK, which appears to have been targeted by the policy, consists of 36%. Based on this, the concentration of funding is thus managed by the R&D Offices. On the basis of Figure 3.4, it is possible to infer that more or less IDR 92 billion of the

⁷⁴ Appendix of the Decision of Minister of Science and Technology No. 110/M/Kp/II/2010 Date on 9th of October 2009 (*Lampiran Keputusan menteri Negara Riset dan Teknologi No. No. 110/M/Kp/II/2010 Tanggal 09 Oktober 2009*). This decision was made during Kusmayanto Kadiman's era as the Minister of Science and Technology.

⁷⁵ Appendix of the Decision of Minister of Science and Technology No. 053/M/Kp/II/2010 Date on 09th of February 2010 (*Lampiran Keputusan Menteri Negara Riset dan Teknologi No. 053/M/Kp/II/2010 Tanggal 09 Februari 2010*). This decision was made after there was a new cabinet appointment, with Suharna Suraprana taking up the position as the Minister of Science and Technology.

funding attained by R&D offices of the ministries circulates in Jakarta (including surrounding Bogor, Depok, Tangerang and Bekasi areas or the Jakarta Metropolitan Region). This policy has reinforced rather than addressed the regional disparity, the central role of Jakarta.

The analysis highlights the notable regional disparity, with the majority of universities managing to attain the grant being based in Java. When there was a shift in policy in 2010 to better accommodate non-universities in the picture, this aggravated the condition with around 40% of the funding received by R&D Offices of Ministries circulating in Jakarta. In addition, it shows how universities still play a major role in research activities, compared to LPNK and the R&D Offices of Ministries, which could be a sign of universities being more entrepreneurial in terms of research. The fact that they are more active in applying for this grant was confirmed by an expert staff member of RISTEK, who reviews the grant proposals (Interview, Jakarta, 17.05.2011). There is a competition between LPNK and universities to attain research grants, with LPNK insisting that they are not to be placed on equal footing with universities.⁷⁶

The term spatial disparity notes not only the restrained epistemic capacity of organisations outside of Java (Lukman 2010), but also emphasises the fact that resources in attaining research grants still circulate in Java.⁷⁷ The government 'intervention' shown in the *Insentif* RISTEK grant in 2010 that was designated for the LPNK appeared to aggravate the condition by reifying the position of Jakarta in attaining resource allocation of research. This indicates centralisation in Jakarta and the concentration of knowledge production in Java Island. Initiatives outside of Java indeed exist to promote knowledge production. To cite an example, the network of researchers at the BALITBANGDA/ R&D Office at the province level also provides an ample resource of information for researchers. The *Jaringan Peneliti Kawasan Timur Indonesia* (JiKTI/Network of Researchers in the Eastern Region of Indonesia) also has affiliates who regularly publish articles in international journals. The members also organise meetings via the JiKTI workshop on information sharing, to learn the strategies of getting articles accepted and published within journals (Karejti 2005; Karetji 2010). Yet there has been little evidence as to how these initiatives can ameliorate the centralisation process in the Indonesian science system.

⁷⁶ The position of LPNK with universities in terms of the *Insentif* RISTEK programme has been a critical issue. One of the Deputies in the LPNK stated his disagreement, reiterating that LPNK has a different position to that of universities and that the policy should not be based purely on merit (Interview, Jakarta, 17.05.2010).

⁷⁷ I had the chance to have an informal discussion with one of the DIKTI Directors in Bonn. I discussed my findings, namely that the concentration of knowledge producing organisations are mostly located in Java, asking what measures are being taken to remedy the situation of unevenness. This could, as I discussed with him, take the form of quota scholarships for lecturers outside of Java or not imposing a full merit-based selection for research grant applications coming from outside of Java, particularly in the Eastern Area in Indonesia. He was quiet at first but then acknowledged that this is a difficult situation from the Eastern Area. He conceded every time Susilo Bambang Yudhoyono (the President) asks for data about the Eastern Area of Indonesia, there is concern amongst high level officials that there is this unevenness of knowledge distribution. Talent scouting and sending several students for matriculation have been carried out. I can infer that change at the policy level in the form of not imposing a 'merit-based' selection of grant proposal is difficult (Informal discussion, Bonn, 10.03.2012).

e. Competition & Collaboration

Previous parts (parts b and c) of this chapter have discussed how there is fragmentation of the policy level due to *inter alia*, the sectoral policy and the difficulty of coordination between ministries in Indonesia. The focus of this part is on the terrains of competition and collaboration between the actors in the science system, i.e. the policy practices. By actors in the science system, I refer to the policymakers, researchers and engineers. The line of inquiry includes: 1) the challenges faced by the actors, 2) the practices and authority relations shaping the competition and collaboration in the science system, 3) the underpinnings of collaboration, and 4) the implication of the 'logic' of science system to the academia and industry collaboration. The study reifies the argument that behind the current wave of centralisation and competition and/or collaboration between the actors in the science system, Jakarta is the centre pulling the control.

Overcoming challenges, competing for resources on the individual level

What are the challenges faced by the knowledge workers (researchers) working in government R&D units? The research-based institutes in the Indonesian civil service will be the subject of investigation in this analysis, on which I limit the study drawing from the case of R&D units managed by BPPT and LIPI and universities located in the Jakarta Metropolitan Region of Indonesia.

The first challenge relates to ranking, which is an indication of seniority rather than a merit-based rank system. The management (*pembinaan*), certification and bestowal of credits for the profession of researcher are currently under the auspices of LIPI (Internal Discussion between RISTEK and LIPI, 07.01.2007).⁷⁸ The credits (*angka kredit*) achieved allow the promotion and mobility of the functional position (*jabatan fungsional*) of the researcher from one level to a higher rank. The credit-based compensation is cemented on various scientific activities, including scientific publication in a scholarly international or national journal or newspaper, book publishing, providing supervision to postgraduate and doctoral candidates, and participation in training activities.⁷⁹ This rank system⁸⁰ may be an indication of seniority⁸¹ rather than being merit-based (see also Oey-Gardiner 2010).

⁷⁸ The legal basis cited for this is Act No. 18 Year 2002 on the National System of Science and Technology as well as the Decree of Minister of State Administrative Reforms (*Kementrian Pemberdayaan Aparatur Negara dan Reformasi Birokrasi*) No. 128/M.PAN/9/2004.

⁷⁹ Appendix of the Head of LIPI Regulation No. 06/E/2009 On the Technical Guideline for the Researcher Functional Position.

⁸⁰ The status of the government employee is accorded once the candidate has passed the *Pra-Jabatan* (civil service pre-training) course. They would start from the rank III/a, and be provided with a *tunjangan umum* or general allowance. Once the incumbent has passed researcher training with the minimum education level of a bachelor degree level (Informal discussion with respondent, Jakarta, 13.08.2010), then the functional route as a researcher may be taken.

⁸¹ It depicts seniority, as the activity of publishing should be understood in the context of formalism syndrome. A syndrome whereby the process of creative writing and academic work is reduced to the pursuing of occupations, such as professorship posts (see also Nugroho 2012). In addition, the process of conferring credits itself tends to be internal within the organisation of LIPI.

The second challenge is the difficulty of accessing references for research related research work. The lack of references used in the *Insentif* RISTEK research grants application was opined by an expert in RISTEK who was a former member of the selection panel (Interview, Jakarta, 17.05.2011). He inferred that minimal articles in international journals are used as references in applying for the grant. The lack of references may be caused by the minimal budget support, or the absence of a focal point organising the journal subscription. In addition, there is also a lack of visibility in the reasoning why certain journals are subscribed to whilst others are not. DIKTI at the Ministry of Education does subscribe to international journal access, and LIPI also subscribes to six e-journals via the Centre for Scientific Documentation and Information⁸² (PDII-LIPI) (Oey-Gardiner 2010). RISTEK also plans to subscribe to journals to enable the researchers to gain more access to up-to-date e-journal references (Interview, Jakarta, 17.05.2010). This means that budgeting for journal subscriptions is made at different levels of government. The subscriptions to journals by DIKTI are on an annual rather than a multi-year basis, and do not include all-encompassing disciplines in science. In 2010 one of the lecturers I interviewed who was fairly active in publishing in the field of electrical engineering voiced his concerns. He stated that for his publication activities, DIKTI only subscribe to non-engineering journals. This has been detrimental to his work, as his university will not be able to cover the IEEE subscription (of IDR 550 million) (Interview, Cikarang, 29.07.2010). This constrains the ability of researchers to access up-to-date materials (particularly e-journals) for their work.

There is also the challenge of poor remuneration for the research-related profession. Low incentives paid to the *jabatan* or title of researcher: III/a, which is *Abli Pertama* (first level expert) in the rank, will be compensated with IDR 325,000 (ca. 27 Euro) per month. IV/d or IV/e *Abli Utama* (the highest level expert) would receive an allowance of IDR 1,400,000 (ca. 116 Euro) (BKN 2011). On top of the low incentives, R&D budget is also restrained in Indonesia. On average, the annual research budget in Indonesia is approximately 0.08% of the Gross Domestic Product (RISTEK 2012). There has been a decreasing trend of research funding from the central government budget from 1998 to 2004 (Simamora and Aiman 2006). The implication is that the supplementation of income from honorarium received via the research project is also lesser in amount.

The discussion shall now shift towards the existing individual practices that weave the system of research in Indonesia. By existing practices I situate the discussion on how the actors in the science system (i.e. policymakers, researchers and engineers) make it function in practice, including the competition for resources to make ends meet.

⁸² LIPI in 2012 no longer subscribes on its own and has followed suit to participate in the subscription provided by RISTEK (Personal communication via email, 05.07.2012).

In an effort to cope with the system, the research professor or senior researcher would typically take up other consulting offers, sometimes in the BALITBANG (R&D Office) at the ministry level. In some cases they assume roles as commentators on television or in mass media. This depends on personal linkages, such as alma mater (i.e. alumnae UGM or ITB) or colleagues within the individual's previous working circle. This may allow trust to the level of expertise offered. The supplementation of income is often termed as *proyek* or *ngobyek*. The *proyek* was, as explained by a former deputy head in BPPT due to the low salary of the civil service, the members (of the organisation) have to work extra (*ngobyek*) here and there (Interview, August 2010). This *proyek* is one technique of supplementing or coping with the system.

Another technique is also taken up through the coping mechanism of the 'entrepreneurial' type of researcher. A shadow business unit would be established in which the individual has flexibility outside the current system of PNBPN.⁸³ Progress is underway (although slow), and in some cases several unofficial accounts may still be found (Nugroho 2005; Ny and Kurniawan 2011). A key informant of this entrepreneurial type of working in one of the LPNK shared his experience. He established a business unit independent of the organisation where he works. In doing so, he added that it would be difficult to base the business unit in the R&D unit, as there is the issue of (complex) bureaucracy and (restricting) rules (Interview with key informant, May 2010). The researcher thus has three positions: as a researcher, as a person holding an administrative position (*jabatan administratif*), and as the CEO of the company that he has founded. At daylight he would be working in his office, and in late afternoon he would then move on to his other office with his staff (Observation, May 2010). In this way no formal rules are contradicted, as he still fulfils his duties as someone holding an administrative position before working again after the office hours in a different office. The access arising from both the resources accrued from the marketing of the product is handled by the person and the personnel company.

A direct implication of taking up consulting offer and the entrepreneurial type of researcher is that the human resources are scattered rather than concentrated. They can be formally tied to a research institute yet be based in one or two other organisations. An expert in LIPI who has

⁸³ The PNBPN/Non Tax State Revenue system obliges all revenue gained from services and goods from the Civil Service, including State Universities and LPNK, to be channelled and transferred directly to the State (*Kas Negara*). This is in accordance with articles 1 & 2 of Act No. 20 year 1997. A penalty of 6 years imprisonment and fine of four times PNBPN will be imposed to those not conforming to this rule, which is explained in the article 4 of the Act. Each civil service unit at the directorate or technical implementation unit has one account for receiving funds from the State Budget and another for receiving funds from the services, all of which will later be transferred at the *Kas Negara* via *Kantor Pelayanan Perbendaharaan Negara* (the Office unit for the State Treasury Services). According to the existing laws, personal accounts are not allowed. However, there are unofficial accounts (*rekening liar*) that are being tracked and closed. Between 2009-2011, over 6,000 unofficial accounts were closed down, and the sum of IDR 7 trillion (ca. 583,333,333 Euro) was transferred for the revenue of the state by the Ministry of Finance (Purnomo: 2011).

reviewed the activity of the *Riset Unggulan Terpadu* (RUT/Integrated Research Programme)⁸⁴ reiterated this scattering of resources (Interview, Cibinong, 18.05.2010). By resources he referred to human capital. Along with the sparse resources, access to infrastructure for research is also constrained. This access, to a certain degree, hinges on networking activities among researchers (Interview and informal discussion, Cibinong, 15.12.2010). It is only in cases where an organisation can maintain its agency and collectivity, such scattered resources can be disciplined. The ATMI Polytechnic Cikarang, which is discussed in chapter seven, portrays an organisational collectivity.

There are other ‘avenues’⁸⁵ to getting research funding. This is the subsequent implication of the restrained research funding system at the formal level. Research budgeting is not only carried out in one ministry (namely RISTEK); MENDIKNAS also has a budget allocation for research within its 20% portion of the state budget. Therefore an increase in research funding is possible via the route of budget in the MENDIKNAS (Interview, Jakarta, 17.05.2011). It is fairly powerful in terms of funding for research activities, due to the intended 20% allocation of funding from the state budget. Besides this, the BALITBANG in Ministries also provided funding to conduct research. In some cases, such as the BALITBANG of the Ministry of Energy and Mineral Resources, the funding received for research is a considerable amount and even greater in sum than that received by RISTEK (Interview, Jakarta, 17.05.2011). The ‘avenues’, although they require the skills and competence to apply for research grants (and thus may recruit the consulting services of senior researchers in LIPI/BPPT), will likely to not shift into an inter-organisational (*antar instansi*) cooperation. This is a contested area that I will reserve to discuss in-depth in the next section.

Further competition, legacies of *Widjojonomics* & ‘shared poverty’

The issue of competition for resources at the individual level reflects a wider issue, namely the contested terrain of coordination between ministries and LNPK in Indonesia. Each of them has their own programme and projects. The ministries tend to have a myopic view and face the hurdle of coordination. This reality surfaces in the interaction between three related ministries (which are related to the academia-industry-government): the BAPPENAS, the MoI and RISTEK as well as the LNPK (BPPT and LIPI).

Coordination is also palpably strenuous between the LPNK (including the R&D units in the LPNK). The problem is visible on the facet of research: there is the duplication of research proposals and programmes. In the mapping of research carried out by the DRN in 2006-2007,

⁸⁴ RUT was a research initiative managed in the 1990s until 2004 by RISTEK. Further information can be found at the following website: <http://www.progriptek.ristek.go.id/webrut/pengantar.htm>.

⁸⁵ Several of my respondents refer to this as ‘doors’ or in *Bahasa Indonesia*/Indonesian language as ‘*pintu*.’ This refers to access in getting resources.

there are 11 research projects on bio-fuel from palm with total funding of around IDR 15 billion, but these projects did not coordinate with each other during their implementation (DRN 2007; DRN 2010). A researcher in biomaterial sciences at LIPI explains the coordination issue:

“This is reflected in the scientific matters. During presentation of advanced materials for construction, fibre carbon for concretes, the biomaterial issue (proposal topic) we proposed in the competitive research programme was already in there (in other research programme). ...the title is the same. It is only different in the conjunctive. But the rest of it is exactly the same. It has the: ‘smart element with electric when bending and enabling sensor’ (here the respondent is mentioning the title of the research proposal). This means there is no coordination” (Interview, Cibinong, 18.05.2010).

The issue of the difficulty of coordination between ministries in designing programmes and budgeting arose during the interview.⁸⁶ RISTEK, the Ministry of Industry and BAPPENAS, which all are concerned with the science policy and industrial clusters, each have their own programme. An expert staff member for the minister in MoI shares his experience about how each year there are joint committee meetings with other ministries, but eventually the programme (in the ministry) is implemented solely by MoI (Interview, Jakarta. 10.08.2010). In a tandem discussion with RISTEK, they also concede the challenge of coordination with other ministries. Budgeting is part of this issue, besides the setting of priorities that are distinct in each ministry. I discussed this with a staff and a deputy assistant in RISTEK in the following dialogue:

Respondent A: “The assumption is collaboration based between ministries is possible.”

Researcher: “Do you collaborate with other ministries in practice?”

Respondent A: “We are heading that way, but the friction still exists.”

Respondent B: “Each ministry has different priorities, this has implication what we (in RISTEK) deem is important and what is not.”

Respondent A: “In the institutional level, we could work together with the Ministry of Industry. But in practice, we are not working together. The barrier is the ego and in budgeting. Basically when it comes to budgeting we do not want to mess around with other people’s pockets” (Interview and informal discussion, Jakarta, 02.06.2010).

Sharing information about budget between ministries is precarious, if not impossible. Reports known as LAKIP (*Laporan Kinerja Instansi Pemerintah*/Government Offices Performance Report) on government budget spending is made per government offices/unit (*satuan kerja*). The reports would more or less follow the spending that was made on the basis of the strategic planning (*rencana strategis*) of the ministry (LIPI 2009). The extent of the budget spending (*penyerapan*) would have an implication on the next fiscal year budget allocation. The logic constructed is that the less the intended spending, the lower the coming budget would be. This is, however, also subject to auditing, communication and lobbying. The different units or offices in the ministry level are thus

⁸⁶ This arose during interview with officials in RISTEK, BAPPENAS, as well as Ministry of Industry in May 2010-June 2010.

accountable in terms of LAKIP.⁸⁷ The extent of the spending of the budget per fiscal year requires teamwork within the unit⁸⁸, and the ministries in Indonesia have been fairly slow in spending the budget (Tanjung 2010). Extending the budget spending to other parties by working with different ministries is a risky business, which requires trust, whilst trust itself is deficient. I will discuss this issue of trust in the cases where collaboration is possible in the next paragraphs.

With the sparse resources and competition, will changes be possible? By changes I mean instilling cooperation at the formal level and raising the formal allowance received by the research related positions, as well as increasing research budgets. Other positions such as Public Prosecutors, Judges, Parliament Members and several ministries, such as Civil Service in the Ministry of Finance, have been part of the remuneration programme within the bureaucracy reform in Indonesia. Research, however, is beyond this ambit of reform, which has been criticised as unfair (Adam 2010; Oey-Gardiner 2010). My inquiry on the subject of changes at the formal level shows two factors constraining structural changes at the decision-maker level.

The first factor is the prevailing legacy of the *Widjoconomics* view at the policymaker level. The *Widjoconomics* view regards investment in natural resources and low cost labour as more vital than investment in human resources and technological development (Juoro 1993; Amir 2008). The Ministry of Finance is currently reluctant to implement the allowance and research support as part of its routine spending (*pagu belanja mengikat*) within the state budget. This is voiced by an expert staff to the minister in RISTEK in the following interview dialogue:

Respondent: “We do wish to increase the functional allowance for researchers, the calculation of allowance for research professor of IDR 15 million (ca. 1,200 Euro) is quite normal, but if institutionalise this every year this means it is vital to prepare in on a fiscal year basis into a routine government spending (*pagu belanja mengikat*). This is not what the Ministry of Finance wish to partake. If this is part of the routine spending, it means on an annual basis they have to spend a fixed amount of money for this.”

Researcher: “That means research is treated as a variable that is dependent on economic growth?”

Respondent: “Yes, that is the reason why in Indonesia research does not go smoothly. During Habibie era (i.e. during former President Habibie) when he speaks with the economists he has power, whatever money or resources we ask for will be provided. Now he is no longer here, that power is being stripped from us. Now we have limited funding” (Interview, Jakarta, 17.05.2010).

There is a strong preference in the central government to invest in policies that directly promote economic growth pursued by economic liberalisation. Another expert staff to the minister at MoI reiterates how this preference, coined by *Widjoconomics*, has affected the knowledge base of industrial clusters in Indonesia. This is due to investment in research (or technology in his words)

⁸⁷ LAKIP is a part of the System of Accountability of Performance of Government Offices as arranged in the Presidential Instruction No. 7 Year 1999.

⁸⁸ There are also practices of saving some money per unit for example for *tunjangan hari raya* (bonus given before Ied Fitri), which was never formalised yet but always given on a per year basis.

being overlooked by the central government (Interview, Jakarta, 04.10.2010). Consequently, there is a lack of support given to research.

The second factor is the *projekisme* that prevailed as a paradigm. Rather than formally increasing the research funding, facilities and allowances needed, the resources are separated into small projects. Geertz (1970) illustrated this resource division in ‘shared poverty’, whereby homogeneity is maintained by dividing the pie into a steadily increasing number of miniscule pieces (1970:97). In an expert interview with one of the officials in BAPPENAS at the decision-making level, he shared his experience of trying to push this agenda forward:

“We have discussed, among other things, the need to increase the welfare and support for researchers. I was just trying to follow up on that. But the other ministries do not seem to agree with me. They prefer *projek*. So we have the IDR 50 million (4,1666 Euro). *Projek* (projects) is assigned per person. That again, and again even in the year of 2009. We still have that in 2010. I see that it is vital to endorse, rather than *projek*, to formally increase the support and allowance for researchers. We have to negotiate this with the Ministry of Finance together, as we cannot do this alone. There was one important meeting with the Minister and Echelon I (Director General) in RISTEK, BAPPENAS and other parties. I was outside waiting. I cannot participate, as I am merely Echelon II (of Director Level). The agenda was for permanently raising the allowance (*tunjangan*) for researchers. After the meeting I received the news that they prefer the research packages, or *projek*. The Minister was also shocked to hear this” (Interview, Jakarta, 31.05.2010).

Rather than working together to install permanent changes that require coordination between ministries, the less difficult route was endorsed. Resources were still channelled, but squeezed into small research packages of projects of IDR 50 million. The rationale for this number was that the regulatory system of the procurement of services and goods enables a direct procurement (*pengadaan langsung*) without a public tender mechanism for consulting that is of maximum value IDR 50 Million.⁸⁹ This was later revised in the latest policy, i.e. President Regulation No. 07 Year 2012 on the Government Services and Goods Procurement.⁹⁰ The prevailing structure as depicted during the fieldwork in 2010-2011, nonetheless, demonstrates ‘shared poverty’ and preference towards cheap labour and natural resources. These are the structures that obstruct changes at the formal policy level in the Indonesian science system.

Patronage & Hubungan Pertemanan as the basis of collaboration

The challenges stated beforehand do not mean that collaboration is an impossible scenario. It is indeed possible, and the typology of social interactions enabling collaboration will be clarified in the coming passages. Collaboration will be discussed in the strand of sharing budgets for research

⁸⁹ This is stated in section b of article 45 of the President Regulation No. 54 Year 2010 on the Government Goods and Services Procurement.

⁹⁰ Article 39 on the President Regulation No.70 Year 2012 on the Amendment of the President Regulation No. 54 Year 2010 on the Government Goods and Services Procurement stipulates that direct procurement can be carried out for the goods procurement, construction work or other services with a value of IDR 200 million with certain conditions. This is an increase on the previous IDR 50 million package for direct procurement.

support, and also for the communication of information and expertise between different ministries. These interweave the social space between actors.

Hubungan pertemanan, or friendship tie, enhances communication between the upper levels of the ministries in Jakarta. Such friends-between-friends relations make the transfer of expertise offered from one ministry to another research organisation possible (Interview, Jakarta, 10.08.2010). This friendship-based connection may be forged on the basis of alumnaeship. For example, the Alumnae of Mechanical Engineering Majors of the Bandung Technology Institute (ITB) are keeping in touch via a mailing list. Furthermore, some of these alumnae exchange information updates in the industrial field and information on projects in other ministries (Interview, Jakarta, 31.05.2010). In addition, the working experience with colleagues also enables the connection. A former deputy in an LPNK shared his experience:

“To be honest, I had a good opportunity, to head one project. This is possible because I have good friends, very good friends to these people who have high (administrative) positions (*petinggi*). Personally we have very good personal relations. This becomes very important. This can be built with time. It does not always mean that you have to be sharing the same alumnae. Life requires us to blend with other people, but with the friendship based relations, more relatives (*saudara*) and more friends. This is something that can be built” (Interview, Jakarta, 24.08.2010).

This linkage is fluid in character and crosses the supposedly built hierarchical rank in the civil service. The connection is also termed as a personal approach (*pendekatan personal*). Trust is also enabled through friendship tie, enabling cooperation for the flow of information. Nonetheless, the trust accorded at this connection level cannot always be translated to the institutional level. The connection, as shared by one of the key informants who used to work in BPPT, builds trust in a fragile manner (Interview, August 2010). It only works within the circle and not in the government organisation where he or she works. This is partly due to the fact the implementation of cooperation is only possible when there is first, good teamwork in the organisation, and second, an understanding of concepts and issues in the programme. This is lacking and has thus ascribed how trust is retained only between the circle’s networks (Interview, August 2010). The friendship ties with the upper echelon members in the ministries in Jakarta brings the possibility of collaboration.

The next element is patronage. The patronage linkage is controlled by the central government (through the key ministries) in Jakarta. I unpack this by deriving from the narrative experience of a former engineer who used to work in a research centre in one of the LPNK before switching to a ministry in Indonesia. He aired his experience:

“I have worked in a project involving 50 cities, including Bandung. That gives me a different perspective. I could see the enthusiasm of the Directorate General of Regional Development

(*Ditjen Bangda*) at the Ministry of Home Affairs (MoHA) to be involved in the project. Previously I have seen them merely as an administrator. The administrator who we could push because the regions (*daerah*) are afraid of them. The regions are afraid because they can provide evaluation of the achievement of the regions. These people from *Bangda* were involved and they are enthusiasts in diffusing technology (the project outputs). Our scenario as researcher and engineer is to bring the technology and result to the regions. This is inaccurate and misleading, we need to involve them ...In terms of substance and content they might need upgrading, but they are the party recognised and highly respected in the region. When we went ourselves to the airport the one who picked us up is the driver, but once we go with them, we see an orchestra. The local government officials respect us very much” (Interview and informal discussion, Jakarta, 12.08.2010).

The pattern exhibited is thus of patronage, which is central to being able to work with the local government and other ministries. The local governments are open in terms of budget information and sharing once the key ministries are involved. In other informal settings that I observed, the LPNK such as BPPT, LIPI and the like need to build alliances with coordinating ministries and MoHA in order to work with the local government (Observation, Cikarang, 25.10.2010). There is a vital need to maintain loyalty and good relations with the central government (*pemerintah pusat*) in Jakarta. On the one hand, being able to build alliances with key ministries is a step towards legitimising and working within the existing social structure to push the current (research) agenda. On the other hand, patronage means that the central government still plays an influential role despite decentralisation schemes.⁹¹ Ryaas Rasyid⁹² stated that the existing patronage of central government during the New Order is the one of the reasons why former President Habibie embarked on decentralisation in Indonesia (Rasyid 2004). It has been more than ten years since the decentralisation schemes were put in place, yet the social structure cannot be reversed by means of endorsing formal structural changes.

This does not mean that there must be this existing element of patronage in every coordination for it to work. The latest trend of coordination based on issues such as the one village, one product programme in Indonesia allows cooperation from ministries such as the Ministry of SMEs, the MoHA, and research institutes. However, this seems to be cemented on the basis of friendship ties between the policymakers, enabling informal communication between them (Observation, August 2010). Yet in terms of resource allocation for research and government related projects, patronage prevails as the edifice that enables interaction between LPNK, ministries and the local government. This substantiates the argument brought forth in part d of this chapter that behind the progression of centralisation, the central government in Jakarta maintain its role as the centre.

⁹¹ This includes for example the enactment of Act No. 34 Year 2004 and the introduction of the general and special allocation fund.

⁹² He was one of the architects and a member of team 7, who designed the draft of the Regional Autonomy Act. No. 22 Year 1999.

The implication of the centralised science system towards academia and industry cooperation

What is the impact of this centralised science system, practices as well as the structure (structuring the interaction) in the individual and ministerial level to the academia-industry collaboration? With collaboration and competition between government levels having been discussed, I shall now observe barriers of linkages and the collaboration between academia (specifically governmental R&D units) and industry.

The regular entry point in observing interactions between industries and academia would be to what extent do the research activities in academia focus on applied work (compared to basic research)? In a survey carried out by PAPPITEK LIPI, applied research dominated the research of universities in Indonesia with 56.70% of activities (Meiningsih 2010)⁹³, with basic research comprising 22.90%. The remaining 20.40% is experimental research. This confirms the assertion of a former selection panel member of *Insentif* RISTEK research programme in RISTEK who stated that most of the research in RISTEK grant is applied based (*terapan*) (Interview, Jakarta, 17.05.2011). According to the same survey⁹⁴, the manufacturing industries also carried out their R&D activities (Grace 2010).⁹⁵ The thematic sector of the spending of the R&D of the industries and universities, however, exhibits a different priority. The majority of industry R&D spending is allocated for engineering and technology activities, whilst universities are keen on spending R&D in chemical sciences. This indicates that there is a lack of interaction in the themes of research between the two spectrums of industries and universities. However, this is not as simple as putting research design into a more practical and applied basis; there are barriers constraining the interaction of academia (R&D Institutes) and industry.

There are several barriers to the linkages and flow of knowledge from research institutes to industries. The *first* barrier is the output orientation of the research activities. The success and output of research activities are measured and graded in terms of submitting the research report and financial reports, especially those funded by the public sector.⁹⁶ The major themes of the research are determined by the central government. This brings the output orientation in the direction of fulfilling the administrative requirements of the research project conforming to research agenda determined by the central government (Interview and informal discussion,

⁹³ Questionnaires for the purposes of this survey are from State Universities (50), Private Universities (15) that are based in Java, and State Polytechnic (25) (Meiningsih 2010).

⁹⁴ The survey is based on returning questionnaires of 1,581 manufacturing companies located in Indonesia. The business line of companies cover food, industries, chemicals, automotive supporting and metal (Grace 2010).

⁹⁵ From the data of domestic or national companies, the vast majority (96.91%) of the spending allocation for R&D is from within the company, with only 2% coming from the government or public sector. Eighty percent of the industries are uninformed of incentives for R&D, including research grants funded by the government (Grace 2010).

⁹⁶ The *Insentif* RISTEK research programme for example has a technical monitoring activity, which is carried out internally by the grant-receiving organisation. There are also monitoring activities of the National Research Council and RISTEK, together with the internal monitoring unit within the organisation (RISTEK: 2010).

Jakarta, 14.06.2010). A senior expert working in the Business Incubator Centre funded by RISTEK further explained this:

“The pattern including in RISTEK is that R&D Institutes and universities are given research funding based on the proposals, being reviewed, and then be given the grants. This is how we produce knowledge. Thus what I observed has been a consistent pattern.....They (the panel members who select the proposals) do not trace the ideas, is it regional, local or to increase the competitiveness in certain industrial sector. These are not given attention by the government” (Interview and informal discussion, Jakarta, 14.06.2010).

Still related with output orientation are the credits and the income supplementation that would arise from being engaged in the research project. The publication activities are graded and awarded credit per individual assessment, required for the promotion of the research rank. As previously mentioned, the researcher is able to build his or her career based on this rank. The motivation of the researchers and perhaps of other professions that are tied to the research projects would be to attain credits, for the personal need for one to be able to reach a professorship level and be certified based on the publication (Interview, Jakarta, 14.06.2010).

The second barrier is the lack of exposure and capacity from the research supply side. This lack of exposure brings implications to the minimum linkages between the two organisations. It is partly contributed by the rigidity of the budget for research from the government funding. Most research work finishes when the research fiscal year ends. This is expressed by the head of an R&D unit in LIPI:

“For research we have to be brave in spending for expose...for example in the mass media. This is vital and needs a special budget. Most of the research only has target as described on the monitoring and evaluation. Once we set this target and this is completed, the work then ends. This is mostly written in the proposal. They do not cross to other terrain. There is no flow to the other (industry) end. Sometimes this expose is successful because of informal contact, like my experience. The person called me asked how much is the investment, and the price (of materials)” (Interview, Jakarta, 18.05.2010).

The information and follow up sometimes flows through informal linkages, not facilitated by formal organisations set up by the government. As will be highlighted in chapter six, this is reflected in the automotive industrial sector.

The lack of facilities and infrastructure also curtails the capacity of the research activities. This is the third barrier. The researcher often has to rely on a network of friends in the area to gain access to testing facilities or equipment (Informal discussion, Cibinong, 15.12.2010). The suggested solution from RISTEK is to offer a IDR 50 million grant per person (RISTEK 2012).

Thus there are barriers of output orientation, lack of expose and restrained research capacity constraining the linkage from the research institutes to the industries. Posing the barriers of the

linkage between academia (in this case particularly research institutes) - industry in the context of the Indonesian science system lead me to reflect on two issues. The tendency to fulfil administrative requirements of research may be due to the control of the state extended to academia (in general not only research institutes but also university) (Nugroho 2012).⁹⁷ Furthermore, the energy spent in fulfilling the administrative output orientation may illuminate a bureaucratisation of the science system, whereby one needs to maintain a certain academic decorum by carrying out research. This is aggravated by the fact resources pertaining to research (i.e. research facility, money and human capital) are dispersed and deflected. Second, still regarding output but tied to the system of representation, research may be applied in terms of its research design, but it is not driven by product output, but rather by the publications and reports. Conversely, in industry research is often tied to the engineering process and refining the products they manufacture.⁹⁸ These different systems of representation have an impact on the output and expectation in the academia and industry collaboration.

f. The Role of Jakarta in the Social Facet

The role of *pusat* or central government is still highly regarded by the regions (*daerah*). The special allocation fund, which is part of the existing intergovernmental fiscal system⁹⁹ (Silver, Azis et al. 2001; Booth 2002), is still managed by centralistic means (Usman 2008; Usman, Mawardi et al. 2008). The lack of transparency on the central government's side, which requires 'lobbying activities' to the government in Jakarta, may have caused this centralistic character (Usman, Mawardi et al. 2008). The manifestation of policy as practices as enacted by practices of the actors in the science system elucidate as to how Jakarta reigns as the centre in the Indonesian science system.

The entry point, simply put, is policy as practices. Rather than emphasising implementation or pointing out fragmentation (Luhmann 1971; Fischer-Lescano and Teubner 2004) in policy¹⁰⁰, the analysis aims in the direction of how practices bring policy into being, in the ethnographic sense. By situating the policy as practices, I look at the social facet of science policy.¹⁰¹ I refer to the

⁹⁷ The form of control, as suggested by Nugroho, is that as long as the project is implemented and satisfies the (government) administrative requirement and the budget is used, then it is deemed successful (Nugroho 2012: 16-17).

⁹⁸ See chapter six of this thesis, which focuses on knowledge flow in the Jababeka Industrial Cluster.

⁹⁹ The current intergovernmental financial system structures 'equalisation grants', which consist of general allocation funds (*dana alokasi umum*), special allocation funds (*dana alokasi khusus*), receipts from the Land and Building Titles Administration fee, and Land and Building Tax revenue, as well as a portion of revenue arising from natural resource exploitation (Booth 2002: 246).

¹⁰⁰ Fischer, Lescano and Teubner follow Luhman's 'speculative hypothesis', namely that global law would embark on fragmentation in the social sectoral arena as opposed to territorial arena. The reasoning is the shift from the normative sphere (such as politics, morality and law) to cognitive conjecture (such as economy, science, technology). In the global society, this would denote that norms, particularly those of stipulations, values and goals, would not comply with pre-programme recognition patterns. Instead, the issue of learning adaptation would achieve structural dominance to enable structural conditions for learning within each social system must be sustained by means of normatisation (see Fischer-Lescano and Teubner 2004: 1000, as cited in Luhmann 1971).

¹⁰¹ See chapter two for an explanation of the social facet.

layering of different social interactions (i.e. collaboration and/or competition) between actors in the science system.

The manifestation of policy as practices hence exhibit *first*, how resources are *scattered*. The actors are predisposed to engage in various *proyek* ('projects') to supplement their income. These knowledge workers (i.e. researchers and engineers) tend not to be concentrated (geographically) in one working place. There are many avenues to get research funding, not only via the DIKTI research grant or RISTEK research grant, but also through the funding from BALITBANG of the ministries. *Second*, the *structure* that obstructs changes at the policy level is '*Widjojonomics*' and *proyekisme*. The former can be seen in the reluctance to increase the research budget (for research budget and for the allowance/*tunjangan* of research related profession), as expressed by the policymakers. The latter is shown in that, instead of implementing the already planned changes in increasing the research budget, there is a preference to resort to squeezing resources (i.e. money) into small amount of projects. *Third*, Jakarta is sociologically the 'core' pulling the control in the science system. By Jakarta I refer to the ministries located in Jakarta. It does so by reinforcing the spatial disparity whereby as shown in the *Insentif* RISTEK research grant, most of the recipients of the grant are universities located in Java. Linkage for collaboration is harnessed through the patronage and friendship tie (particularly with the upper echelons of the ministries level). These two linkages weave the social space of interaction between the actors. The visible form of the control yield towards academia (particularly R&D institutes) is the administrative output orientation of research projects and research themes (which is designed, by and large, by Jakarta). This restricts the collaboration between academia and industry, and may inadvertently push academia into the bureaucratisation process. Bureaucratisation is a process whereas the machineries of knowledge production in academia are captured by the routines of fulfilling administrative reports. This bureaucratisation process will risk the scientific character of the academia.¹⁰² Hence, Jakarta still persists in gripping the control of funding allocation in the centralised science system.

g. Summary

This chapter started by asking the question, what drives and perpetuate the working of the science system in Indonesia? I posit the answer is that the centralised character of the science system is what perpetuates the system in reality. To come up with this answer, I looked at manifestation of the state in its science policy in the normative facet and the manifestation of policy as practices as enacted by the actors in the social facet.

¹⁰² I expound the argument on the bureaucratisation process and academia in chapter eight.

The inquiry at the science policy inscribed in the normative facet concentrates on the manifestation of the state, on how the state is promoting centralisation the normative science policy. It begins by looking at the normative science policy applicable in the institutional (juridical) space. The thematic research themes in RISTEK focus on seven areas: food security, energy, technology and transportation management, information communication technology, defence and security technology, medicine and health technology, and advanced material sciences. There are two organisations that are architects of the national research agenda, namely DRN and RISTEK. DRN functions more as a unit of RISTEK. The accreditation of national journal is also carried out by the state. In this case DIKTI and LIPI are responsible for the accreditation. The regulation of researcher and lecturer as profession is assumed by the state, also by DIKTI and LIPI. Hence, the state reifies its control of science policy.

It then moves on the liberalisation embarked by the state. Indeed, it is also keen in liberalising the higher education sector and in the industrial cluster sector. In higher education, privatisation of seven state universities is underway, despite the current BLU format offered as a panacea to the situation. The private universities and polytechnics, however, have been and currently are leaning on the market to cover their costs. In manufacturing and industrial cluster-related policies, the investment related laws indicate a benevolent nod for having more FDI flowing in the country. This is indicated by the normative prescription emphasising more in tax holidays, tax incentives and labour policy. Less is shown in terms of reliance of technical standards and national standardisation norms. The automotive industry policy also shows the same pattern in its reliance import duty and luxury tax. This policy is in place despite the vacuous absence of technical standards for the automotive supplier companies in Indonesia. It shows how importing knowledge from the key automakers, in this case the Japanese automakers, is a much-favoured route. The industrial policy for clustering follows the 35 thematic clusters. This policy has several deficiencies, i.e. no definite bounded areas are designated; it is sectoral and not linked with policies from other ministry such as RISTEK; the bottom-up planning apparently does not function. Nonetheless, this policy is linked with the Indonesia's Economic Development Master Plan (MP3EI). The master plan itself is funded by JICA, carried out by a BCG consulting firm, and later on adopted by the Coordinating Ministry for Economic Affairs.

Going back to the earlier notion of manifestation, the state by way of the normative policy is manifested through its phobia (of not wanting to let go of the control of science), fragmentation (which relates with sectoral policy, and lack of integration between the industrial related policy with the local knowledge base as reflected in the standardisation norms) and building alliance with other countries, specifically Japan (for the collaboration in economic master plan and the JETRO linkage with the IMDIA). In economic liberalisation it enjoys its collaboration and sharing of

interest with another country, i.e. Japan. Science policy in Indonesia displays the multitude of interests that the state has in centralisation and liberalisation, indeed this is the *first foundational argument*.

The next manifestation is the policy as practices enacted by the actors in the science system. I trace this issue by observing two components: the spatial distribution of research grants and the practices of competition and/or collaboration in the science system.

To start with, the allocation of research grants in the *Insentif* RISTEK programme in 2008-2010 indicates a spatial disparity. The patterns held up the notion of how from 2008 to 2010 more than half of the recipients are universities located in Java Island. In 2010 around IDR 92 billion of funding (out of IDR 196 million) circulates in the R&D units of the ministries in Jakarta. A geographical disparity becomes evident.

Now, shifting to the actual practices of the actors, they (the individuals) face challenges in having functional career based ranking that tends to reflect seniority rather than merit. Further challenges arise due to the difficulty of accessing references and journals for research related work, and the poor remuneration. Thus, they engaged in various means to cope with the challenges. This includes taking up consulting offers, being entrepreneurial and setting up a business unit. Clearly this brings pressure to the functioning of the science system, the visible one is human resources is dispersed (lest there is organisational agency maintaining grip over the technique of individual supplementation). In addition, there are other 'doors' to get research funding, not only via the ones managed by DIKTI and RISTEK. These 'doors' sometimes are under the auspices of BALITBANG of ministries. Further competition is palpable in the level of cooperation between ministries and LPNK. For research as subject matter this lack of cooperation brings about duplication in research. Changes (or reform) in the form of raising functional allowances (*tunjangan*) for research related positions at the policy level are arduous. Policymakers opt for making these changes outside of the government routine spending. *Proyekisme*, i.e. dividing research packages into minuscule units, are then chosen to ensure that research is still carried out as part of the routines. Collaboration between the actors (researchers and policymakers) is possible on the grounds of friendship ties forged by previous working experiences or alma maters. Having a friendship tie with the persons holding office in the upper echelons of the ministries in Jakarta is thus essential. Furthermore, collaboration is also possible on the basis of patronage. It is by means of collaborating with key ministries, particularly MoHA, that programmes/projects (including research) can resource sharing (particularly in the form of co-funding) be possible with the local governments. The two elements forged the social space of collaboration among actors. This centralised science system and the way resources are dispersed have an impact on the linkage

of the academia and industry. The output orientation is tied to meeting the administrative requirement, attainment of the credits and the incomes that come with the research projects. Lack of research exposure as well as minimum research facilities exacerbate the condition enabling the linkage. Leading to the *second foundational argument*, it is Jakarta, which held an upper hand in the control of linkages (through patronage and friendship tie) and the control of scientific knowledge production (by way of its control in funding allocation). The latter may bring unintentionally the process of bureaucratisation with the output of research being assessed in terms of satisfying administrative requirements.

Thus science policy is not just legal rational decision-making carried out by the state. By juxtaposing the analysis in terms of normative and social facets, I have shown the logic behind the centralised science system in Indonesia. The study hence brings Jakarta and the state in the bigger picture of science policy. This is how knowledge is governed from the lens of science policy. Consequently, one should (re-)consider the role that the state has, and the actual yield that science policy brings. To this point, I return to the comment made by Satjipto Rahardjo, a prominent Indonesian professor in the sociology of law, on the role of Jakarta:

“It is (sometimes said that) policymakers see all of Indonesia from the Capital. Jakarta is becoming the point of reference from which the whole country is being controlled, engineered, and measured” (Rahardjo 1994).

Chapter 4

The Perils of *Pemekaran* in Bekasi District: The Regional Facet

Chapter three brought forth the argument that the science system in Indonesia is centralised. To what extent has decentralisation progressed? What are the existing capacities (in organisational terms and in producing knowledge) of Bekasi District Government? These are the main questions in this chapter, which guide the discussion of regional autonomy and special economic zone planning in Bekasi District, Indonesia. From the overall policy study in chapter three, I scale down to the Bekasi District in West Java, in order to observe the restricted capacity of the *pemekaran*¹⁰³ District Government. The regional facet discussed in this chapter is the third aspect of the ordering of the science system in Indonesia.¹⁰⁴ The term regional (in the regional facet) that I use is inspired by the work of Carl Schmitt¹⁰⁵ (2006), in this chapter this refers to the progression of decentralisation in the Bekasi District. *Pemekaran* itself is a logical consequence of materialising regional autonomy in Indonesia, an antithesis of the centralised authoritarian past during the Soeharto regime. In the period 1999-2009 there were 164 new district (*Kabupaten*) administrative units, 34 new municipality (*Kota*) administrative units and six new provincial (*Provinsi*) administrative units (Munawwaroh 2011). The hallmarks of *reformasi* are decentralisation (as opposed to centralisation) and ideally bringing the government closer to the people (Diprose 2009). The District Government of Bekasi is an output of post-*pemekaran* process. It used to be in unison with the City Government of Bekasi, before splitting and forming a new administrative area in 2004 (Interview, Cikarang, 22.07.2010).

I postulate that the *pemekaran* allows the utilisation of geographical space (i.e. government new administrative unit) for the competition of resources among bureaucratic elites. This has accelerated the centralisation process in the Indonesian science system.

The Jababeka Industrial Cluster in Cikarang is located in Bekasi District. Jababeka, Lippo Cikarang, Delta Mas, Hyundai, EJIP, Bekasi Fajar, and MM2100 are the industrial estates proposed to be an area of bonded zone or special economic zone in Bekasi (see also Setiawan

¹⁰³ The term *pemekaran* can be literally translated as regions or administrative units that blossom. The situation can be more precisely described as a region that splits into several regions/administrative units.

¹⁰⁴ The first facet is the normative facet, the second one is the social facet, both of which are related with the order of the science system. The term of 'order' refers to the working of the science system and how the state manifests itself in terms of the written norms (of science policy). See chapter two for further explanation.

¹⁰⁵ In his work of *Nomos of the Earth*, Carl Schmitt considered the history of the progression of International Law. He pointed out that unlike the Eurocentric spatial order, anti-colonialism lacks the capacity to create a new spatial order. I took the analogy of the formation of new states in International Law with the *pemekaran* or the formation of new administrative units at the region level in Indonesia. Just like states need claims on soils or *terra nullius*, new *pemekaran* units need such territorial areas. In the work of Schmitt, he showed how changes of territorial possession are inevitable and may pose a threat to the continuance of common spatial order. The binding feature of the complete spatial order is conceived as the balance (Schmitt 2006: 188). In the *pemekaran* new units, this balance is problematic.

2007). Batam was the initial predecessor to the special economic zone regions (Royle 1997; Phelps 2004). Furthermore, in early 2012, there were two regions that are conferred with the special economic zone status: Sei Mangkei Special Economic Zone¹⁰⁶ in North Sumatera Province and Tanjung Lesung Special Economic Zone¹⁰⁷ in Banten Province. Bekasi (where this research is located) had a population of 2,193,776 in 2008. It is located in the West Java Province, and remains a part of the peripheral area of the Jakarta Metropolitan Region (PMD-BAPPEDA 2010). The Head (*Bupati*) of the Bekasi District in 2010 is from the *Partai Keadilan Sejahtera*/Justice and Prosperity party, which is an Islamic party. The office of the local government of Bekasi, including the Police, the Public Prosecution office and the Judiciary are all located in Delta Mas area of Central Cikarang. The land titles of 40 hectares in the Delta Mas area were granted (*dibibabkan*) by PT. Delta Mas to the District Government of Bekasi (Interview, Cikarang, 06.08.2010, 08.07.2010). Delta Mas is a part of the Sinar Mas group company, which has close ties with the contract, strategic partnership as well as joint venture agreements with the Salim group (Haley 1997; Harianto 1997).¹⁰⁸ The industrial clusters in Cikarang originated and expanded before and after the post-*reformasi* Indonesia. Yet to date there has not been any conclusive study that observes the efforts of steering the progression of cluster development (into a special economic zone) by the local government.

Considering this brief backdrop, I pose the inquiry on the existing capacities of the Bekasi District Government in steering the cluster development. I take the case of the West Java special economic zone planning in discussing this subject matter in the first part. The second part focuses on how the *pemekaran* induced the bureaucratisation process of the Bekasi District Government. The form of knowledge being produced by the Bekasi District, in light of the absence of functional posts (*jabatan fungsional*), is the focal point of examination in the third part. Summary is then provided towards the end of the chapter.

a. West Java Special Economic Zone Planning

How is the West Java special economic zone planned? Who plays an important role? My analysis shows that this planning in West Java has been centralistic, and will likely to persist as such in the future. It has been, however, shared with the profit-oriented motives of the companies managing the industrial estates.

¹⁰⁶ Government Regulation No. 29 Year 2012 on the Special Economic Zone of Sei Mangkei.

¹⁰⁷ Government Regulation No. 26 Year 2012 on the Special Economic Zone of Tanjung Lesung.

¹⁰⁸ They are both Chinese business groups that are profit oriented in their operations. The Sinar Mas economic motives can be traced from, *inter alia*, its strategy in capitalising Indonesia's vast natural resources, and exporting technology by means of its foreign network (Harianto 1997).

The legal basis of special economic zone formation and proposal procedure is under the Act No. 39 Year 2009 on Special Economic Zone. There are several forms of the Special Economic Zones in Indonesia, namely: export processing, logistics, industry, technology development, tourism, energy and/or economy as stipulated in article 3 of the Act. Various incentives are in place for the special economic zones.¹⁰⁹ This ranges from the facilities for the importing of goods (which includes *inter alia*, customs tax deferral, import duties exemption), facilities for export, incentives on waivers or exemption on tax and regional retribution (*retribusi daerah*), to other forms of facilities. With the various facilities offered under the current law, the establishment of the special economic zone, which include the various facilities, will bring in more investment in the region. As stated beforehand, there are seven industrial clusters that are proposed to be part of the future special economic zone in Bekasi. They are Jababeka, Lippo Cikarang, Delta Mas, EJIP, MM2100, Bekasi Fajar, and Hyundai. The seven industrial clusters are proposed to be Bekasi Special Economic Zone. The Indonesian Association of Industrial Estates proposed this to the National Board for Special Economic Zone (*Dewan Nasional Kawasan Ekonomi Khusus*) in the year 2006. The profile of these estates is shown in Table 4.1:

Table 4. 1 Industrial Estates Proposed for the Future Bonded Zone in Bekasi District

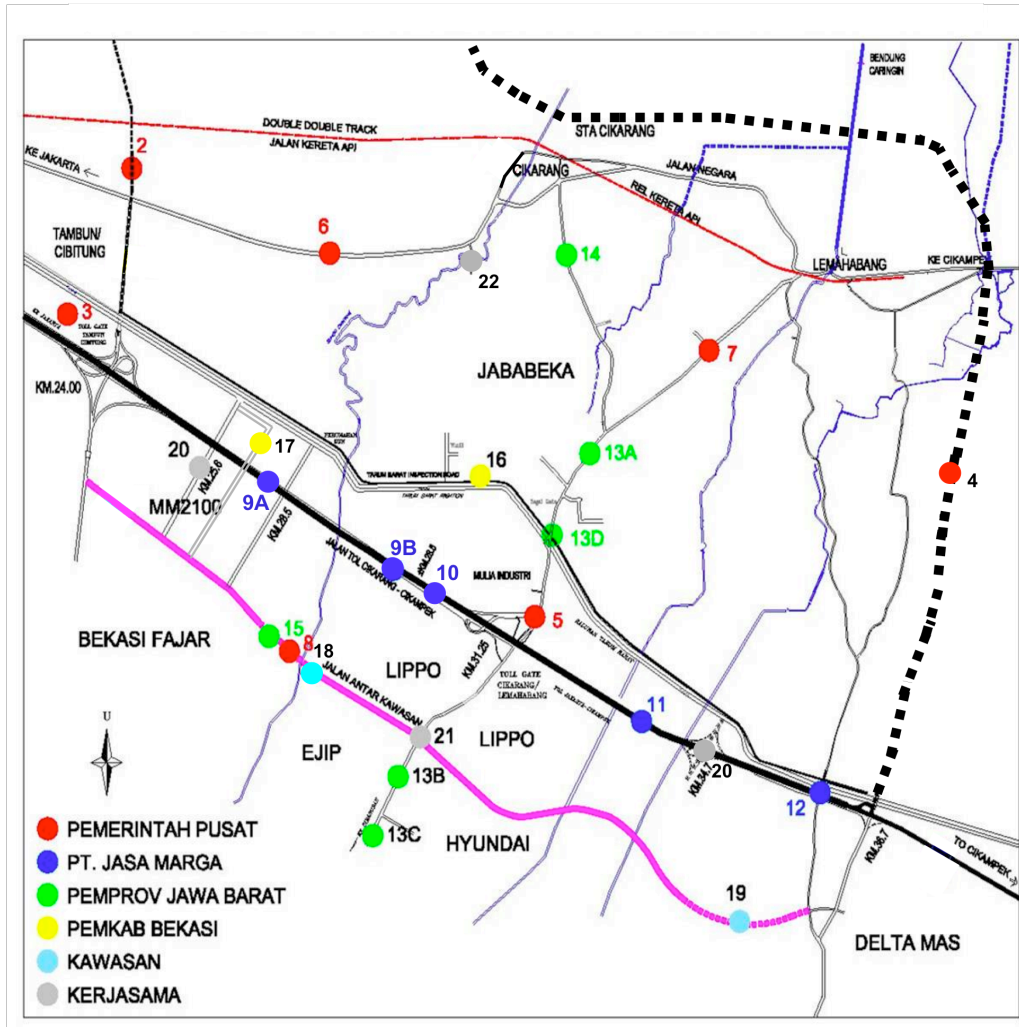
No	Industrial Estate	Number of Companies	Manpower		Production Value (USD. Billion)	Flow of Goods (USD. Billion)		Land Coverage (hectares)		
			Foreign	Local		Export	Domestic	Licences Owned	Built Area	Potential to be Built
1.	Jababeka	1.235	263	202.000	4,0	5,9 - 8,4	2,2	5.000	2.000	3.600
2.	Lippo & Delta Silicon	345	100	45.000	2,0	1,4 - 1,6	1,6	2.500	1.500	1.000
3.	Hyundai	140	127	10.000	1,4	0,0	1,0	200	200	0
4.	EJIP	100	90	43.000	2,9	3,2- 4,6	0,8	320	320	0
5.	Bekasi Fajar	42	38	12.000	0,8	0,0	0,4	2.100	985	1.115
6.	MM 2100	203	165	65.000	7,2	4,8 -7,2	1,4	1.200	805	395
7.	Deltamas	70	0	250	0,0	0,0	0,0	3.000	500	2.500
Total		2.125	748	388.250	18,80	15,1 - 30,0	18,80	14.920	6.310	8.610

(BAPPEDA 2007)

The milestone was the signing of a Memorandum of Understanding (MoU) in 2006 on the development of a special economic zone by the aforesaid industrial estates. The profit-oriented interests of the companies managing the clusters are clear: by pushing the international economic zone forward they would be able to sell more factory areas to companies. The MoU was then updated to involve more parties on the 6th of December 2006, including the Ministry of Public Works, PT Jasa Marga – a state owned company involved in managing the road infrastructure, the

¹⁰⁹ This is covered in article 32-36 of Act No. 39 Year 2009 on Special Economic Zone.

Province of West Java, and the District Government of Bekasi. A coordinating team was formed by the West Java Governor to build infrastructure in the industrial clusters in Cikarang.¹¹⁰ There were meetings that followed, including those with the Ministry of Finance and the Ministry of Industry (MoI). The distribution of responsibility between the different organisations can be seen in Map 4.1.



(BAPPEDA 2007)¹¹¹

Map 4.1 Shared Function between Organisations for the Special Economic Zone Plan

Based on the archival and qualitative interviews¹¹², it is possible to generate two inferences in respect to the preparation of the special economic zone. First, the West Java Provincial Government and companies managing the industrial clusters take the leading role in preparing the

¹¹⁰ Governor Decree No. 912.05/Kep.40 – Dalprog/2007 dated on 29th of January 2007.

¹¹¹ Translations of the terms used are as follows: *Pemerintah Pusat*: central government, *Pemprov Jawa Barat*: Provincial Government of West Java, *Pemkab Bekasi*: District Government of Bekasi, *Kawasan*: Companies managing the Industrial Cluster, *Kerjasama*: cooperation between different parties.

¹¹² I base this on the data (minutes of meetings, powerpoint presentations, keynote speech) provided by the West Java Province when I was in the field in February 2011. The data is from the year of 2006-2007. I could not get the same data pertaining to the master plan in 2012.

requisite infrastructure outside of the clusters. The internal cluster facilities and infrastructure will be catered by the industrial estates companies. Provincial government under the current decentralisation framework in practice tend to function more as a representative (*perpanjangan tangan*) of the central government (Ngakan, Achmad et al. 2005). A government official in the Bureau of Industry and Trade in the West Java Province conceded that the condition is that sometimes they act more as *kanwil*¹¹³ (*kantor perwakilan*/representative office) of the central government (Interview, Bandung, 04.02.2011). In the West Java special economic zone planning, the West Java Province involved the central government, i.e. ministries and state owned enterprises such as PT. Jasa Marga. The limitations of regional government budget (APBD) makes the project of realising a bonded zone only plausible with the support of the central government budget (APBN). The characteristic of the role of the provincial government, which represents more of the interests of the central government and the limited support from the APBD, shows the centralistic process. Second, there is minimal support from the District Government of Bekasi.¹¹⁴ In addition, there is also a lack of understanding of the clustering and international economic zone from the District Government of Bekasi (Interview, Jakarta, 04.10.2010). In one instance of a focused group discussion¹¹⁵ I was approached by one of the representatives from West Java Province and asked whether I knew anyone from the District of Bekasi. He then complained that it is difficult to coordinate and meet the officials in Bekasi, especially if he does not know the present incumbent with all the rotation that has been frequently going on (Informal discussion, Cikarang, 09.11.2010).

It has been the case the proposed plans of special economic zone yield not a distinct story to that in Batam.¹¹⁶ It will still be centralistic in character, yet it will be co-shared with economic motives of the companies managing the clusters. Then what does the Bekasi District Government do organisationally, being a new divided region due to the *pemekaran* process?

b. *Pemekaran* Facilitating Bureaucratisation of Bekasi District Government

The term *pemekaran* referred to the new divided region, whilst *daerah induk* referred to the (old) parent region (BAPPENAS-UNDP 2008). Past coverage of progress of these *pemekaran* regions

¹¹³ *Kanwil* is a term used during the New Order regime to denote to the term of representative office of the central government.

¹¹⁴ This was substantiated in the presentation of the Economic Assistant in the Regional Secretary office in the West Java (document date on 26th of November 2007).

¹¹⁵ In various FGDs I attended in Bekasi I associated myself more as a part of President University and thus sat more often with them as well as colleagues from Jababeka Group.

¹¹⁶ According to Phelps (2004), Batam has a particular typology of industrialisation that resembles more a 'hybrid experimental model of Indonesian-Singaporean social order', which was an output of a centrally planned postcolonial states.

has shown discouraging results. In a study carried out by UNDP and BAPPENAS¹¹⁷ the parent regions have indicated better performance in sectors of fiscal management, public service delivery, economic growth and government personnel than the *pemekaran* region. The *pemekaran* regions have also caused a strain on the state budget at the local and the central level, totalling IDR 76 trillion during 2001-2005, with most of the expenditures going to 'sticky' routine expenditures and the lump sum effect (DSF 2007). Most studies concerning *pemekaran* look at the process of regions fragmenting, which occurs due to a cooperative effort between groups and individuals at different territorial levels or territorial coalitions (Kimura 2010). Successful lobbying allied with powerful persons at the executive and legislative levels may contribute to the inception of these new administrative units (Booth 2011), in which the elites in Jakarta have played a role (Brata 2008; Kimura 2010). Claims over local cultural identity such as *putra daerah*¹¹⁸ have also been deployed in attempts to create new administrative *pemekaran* units (Bunnell 2009). A rather brief review carried out from the 1950s to 2001 indicates that this splitting process has been on-going since the 1950s, yet with different momentum (Booth 2011). This process is pushed by the interests of political and bureaucratic elites utilising ethnic sentiments to render their claims (Malley 2003; Nordholt and Van Klinken 2007). However, what happens after *pemekaran*? My study shows a different standpoint of Anne Booth (2011). Booth pictured Java as relatively stable compared to regions outside Java in its splitting of administrative units (2011:52). Java is also not immune to the process of *pemekaran*, particularly when there are resources available, as this shapes the territorial facet at the newly divided level. I argue that *pemekaran* has entangled the Bekasi District Government into a bureaucratisation process. This process is marked with the erosion of experiential knowledge and 'poor' governance (due to the kickback and patron client practices). *Pemekaran* therefore provides avenues for resource competition.

The issue of what the Bekasi District Government does (in terms of knowledge production) is to be probed from an organisational sociology point of view. The prior part (part a of this chapter) has shown how there is a lack of understanding and minimal support shown from the Bekasi District Government. In this part I address matters pertaining to the availability of functional assignments to certain professions, the rotation of human capital and various constraints in the usage of resources (in this case budget to support knowledge-based activities by the district government). Bureaucratisation hence inevitably becomes a major part of this discussion. Indeed, bureaucratisation is not a simple topic as such as it pertains to stratification, cultural change, (Evers 1987), and also territorial change. There are several reasons for the increasing growth of bureaucracy, chiefly that it can be a precursor to economic growth and highlights the responsiveness to the increasing tasks of a government in a complex society (Evers 1966; Evers

¹¹⁷ Here they sample the data based on the *pemekaran* areas outside of Java from 2001-2005 in Sulawesi Tengah, Sulawesi, Nusa Tenggara Timur, Kalimantan Barat, Jambi and Lampung. They use treatment control to evaluate the performance and the existing conditions of these new regions.

¹¹⁸ This can literally be translated as a 'native/indigenous son belonging to a designated area'.

1987). I shall not utilise a Weberian analysis of bureaucratisation, namely the increasing specialisation and rational principles in the bureaucracy (Weber 1978), and instead look at the practices of the civil servants.

Bureaucratisation is signalled with the augmentation of the numbers of government personnel. At the state level, the numbers of bureaucracy personnel are growing at the district/municipality level (BPS 2010). There were 14,000 civil servants at the Bekasi District Government level in 2011 (PMD-BAPPEDA 2010). It has been widely criticised as being ‘obese’ or oversized. However, the district government has stated that it still needs additional human resources for teachers and the medical profession (Tza 2011). The archival analysis shows that there was recruitment for civil servants in 2008 and 2009. In 2008 the total of 613 recruited included not only medical professionals and teachers, but also other positions of technical and general character ranging from human resources to agricultural specialists. The following passages provide the analytical description of bureaucratisation process in the Bekasi District Government.

The initial feature is the absence of non-administrative positions. Based on the qualitative interviews, there is an absence of functional positions or assignments, particularly planners and researchers. The functional or profession-based positions are regarded as ‘second class’, and are associated with a lack of prestige. I asked why there are no planners or researchers in the Planning and Development Regional Agency (BAPPEDA) at the District level, and a respondent who is a section head in economic affairs explained the reason in the following interview excerpt:

“The Head (*pimpinan*) in here well, has no focus and support yet to the functional assignment. So well, also these positions are like second class. I see for example in terms of allowances, they should be the same with (administrative) positions” (Interview, Cikarang, 08.07.2010).

He describes the minimum prestige and financial support given to these assignments at the BAPPEDA. The administrative positions are much more lucrative in terms of prestige, facilities and monetary compensation. For example, meetings are restricted to civil servants in certain administrative positions. This is usually termed as *pejabat di instansi yang terkait*, or people holding administrative positions at a certain level (Observation, Cikarang, 08.07.2010).

The next feature is rapid human capital rotation. During August 2010 through January 2011 there were two rotations of officials, with the rotation at the end of 2010 involving the reassignment of 200 officials (Informal discussion, Cikarang, 11.01.2011). This rapid rotation also contributes to the erosion of the experiential knowledge belonging to the civil servants. Such rotations do not seem to take into account the expertise of the person. They are made on the grounds of the hierarchical administrative rank in the bureaucracy (*golongan ruang kepangkatan*) (Observation, Cikarang, 17.07.2010). In a sense, regional autonomy has kept the rotation of individuals insular

within the bounded area of the administrative unit. A senior official in the field of trade and industrial policy in the West Java Province shared some of his experience. He described how reassignment of human capital after the New Order occurred only in one area in a district or municipality. He added that this makes it more difficult for learning (*pembelajaran*) of the Bekasi District Government officials, especially when working closely (including for industrial policy related affairs) with them (Informal discussion, Cikarang, 09.11.2010). Of course, during the New Order lobbying and linkage the central government would also be an additional factor for the reassignment of people. However, the fact that expertise is not taken into account in the current reassignment process is worthy of consideration. For example, the educational backgrounds of human capital working in the Bureau of Industry and Trade, and BAPPEDA are mainly of bachelor or senior high school graduates (Informal discussion, Cikarang, 17.07.2010). As a result, there are occasions where a division head is dealing with cooperative/industrial policy yet has no expertise, having previously worked in the sub district (*kecamatan*) level. The person, however, has a considerably high level on the hierarchical rank. This rotation has made it strenuous for the organisation to facilitate knowledge sharing internally in the organisation and knowledge exchange with the West Java Province.

An additional feature is the constraint of local government usage of budget. There is a great dependence on the central government balancing grant in the form of general, special allocation funds and tax share, and non-tax share. Table 4.2 illustrates this trend.

Table 4. 2 Actual Revenue of the District Government of Bekasi

Year	Regional/District Original Revenue	Balancing Grant	Total
2007	IDR 196,320,104,849	IDR 798,411,987,466	IDR 1,166,169,585,750
2008	IDR 249,063,806,936	IDR 977,738,732,256	IDR 1,398,270,356,705

(BPS 2009)

It is evident from the budget allocation (as shown in Table 4.2) that the District of Bekasi's revenue was subsidised quite substantially in 2007-2008. There was dependence towards these subsidies in the form of a balancing grant from the central government. Questioning bureaucratisation requires an inquiry towards the component of *belanja pegawai* or personnel expenditures. The budgeting that was made by the District of Bekasi complies with budgeting 'template' as stipulated by the Ministry of Home Affairs Regulation No.22 Year 2011 on the Guideline of the Local State Budget Revenue and Expenditures Year 2012. There is no separation between routine and development expenditure, instead the terms used are direct expenditure and indirect expenditure posts.

An observation is made regarding the allocation for the personnel expenditure from both of the posts by using statistics provided in the Central Statistics Agency (BPS 2009). In the fiscal year of 2007 this constituted 37.43% of total spending, increasing to 56.09% the following year. The character of the budget thus indicates both dependence towards central government subsidies and the quite significant spending for civil servants' expenses. This depicts a rise in the number of bureaucratic elites¹¹⁹ (for a discussion of elites see Bottomore 1993) supported by the *pemekaran* budget and process. As demonstrated by Evers, 'any firmly established social order contains already the seeds of a new social structure in the form of individuals or groups who might under certain conditions at certain times grow and develop into larger units, groups and classes' (1980a: 249). Such bureaucratic elites¹²⁰ make up the middle class in Indonesia (Gerke 2000). An estimation from the World Bank in 2011 (Manning and Purnagunawan 2011; World-Bank 2011) suggests that the middle class in Indonesia increased by over 50%, from 80 million to 130 million, during 2003-2010. The bureaucratic elites will likely further increase in numbers unless there is a moratorium of the *pemekaran* process, but they manifest a void in terms of competence and skills due to bureaucratisation and lack of functional positions.

The constrained budget is also due to the patron client relations (Eisenstadt and Roniger 1984) and 'kickback'. The former takes place in the form of clientele relations between the parliament members and the civil servants. A key informant told the experience of budget posting, in which they would sometimes receive pressure from the members of the local parliament to spend the budget in their constituency regions. The budgeting right is retained by the local parliament members, and non-compliance would mean the budget would not be approved (Informal discussion, October 2010). The latter manifests into the form of extra facilities such as cars provided for the head of the sub district (*kecamatan*) level at the right¹²¹ time (Observation, Cikarang, 14.07.2010). Both patron-client relations and the 'kickback' pushed the government into more bureaucratisation marked with spaces of corrupt resource competition.

However, the picture is not entirely bleak. The government is gearing 'one stop services' for the issuance of licenses/permits. They have established *Badan Pelayanan Perijinan Terpadu* (Integrated Permit Services Agency), also a new unit under the auspices of the Bekasi District Government. It

¹¹⁹ The term 'bureaucratic elites' refers to the elites who hold positions in the high level government officials and/or the individuals who have access to the state budget disbursement (see Bottomore 1993: 67).

¹²⁰ Having observed the interview process and various meetings, I cannot help thinking that despite the constraining budget for development related or now termed direct related expenditure, the situation remains normal. The government employees arrive at the office using their car or the shuttle bus in the morning, and after office hours they would hop in the vehicles. There are subsidies in the form of honorariums given to the government officials to top up the salary, which is low. The reality speaks to a different version than the numbers in the budget. In a 'business expo' held to promote the product of *kecamatan* in Bekasi district, one official told me that although Jababeka Group provided security and that there are also police in their emblematic presence and cars, they (the government) had to pay the local *preman* to not to disrupt the event (Informal discussion and observation, Cikarang, 23.07.2010). This represents the reality of the work of bureaucratic elites in Bekasi.

¹²¹ The right time means sometime before the local election for the new Head of District of Bekasi (*Bupati*) (Observation, Cikarang, 14.07.2010).

attempts to facilitate the processing and issuance of permits and licences in a one-stop service. It is therefore expected to reduce the lengthy bureaucratic procedures (Interview, Cikarang, 17.07.2010). The performance of such an agency will take time since it is relatively young in terms of operation. What the bureaucratisation process reveals, however, is a district government that faces challenges in terms of erosion of experiential knowledge (of the civil servants) and poor governance, which provides avenues for resource competition for the bureaucratic elites. The creation of a newly divided region (of Bekasi District Government) enables this competition of resources in the territorial facet.

c. Knowledge Production through Personal Linkage

In its current state, how does the District Government of Bekasi produce knowledge? The output of this inquiry suggests that new knowledge is produced in the form of studies (*kajian*), which are subcontracted to consulting services and/or attained by way of experts hiring. Here personal connections and linkages forged on the basis of alumnae ship facilitate the production of knowledge. The budgeting of these studies is referred to as development related expenditure (Interview, Cikarang, 08.07.2010). They are slotted in the *belanja tidak langsung* (indirect expenditures) of the local government budget (APBD).

The costs of the studies are treated *on par* with the goods procurement. Thus knowledge (namely these studies), as shown during the fieldwork, is presumed as goods and services under the President Regulation No.54 Year 2010 on the Procurement of Goods and Services.¹²² This means they go through the public procurement and tender process, being regarded as *proyek* and linked to the indirect expenditures related programmes.

In some cases the recruitment of experts is made via the *swakelola*¹²³ contract, as according to the President Regulation No. 54 Year 2010 these experts cannot be recruited directly through a government-academia network of cooperation. An expert in Bekasi would be an external resource person for a consulting project or *swakelola*, or someone in the office who has more experience in the matter concerned. This is visible in technical meetings where a presentation has to be given, whereby the expert would be sitting fairly close to the head or director providing the advice. This arrangement is referred to as *didampingi*, or to be assisted (Informal discussion, Cikarang, 11.01.2011). The intention behind this *swakelola* programme and open e-procurement is to enable a transparent system. This, however, does not always achieve the rationale of the system. The case of the recruitment of experts either through consulting or *swakelola* in the BAPPEDA shows that

¹²² This policy was later revised in 2012. The latest policy is the President Regulation No.70 Year 2012 on the Government Goods and Services Procurement.

¹²³ *Swakelola* may be literally translated as self-management.

alumnaeship significantly contributes to the hiring of experts. The rationale of experts is of course the track record, but also of *kenal baik* or familiarity as well as alumaneship (Interview, Cikarang, 08.07.2010). The STPDN¹²⁴ (now known as the IPDN) linkage through its alumaneship is acknowledged in terms of its importance (Interview, Cikarang, 08.2010). The consideration is not of geographical proximity¹²⁵ or the prestige of the academia *per se*, but rather the familiarity and the alumnaeship.

During the consulting phases of these studies (*kajian*) there are knowledge sharing activities between the civil servants and consulting agencies, and feedback may be given in the first reporting phase. Apart from being kept in the reports, the knowledge produced from these studies is also kept in the tacit individual level. This is particularly evident when considering the lack of effective filing systems or the minimum usage of ICT in the administration of the government agencies in the Bekasi District. The rotation of human resources contributes to the erosion and loss (Evers and Wall 2006) of this tacit knowledge, as after the studies are carried out some of them are reassigned to another post. Therefore once the person who carries the knowledge is moved to a new and different position, the knowledge is likely to be missing. One such illustration is the *Rancangan Perda* (draft on the local regulation) of the relocation of *Pasar* (traditional market) in Bekasi. From the consulting project towards a draft of *Rancangan Perda*, the flow of planning and materialisation has been kept intact. Yet this failed to materialise in a regulation in the DPRD (local parliament), because, among other reasons, the person involved from the beginning was moved to a different position in another office (Interview, Cikarang, 04.08.2010).

Therefore the creation of new knowledge in the form of studies or recruitment of experts (in order to seek their advice) is likely to be eroded due to the rapid human capital rotation in the Bekasi District Government. The recruitment of experts is subject to the familiarity and alma mater instead of spatial proximity, whilst these studies are assigned with an equal footing with goods procurement.

d. Summary

The chapter starts with a sceptical tone, by asking to what extent the science system is decentralised and the existing capacities of the Bekasi. It aims to show the organisational capacity and knowledge production of Bekasi District Government and to illuminate the progression of the West Java Special Economic Zone Planning.

¹²⁴ STPDN (*Sekolah Pemerintahan Dalam Negeri*) now has changed into IPDN (*Institut Pemerintahan Dalam Negeri* or the Home Affairs Government Institute). It is located in Bandung, West Java.

¹²⁵ I asked if they would consider recruiting from other universities, especially those close by in the Cikarang or Bekasi area, but I was shown a lack of interest (Interview, Cikarang, 08.07.2010).

The first part discusses the West Java Special Economic Zone Planning. Under the current legal framework, i.e. Act No. 39 Year 2009, special economic zone may take several formats in Indonesia. They include zones for export processing, logistics, industry, technology development, tourism, energy and/or economy. Various facilities range from import facilities, export facilities to tax exemption and other regional levies (*retribusi daerah*). It is expected that with the establishment of the special economic zone, more investment will flow. In West Java Province there are seven industrial clusters that are part of the proposed special economic zone. They are Jababeka, Lippo Cikarang, Delta Mas, EJIP, MM2100, Bekasi Fajar, and Hyundai. The proposal for the establishment of such a zone was filed in 2006 by Indonesian Association of Industrial Estates on behalf of the companies managing the aforesaid clusters. It was later on the West Java Province, Bekasi District Government and ministries joined the plan. The preparation of the special economic zone indicates that the West Java Province functions in a more dominant way in terms of planning. In here the West Java Province for the industrial cluster related planning act as more as a *kanwil*, a representative of the central government. Furthermore, support for the physical infrastructure for the special economic zone preparation will only be possible with the backing of the APBN (the central government budget). The Bekasi District Government has been slow in responding to the plan, demonstrating minimal understanding and a lack of support. The planning shows that it is centralistic and will likely coexist with the profit-oriented motives of the companies that are managing the clusters.

The second part discusses how the Bekasi District Government organisationally is entangled in a bureaucratisation process. I investigate this from the angle of organisational sociology. The numbers of bureaucracy personnel in the Bekasi District Government are growing. There were 14,000 civil servants in 2011. Further recruitment for civil servants took place in 2008 and 2009. Indeed for the purpose of the study, bureaucratisation is marked with the growth of numbers of bureaucracy personnel. The first feature of the bureaucratisation process in Bekasi is the absence of non-administrative positions. The functional positions are perceived as having a second-class rate due to the minimum prestige and lack of financial support for these positions. The next feature is frequent human capital rotation. Between August 2010 and January 2011 there were two instances of rotation. In 2010 there were 200 officials reassigned in different government levels. This leads to the loss of experiential knowledge belonging to the civil servants, as the process does not take into account the expertise of the person. It is made based on consideration of the hierarchical administrative rank in the bureaucracy. These frequent rotations have made it difficult for the government officials in the West Java Province to work with the officials in Bekasi District Government. In addition, this has made it difficult for the government organisation to facilitate knowledge sharing internally. Moreover, the government is also curbed in making use of the budget, which is the subsequent feature of the *pemekaran* government. The Bekasi District

Government budget shows a dependence on the central government balancing grant. The budgeting is indeed made with the current model under the auspices of the Ministry of Home Affairs Regulation No. 22 Year 2011 on the Guideline of the Local State Budget Revenue and Expenditures Year 2012. Closer observation indicates that the budget spending and revenue depends substantially on the balancing grant and allocated for civil servants' expenses. This process augments the increase of bureaucratic elites. Furthermore, the constraint in the budget usage is due to patron-client relations with the parliament and the various 'kickbacks'. Except if the process of *pemekaran* is reviewed, the bureaucratisation process will pose the Bekasi District Government to the erosion of experiential knowledge and the poor governance. What *pemekaran* did is provide the geographical space (by being divided into a newly government unit) for the bureaucratic elites to compete for resources (in this case, money).

The third part looks into the means of day-to-day knowledge creation in the Bekasi District Government. Knowledge is created in the form of studies (*kajian*) and recruitment of experts. The ways the studies are managed are similar with the goods procurement. In several cases, the recruitment of experts is made via the *smakelola* contract. An expert is someone who has more experience in the office or an external resource person. Recruitment of experts, however, is subject to the network of linkage made on the basis of alma mater and/or familiarity. During these studies, there are knowledge sharing processes taking place between the consultants with the government officials. The output is kept tacit in the individual level. Along with the human resources rotation, the tacit knowledge tends to be lost as the individuals are in charge with a task that may significantly differ from his or her previous post.

Consequently, based on the analysis of the chapter, what was intended to be an antithesis of centralisation, in fact, reinforces centralisation. The regional facet of the order of the science system thus relegates the progression of decentralisation by harking back to centralisation. The *pemekaran* provides the geographical space for the process of bureaucratisation and the competition of resources between bureaucratic elites and actors seeking benefits from the new resources created in the Bekasi District Government. This impacts the planning of the West Java Special Economic Zone, which by large is planned by the centralistic manner and shared with the economic oriented motives of the cluster developer (i.e. companies managing the estate). These are the perils of *pemekaran*.

Chapter 5

The Characteristics of Jababeka Industrial Cluster

What are the locational characteristics of Jababeka Industrial Cluster and how does this affect the internal structure¹²⁶ of the cluster? These questions guide the inquiry of spatial and socio-economic characteristics of the Jababeka Industrial Cluster as stated in the heading of this chapter.

The discussion of locational impact on economics was pioneered by von Thünen in 1826 (Fujita 2010; Nordin 2012). Von Thünen, as suggested by Johansson and Forslund, forwarded the central notion that spatial structure is influenced by the assumption that the delivery of goods between seller and buyer is distance sensitive (Johansson and Forslund 2008). Marshall (1920) coined three reasons as to why the localised economies of scale would exist, namely the local knowledge spillovers, the local non-traded inputs produced under scale economies and a local skilled labour pool (see also McCann 2008). An inquiry of the locational characteristics of the cluster is vital not only in terms of the economic growth, but also for technological as well as institutional (in the sense of global and regional trade framework) reasons (McCann 2008: 24-25). By focusing on the issue of location, I aim to bring physical geography back in industrial cluster study and tie it to the overall knowledge capacity of the cluster. An insight into the core-periphery structure of the industrial cluster in Bekasi was offered by ITB in 2010, in which they carried out research on supply chain linkages and industrial clusters. The study highlights that the core area of industrial clusters in the Bekasi District is located in Cikarang Sub District (*kecamatan*) (Observation during FGD, Cikarang, 09.10.2010). They based this claim on the actual and potential linkages of small and medium enterprises, and by not having focused on a particular industrial cluster in Bekasi District (Observation, Cikarang, 09.10.2010). However, an issue remains unanswered. How does this linkage pushed by the supply chain affect the internal structure and the knowledge base of the cluster?

In this chapter, I utilise the concept of knowledge cluster to make inferences about the industrial R&D capacities of the industrial cluster of Jababeka. Scholarly analysis of epistemic landscape has been carried out in Vietnam (Evers and Bauer 2009; Bauer 2011) and in Malaysia (Nordin 2012) showing the knowledge dense areas. They did this by using knowledge workers as the unit of analysis. Due to data restriction in the field¹²⁷, in using this concept, I rely more on the qualitative

¹²⁶ By internal structure I refer to the spatial core-periphery progression of the cluster.

¹²⁷ I cannot attain the overall manpower distribution of the companies located in the cluster. The data provided by the BPS (National Statistic Agency) uses the *kecamatan* (sub district) in Bekasi as measurement base of the background of education. The companies could not disclose data such as the human resource matrix that shows the level of training.

interviews to make inferences about R&D capacity and (as shall be explained in chapter six) on the knowledge flow in the cluster.

I contend that location is the prime attraction of the Industrial Cluster of Jababeka, as the cluster functions to facilitate the supply chain. The output of the cluster is likely not to be new product (or new parts) development; rather, it is, as I shall substantiate later in chapter six, tacit experiential knowledge pertaining to the production process.

The key role of location is signalled in the privatised spaces and tension in the cluster. The company managing the cluster exerts its profit-oriented interests in the cluster development. The importance of location is shown in the spatial proximity of the companies with customers. The cluster is an industrial agglomeration pushed by the supply chain instead of government thematic cluster policy. Despite being an industrial agglomeration, the cluster exhibits a core-periphery spatial progression. It is due to the locational reason the cluster then functions less as a knowledge-based cluster, as marked in the lack of R&D.

The organisation of the chapter is as follows: the first part (part a) will look generally at the subject matter of location in the context of the cluster development, the role of the cluster developer (i.e. Jababeka Group) and the social relations between the actors inhabiting the cluster. The second part (part b) will delve into the issue of location by observing the spatial distribution of the companies, the reasons of opting location in the cluster and discussing the core and periphery structure. The third part (part c) will elaborate on the capacity of the cluster to emerge as a knowledge cluster. The fourth part (part d) will sum up the discussion.

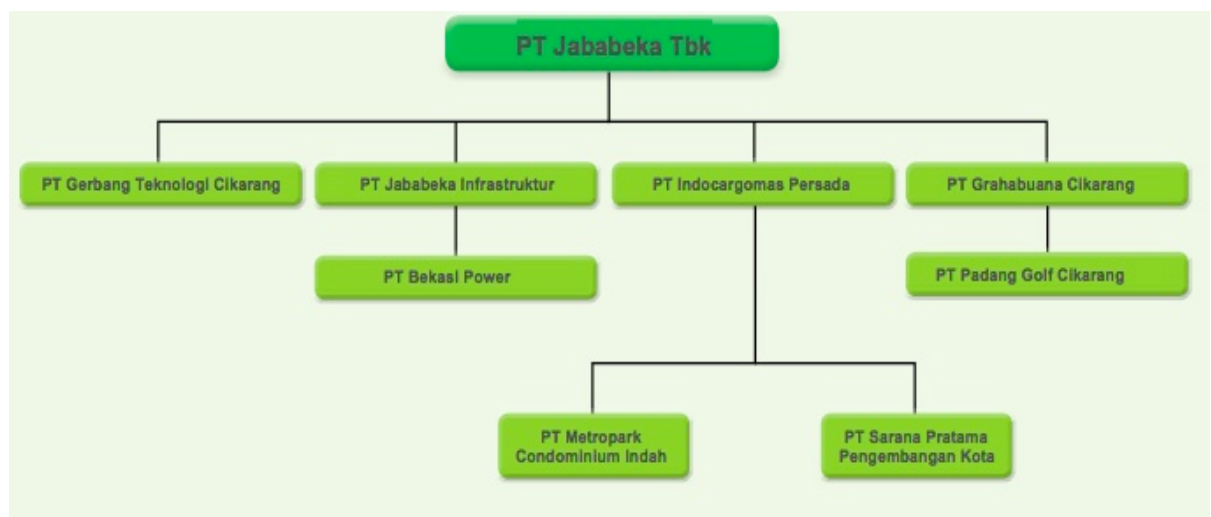
Specifically for parts b and c of this chapter (as well as chapter six of this thesis) I will use the data from automotive supplier industries. The automotive industry has been selected in this study as part of the manufacturing industries, which comprise a major part of the Jababeka Industrial Cluster. By considering the process of knowledge flow in these companies (the majority of which are suppliers), one could infer the knowledge dynamics of the cluster. Furthermore, within the fieldwork most of the companies willing to be interviewed in this research were such automotive supplier companies. Finally, taking into consideration Indonesia's automotive policy¹²⁸, which implies the reliance on knowledge flow from automakers or customers, one could infer how this affects the knowledge base of the cluster.

¹²⁸ This discussion can be found in chapter three part b on the hype of liberalisation. I discuss in part b the reliance on fiscal policies and import of knowledge from the Japanese automakers.

a. Location as Imprint of Privatised Spaces & Tension

The focus of this part is on the location as the imprint of the privatised spaces and tension. This is the first characteristic of the Jababeka Industrial Cluster. The Jababeka Industrial Cluster is developed primarily for the companies inhabiting the cluster and reflected the profit-oriented motives of the cluster developer (i.e. Jababeka Group). To corroborate this, I will discuss the company managing the cluster (or the cluster developer), the historical backdrop and social relations between groups and/or actors in the Jababeka Industrial Cluster.

The cluster developer is PT Jababeka Tbk, or Jababeka Group. Jababeka Group was established in 1989 and has been listed in the Indonesian Stock Exchange since 1994. It is the first estate developer to have gone public in terms of capital ownership (Jababeka 2010). In total there are eight companies managed by the Jababeka Group.¹²⁹ The structure of the Jababeka Company as a group can be observed in Figure 5.1:



(Jababeka 2010)

Figure 5. 1 Structure of the Jababeka Group

Jababeka Industrial Cluster's master plan is devised by the Jababeka Group.¹³⁰ This is also visible in the residential area. In 2010, the Jababeka Group had an increasing net income of 62.1 billion IDR in 2010 (Jababeka 2010). This income was accrued from a wide range of activities including industrial plot and residential housing sales, and infrastructure and services including electricity. In

¹²⁹ I argue in my seventh chapter part a that there are in fact not eight but nine companies of Jababeka. The ninth is President University, which cannot escape the influence of its founders.

¹³⁰ This can be captured in the Jababeka Group website: <http://www.jababeka.com/city/8/masterplan/ind> (website accessed on 21st July 2012).

an interview with S. D Dharmono, who is a Chinese *Peranakan* Indonesian,¹³¹ he stated that four segments of Jababeka Group are prioritised¹³² (Ririh and Kusumaputra 2011). The primary segment, however, is selling industrial plots/land to the factories, although the remaining three will also be developed for the balanced income of companies (Ririh and Kusumaputra 2011). In addition, the influx of FDI in Indonesia has spurred sales of industrial property in Jababeka Industrial Cluster to 197.9 billion IDR in 2010, with 32% (or 63 billion IDR) of these sales coming from FDI (Jababeka 2010).¹³³ The focus of the Jababeka Industrial Cluster development, hence, is on providing services for the tenants and selling industrial plots.

It is not only the industrial cluster and the residential areas that are planned by the Jababeka Group. The overall city (where the industrial cluster and the residential areas are based) is branded and will likely to be developed with the 'Jababeka' emblem. There was a shift towards "beyond property" of Jababeka Group in 2007 marked by the embarking on more demanding physical development projects, namely that of the Medical City and Indonesia Movieland (Hudalah and Firman 2011). Usage of the slogan, "Jababeka: Home of President University" is evident in the field (Observation, Cikarang, 01.06.2010), in the entrance of Jababeka City. The shift is also apparent in the development of SME centre at the *Segitiga Emas Jababeka*¹³⁴ and the establishment of President University-Jababeka Innovation Centre (PU-JIC), managed jointly by the Medical City and President University (Observation, Cikarang, 20.09.2010). Once the Dry Port started to function, this slogan was later replaced with 'Cikarang Dry Port'. The brand currently employed by Jababeka is *Kota Mandiri/Independent City* (Kartajaya 2009), implying a city that is managed and planned not by the government but by the Jababeka Group.

Having discussed the cluster developer, I will now focus on the Jababeka Industrial Cluster, which is often termed as KIJA (*Kawasan Industri Jababeka*). It started business in 1989 when the West Java Province provided a permit to the 21 businessmen consortium to develop land located in Bekasi into industrial estates. The lands were previously unproductive and mainly used for making rooftop materials (*genteng*) (Kartajaya 2009). The name 'Jababeka' stands for Jawa Barat and Bekasi. The Jababeka Group claims to facilitate over 1,400 companies in the Jababeka Industrial Cluster, occupying across 5,600 hectares in Cikarang, Bekasi in 2010. Back in 1989, it was only 500 hectares (Kartajaya 2009). It is the largest industrial estate in Cikarang and Southeast Asia (Hudalah and Firman 2011). In the cluster itself there are wide ranging facilities available, including 24 shopping malls, a golfing area and hotels. In 2007 the cluster was the place of work

¹³¹ He currently holds the position as the President Director of the PT Jababeka Tbk, and he has a considerable network among top-level officials in the government ministries in Indonesia.

¹³² These include industrial land/plots, residential building sales, commercial building and recurring income.

¹³³ New investors are typically from the U.S.A, Taiwan and South Korea, and they focus more on electronic industries and consumer goods (Jababeka 2010: 24).

¹³⁴ This can be literally translated as the Golden Triangle of Jababeka.

for 350,000 workers (Jababeka 2007), and there were 958,000 inhabitants living in the city (Jababeka 2007).

As the focus of the development of the cluster is geared towards providing services (apart from selling industrial plots), the companies (as illustrated in Figure 5.1) provide an array of services for the companies situated in the Jababeka Industrial Cluster. ‘Tenant’ is a term used by Jababeka Group employees to refer to companies residing within the cluster. For electricity services, the Jababeka Bekasi Power plant supports the electricity supply of industries in Jababeka Industrial Cluster, and also in some cases to PT. *Perusahaan Listrik Negara*/State Owned Electricity Company (Suprpto 2009). Other related services, namely wastewater management and social events such as weekly tenants’ meetings, are also organised by PT Jababeka Infrastruktur (Interview, Cikarang, 08.08.2010). Another service dispensed by the Jababeka Group is related with the shipment of goods through the Dry Port. Cikarang Dry Port located in the Jababeka Industrial Cluster is an initiative propelled by Jababeka Group. It invested in the emplacement enabling the connection between the Dry Port and Tanjung Priok Port via the railway (Jababeka 2010).¹³⁵

Consequently, the physical development of the cluster’s facilities, services and the residential areas are privatised and planned by the Jababeka Group.

Tension is the next locational imprint of the cluster. I will now concentrate on the social relations between the actors and groups in the cluster. An observation in the cluster shows that there is a rapid change of land title functions from agricultural paddy fields to factory areas. It was reported in 2011 by Media Indonesia newspaper that the land dedicated for agricultural paddy fields has significantly decreased to a mere 54,000 hectares out of the 127,388 hectares of total area in the Bekasi District (Media-Indonesia 2011). In the past 20 years, there has been a decrease of agricultural land use up to 5,000 hectares (Media-Indonesia 2011). The opening up and functioning of the industrial estates since the 1980s and the toll-way connecting Jakarta-Cikampek have precipitated this significant decline (Media-Indonesia 2011). The land title usage for factories is being managed by one of the Jababeka affiliated companies, justified with the principal approval permit under the Government Regulation No. 24 Year 2009 on Industrial Estates (*Kawasan Industri*).

There is indeed some tension between the Jababeka Group with the District Government of Bekasi. This arises from the management of the land between the *Kelurahan* (sub District of Bekasi) and PT. Jababeka Infrastruktur’s mid-level management (Interview, Cikarang, 08.07.2010)

¹³⁵ A Memorandum of Understanding was signed between PT. Kereta Api Logistik Indonesia (Indonesia Railway Logistic Company) and Jababeka on 30th September 2010 to enable this railway connection (Jababeka 2010: 14).

due to some extra time being taken in the administrative procedure.¹³⁶ At the top-level management, however, communication appears rather fluid, with the Head of Planning and Development Agency (BAPPEDA) at the Bekasi District often playing golf with some of the upper management individuals of the Jababeka Group Company. The tension between employers in charge in one of the affiliated Jababeka Group companies and the District Government at the *kelurahan* level indicates possible conflict relating to land titles.

Relations between ethnic groups are also uneasy. The Madurese who came as migrants to live in the Bekasi area in 1990s started their business by recycling industrial waste (Achmad 2011). This business is typified as being dirty, low and lacking in prestige (Achmad 2011). However, it is a booming and thriving business due to the development of industrial estates, and this has consequently caused a stir amongst the local *urang* Bekasi, since some of them rely on petty trading and agribusiness (Interview, Bandung, 04.02.2011). The licence issued for waste recycling is being treated as an object of market transaction (*diperjualbelikan*) between local officials and businessmen (Interview, Bandung, 04.02.2011). Some of these wealthy Madurese are living in the Tropicana residence and maintain a solid linkage among their ethnic group. The lack of stable occupations¹³⁷ available for the *urang* Bekasi may have caused this tension between the locals and the migrants.

The residential site where the individuals live is physically segregated. This physical segregation (see also Hudalah and Firman 2011: 7) becomes visible once having lived in the cluster on a daily basis. The Japanese expatriates living in Bekasi normally live in the condominium at Sahid Jaya Hotel in Lippo Cikarang. The white-collar workers (including Korean expatriates) live in the Metropark Condominium or in the exclusive *kost*/mini apartment. Alternatively, some upper-middle class Indonesians live in luxury housing with gated security in the Tropicana residential area, or the Veranda Golf Townhouse. The locals, or *urang* Bekasi, normally reside in *kampung* areas. They are pushed deep between the high walls of industrial estates or in the borders, as evident in the street in Cibitung that heads to Karawang. This physical segregation is emblematic of the *Kota Mandiri*.

Hence, what unfolds from the characteristics of the location is privatised spaces and tension. The tension is exhibited between different actors/groups and rapid change of land title pushed by the economic interests of the private company managing the cluster. I have also shown that the

¹³⁶ A respondent from Jababeka Group stated that this is a strategy from the *Kelurahan* to charge extra unofficial costs (*minta uang*) (Interview, Cikarang, 08.07.2010).

¹³⁷ I have come across two companies that explicitly stated their unwillingness to recruit the locals (indigenous) in Bekasi for operator level positions or supervisor level positions on their shop floor. Despite this, I also found that there are *urang* Bekasi and *urang* Karawang working actively on the shop floor. They speak a distinct Sundanese language different than that in Bandung or Cianjur area.

industrial cluster development is driven by profit-oriented interest of the Jababeka Group, this privatised the spatial development of the cluster. Further physical development of the cluster will bear more privatised spaces; both in the form of industrial land plots being sold or residential housing being built.

b. Location Facilitating the Supply Chain Network

The second characteristic of the Jababeka Industrial Cluster is that the location of the cluster functions more to facilitate the supply chain linkage. The physical distribution of companies within the Jababeka Industrial Cluster exhibits an uneven spatial progression designated to facilitate the supply chain linkage. I look at the spatial distribution of the companies in terms of size and business sector. I use the core-periphery distinction¹³⁸ (Friedmann 1963; 1966; 2001) for this spatial analysis. Prior to going further in making the case for the argument (i.e. that the cluster's location functions more in terms of the supply chain linkage), the next paragraphs will present a general description of the cluster.

Jababeka Industrial Cluster & Jababeka Education Park

There are three parts of Jababeka Industrial Cluster. First there is the Phase I Jababeka and Phase II of Jababeka Industrial Cluster. There is also an education park located quite close to Phase II Jababeka that has become an inseparable part of the package of Industrial Cluster of Jababeka. They are depicted in Map 5.1.

¹³⁸ This term is also explained in chapter two of the thesis.



Source: (Jababeka 2008)

Map 5. 1 Jababeka Industrial Cluster & Jababeka Education Park

Phase I was the first developed in 1990, and it covers 739 hectares in total. Phase II was later developed with a joint venture agreement to develop the High Technology Industrial Estate with Jurong Town Corporation in Singapore (Kristyanto 2000). The joint venture enabled the acquisition of 246 hectares of industrial area in Cikarang. Thus by 1996, Jababeka had embarked upon the expansion of two phases, each known as *Jababeka Satu* (Phase I Jababeka), or *Jababeka Dua* (Phase II- Jababeka) (Interview, Cikarang, 08.08.2010). The popular *Pasimal*³⁹ is located in the Pecenongan Square between Phase I and Phase II. In terms of the capital origins¹⁴⁰ of the companies located in Phase I and Phase II, Indonesian companies make up the greatest proportion of the industrial cluster member companies.¹⁴¹ The second largest group of countries are China, Japan and Korea, which account for 384 companies. It is evident that the cluster is mainly comprised of Indonesian or national industries.

¹³⁹ *Pasimal* is an abbreviation of *Pasar Siang Malam*, this translates into English as Night and Day Market. In the *Pasimal* one can find business offices, restaurants, shops and internet cafes. During lunchtime and dinner these areas are mostly crowded with employees and workers enjoying their meals.

¹⁴⁰ By origins I mean the capital ownership of the companies based on the countries.

¹⁴¹ Despite this physical development of the industrial cluster including the education park, important decision-making and meetings pertaining to the industrial cluster are likely to be taken not in Cikarang where the cluster is based, but rather in *Menara Batavia* in Jakarta, which refers to a building where the board of directors are based.

The Jababeka Education Park was established in 2001 (Jababeka 2010). There are two higher education organisations functioning within the park: President University and ATMI Polytechnic Cikarang.¹⁴²

Thus, the general description of the area of the cluster indicates that there are three main areas of the Jababeka Industrial Cluster: the Phase I Jababeka Cluster, Phase II Jababeka Cluster and the Jababeka Education Park.

Industrial Agglomeration

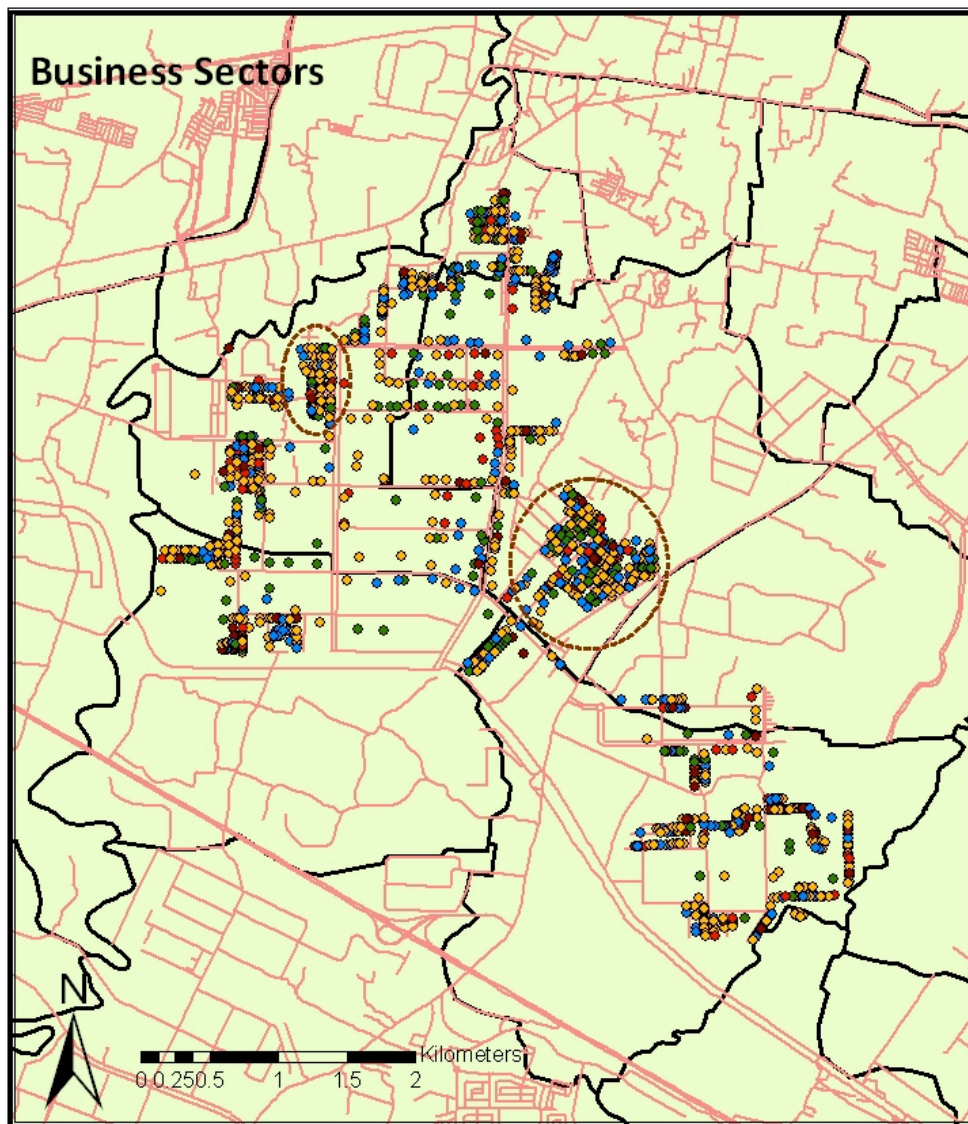
I assert that the cluster is formed as an industrial agglomeration pulled by the supply chain linkage. In order to pursue this argument I combine the map analysis with the result of qualitative interviews.

Herein, I first inquire about the spatial distribution of the companies in terms of business sector to substantiate the argument that the Industrial Cluster of Jababeka is a form of industrial agglomeration; it is not pushed by the government clustering policy. This is displayed in Map 5.2¹⁴³ The majority of the companies located in the cluster are manufacturing companies.¹⁴⁴ The industrial characteristics of the Industrial Cluster of Jababeka are primarily manufacturing and supporting industries; they are mixed and not categorised based on business sectors.

¹⁴² These two organisations are discussed in chapter seven.

¹⁴³ The maps (Map 5.2, Map 5.3) are produced based on the existing data of companies from BTC at RISTEK, BTC at President University and Jababeka Company in 2008. The GPS coordinates are attained using Google Earth maps, which are dated 20th July 2003. By using a combination of addresses from the companies' data and the map provided by Jababeka and Google Earth, the GPS coordinates are carefully marked down. The result will be discussed in the coming paragraphs. Based on the map, there are a total of 1,037 organisations located in the Jababeka Industrial Cluster.

¹⁴⁴ The five categorisations above have been made from more than thirteen categories available in the data. Automotive, electronic and manufacturing (supporting) industries represent the majority, with 581 of the companies in this sector. Food and consumer goods is the second most represented business sector according to companies located in the cluster.



Legend

Jababeka Industrial Cluster

- Automotive, Electronic & Manufacturing
- Food & Consumer Goods
- Chemical & Pharmacy
- Others
- Trading & Services
- ▭ Village Administrative Boundaries
- Roads Infrastructure

(Source: Author's Own GIS Map & Data)

Map 5. 2 Analysis Based on Business Sectors

The mixture of business sectors is apparent in Map 5.2. On the one hand, one can find that a company running a business line of automotive supporting industry is positioned adjacent to a

company that provides food and catering services.¹⁴⁵ On the other hand, there is a company running business in chemicals, located not too far from a food and consumer goods company.¹⁴⁶ This indicates that the clustering process is not pushed by the 35 thematic government cluster policy as prescribed in Government Regulation No. 28 Year 2008 on National Industrial Policy.¹⁴⁷ In fact, the marketing of Jababeka Group plays a significant role in the mix of locations of the various business sectors of the companies (or in their words, the ‘tenants’). They focus on selling the industrial land plots without having a clear plan of designating the cluster thematically. For instance, the marketing staff actively organises events such as CEO Gathering to provide bait for future services and approach future ‘tenants’ about buying the industrial land plots (Interview, Cikarang, 08.06.2010). Indeed, there are in Phase II of the ‘nested cluster’ area collocation of similar industries in the business sectors of moulding, dies, and stamping press. This decision to be located in the ‘nested cluster’ is likely to be caused by the prior informal contact made between the director and/or the head of engineers of the companies (Observation, Cikarang, 22.12.2010).

The cluster is at its premium due to its location, which is in close proximity to the customer companies. In the automotive supply chain linkage, timely delivery of parts is vital, as well as accessibility of the customer company production plant. Here onwards, I explore the reasoning of why industries opt to be located in cluster. In doing so I focus on the automotive supplier industries¹⁴⁸ interviewed in the cluster.

The proximity to the assembler company is the main reason why the supplier industries are located in the Jababeka Industrial Cluster. A marketing staff member of CHN Company explained why the company moved from Kapuk to the Jababeka Industrial Cluster in Cikarang:

“We used to be located in Kapuk (North Jakarta), but then we moved to Cikarang and also in Karawang. Most of the four wheels vehicles are based in Karawang. This is because of lack of space and location (in Kapuk). Honda is also there in Karawang” (Interview, Cikarang, 30.08.2010).

Consequently, the supply chain represents the main reason for selecting the location in the Jababeka Industrial cluster (Interview, Cikarang, 26.10.2010). One respondent from TC company explained that since 1994, after the liberalisation of the automotive industrial policy, the tendency of the supplier industries has been to move east (of Jakarta). He reiterated that the Tangerang area is too crowded, thus he tried to get as close as possible in terms of radius and distance from the customer being supplied (namely Daihatsu/Toyota) (Interview, Cikarang, 06.09.2010). Another

¹⁴⁵ To illustrate this, I have made two brown dotted circles to mark two areas on the map. The combination of various business sectors can be seen in the left brown dotted circle on Map 5.2.

¹⁴⁶ This is visible in the right brown dotted line on Map 5.2.

¹⁴⁷ Indonesia’s cluster policy is analysed in chapter three of the thesis.

¹⁴⁸ Due to confidentiality, I will use the initials of the supplier companies and not divulge the entire name of the company. The exceptions are Honda, Yamaha and Toyota.

interviewee offered the factor of delivery to the customer as a reason for opting for the location in Jababeka (Interview, Cikarang, 09.12.2010).

The second reason relates to the facilities available within Jababeka Industrial Cluster. Jababeka Group provides companies in the cluster with various services and facilities. Some of them would be wastewater treatment, which is provided by PT. Jababeka Infrastruktur, or electricity, which is catered by PT Cikarang Listrindo. The reputation of Jababeka (Group) also ensures that the facilities are reliable (Interview, Cikarang, 26.10.2010).

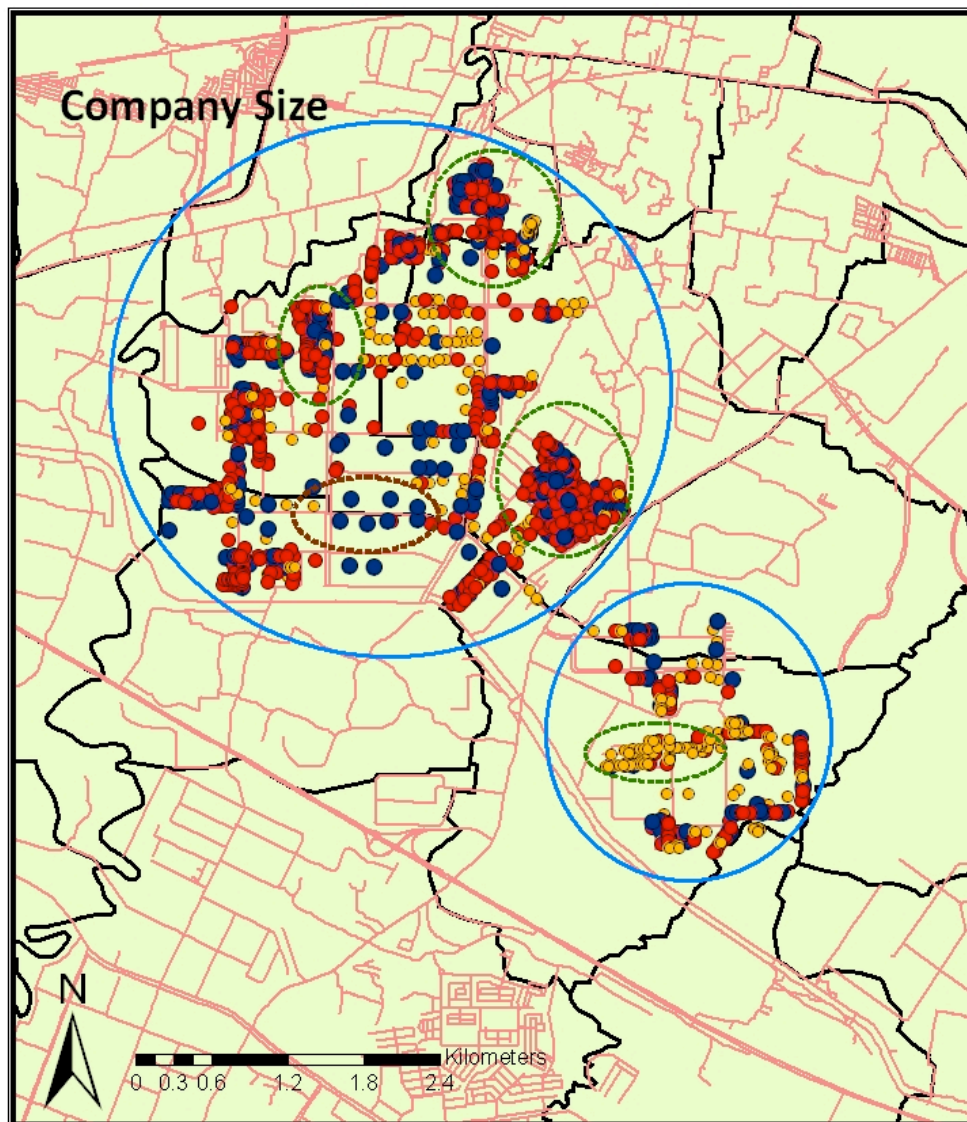
The third reason is to be in closer proximity to similar industries. There are various supplier industries supporting the materials and parts needed for the first tier¹⁴⁹ companies, such as plating, moulding, special purpose machines, and welding services. There is a tendency for smaller companies to seek collocation with other similar companies within Phase II Jababeka Industrial Cluster and outside of the formal Cluster of Jababeka (Informal discussion with SMEs, Cikarang, 24.09.2010). This is evident in the *Ruko Beruang* area that is closely situated near Phase II Jababeka Industrial Cluster. The case of geographical proximity may be valid for smaller industries and not with tier one industry, as during my fieldwork in FTR Company, interaction with neighbouring industries appeared to be the exception rather than the rule.

The Industrial Cluster of Jababeka is, thus, an industrial agglomeration pushed by the supply chain linkage. It was not formed as a response to government clustering policy.

Core-Periphery Spatial Structure

The fact that it is an industrial agglomeration, facilitated by the developer of the cluster rather than government policy, leads to the question of the (internal) spatial structure of the overall Jababeka Industrial Cluster. The question asked in this analysis is: what is the spatial distribution of companies in terms of company size? The distribution of companies according to size is unevenly divided in areas of Jababeka Phase I, Phase II and in *Ruko Beruang*. Based on the analysis, I argue that: 1) the spatial distribution resembles the core-periphery progression; 2) there are dense nested cluster areas in the cluster. This is displayed in Map 5.3.

¹⁴⁹ Explanation of the first tier and second tier companies within the supply chain network is provided in chapter two.



Legend

- Jababeka Industrial Cluster**
- Village Administrative Boundaries
 - Large
 - Medium
 - Small
 - Roads Infrastructure

(Source: Author's Own GIS Map & Data)

Map 5. 3 Analysis Based on Company Size¹⁵⁰

¹⁵⁰ Analysis is carried out based on the aerial view when GPS coordinates are made via Google Earth, the data from the Jababeka Company and my field notes. *Kawling* is for small companies. This is coded with **S**. SFB (Standard factory building) or abbreviated as “S”, TOB (three-in-one building) are for medium companies or abbreviated as “T”. These companies are coded with **M**. Companies that have more than one *kawling*, maximum two *kawling* are Medium companies. On the other hand, companies with more than one T, or S are referred to as large companies or the code is **L**. The address block is also used as an indicator, with the more numbers meaning a larger sized company. For example, G 16-25 would refer to the company buying a 10 *kawling* size, it would be a L (or Large) company.

The large and medium-sized companies are mostly located in Jababeka Phase I.¹⁵¹ This is the core of the overall Jababeka Industrial Cluster. In this area one can find various facilities, including wastewater facilities and electric companies managed by the Jababeka Group. There are more large multinational companies, such as Samsung and Unilever, located in the Jababeka Industrial Cluster Phase I.

Inside the core I have identified a core and periphery.¹⁵² These areas are the prime areas, as roads are larger and there is greater accessibility, thus it offers advantages in terms of the shipment of goods via the toll-way of Jakarta-Cikampek or via the Cikarang Dry port. The land plots and the factory areas are more spacious, and consequently they are more expensive in these areas. The maintenance fees are also higher in this 'core of the core'. There is low density in the core. Furthermore, based on my observations, these companies situated in the low-density area of the core do not frequently interact with their neighbouring companies despite being located close to one another.

Dense company areas, or 'nested clusters', can also be found in this core, making up the periphery.¹⁵³ They are mostly medium-sized companies, although in some cases there are also large companies located in these areas. There are three 'nested clusters', which are located in the periphery of the core. In these 'nested clusters'¹⁵⁴ companies often interact with the neighbours in two respects. The first is in regard to supplying and subcontracting activities, and second is to discuss the problem solving of the parts produced in the subcontracting activities.

The periphery of the Jababeka Industrial Cluster consists of the Jababeka Phase II and the *Ruko Beruang* areas.¹⁵⁵ Differing from the core area, this periphery has fewer facilities such as the road infrastructure and is less vast than the core. Most of the factories are homogenous in size, unlike in the core where they are heterogeneous in size depending on the plot and area. The smaller and medium-sized companies tend to be situated in Jababeka Phase II. The *Ruko Beruang*, consisting of small industries, is located outside of the formal clusters yet quite close to Jababeka Phase II.

One can find the 'nested cluster' within this periphery.¹⁵⁶ Different than the peripheries in the core of Jababeka Industrial Cluster, the social interactions in this periphery or 'nested cluster' are not only dictated by the grounds of subcontracting or job order requests.¹⁵⁷

¹⁵¹ The Jababeka Phase I is circled as the large blue area at the left side of Map 5.3.

¹⁵² The brown dotted line is the core where most of the large multinational companies are located. This is apparent in Map 5.3.

¹⁵³ I have circled such areas in the dotted green line in Map 5.3.

¹⁵⁴ This is depicted within the dotted green circle located in the left of Map 5.3.

¹⁵⁵ This is circled in the small blue line in Map 5.3.

¹⁵⁶ I have circled the 'nested cluster' in the green dotted line in Map 5.3.

¹⁵⁷ I will discuss this in depth in chapter six, when I focus on the inter-firm linkage of knowledge flow.

What connects the peripheries with the core?¹⁵⁸ Based on my fieldwork the peripheries support the function of the core in terms of the production of goods and parts, as well as providing services. An additional question would be, does the geographical proximity enjoyed by the companies in these dense areas provide the basis for knowledge flow? I will try to dissect this question about the knowledge flow and knowledge exchange process in the automotive supporting companies in chapter six.

Summing up, the industrial cluster shows that it is shaped by an industrial agglomeration process and pushed by supply chain linkage. The location of the cluster is important because it is close to the customers. Despite this, the internal structure of the industrial cluster shows a core and periphery distinction. The analysis provided the foundation to ask whether geographical propinquity enhances knowledge flow in the industrial cluster level. This becomes particularly relevant when one bears in mind the ‘nested clusters’ in the Jababeka Industrial Cluster.¹⁵⁹

c. Restrained Capacity as a Knowledge Cluster

The conundrum of Jababeka Industrial Cluster (to emerge as a knowledge cluster) is that it lacks industrial R&D activities as well as design (engineering) capacities. The output of the cluster is likely to be not new products or new parts development, but tacit experiential knowledge pertaining to the production process.¹⁶⁰ To back up my assertion, in the coming paragraphs I describe industrial R&D activities of the automotive supplier companies.

The fieldwork in Cikarang showed that only three of the 44 supplier companies interviewed have research and development (R&D) units. Within such examples, one has it within the first tier¹⁶¹ company, mostly active in material engineering (Interview, Cikarang, 26.10.2010), whereas the second company’s R&D is at the second tier company actively developing tooling such as moulding and dies required for the production of parts (Interview, Cikarang, 22.12.2010). For these two companies the R&D is located within the engineering division. The third company has its R&D based externally within the Dharma group, namely Dharma Polimetal, located not in Cikarang, West Java Province but in Tangerang, Banten Province.

One of the difficulties of establishing R&D is the cost allocation. Companies should allocate costs and bear risks arising from research and development activities, yet this requires an understanding beyond cost structures or cycle time needed for manufacturing. This issue was expressed by the engineering head of an Indonesian supplier company:

¹⁵⁸ To put it in terms of Map 5.3, the question becomes: what is the connection between the different green dotted circles and the dotted brown circle?

¹⁵⁹ This subject matter is discussed in chapter six of this thesis.

¹⁶⁰ The argument that the cluster produces tacit experiential knowledge is explained in chapter six.

¹⁶¹ Definition of first tier and second tier company is available on chapter two.

“We do not have R&D, so it is still in process (of manufacturing), the director also expects us to have R&D but we are still thinking about how to have it here. Based on the previous discussion with him, he has proposed the idea but we have not been able to take it up and materialise it. R&D requires financial resources, yet we do not have enough of this. I have proposed the idea that every time we in engineering develop a product from five to three products, a certain percentage goes to R&D. But we need to break it down. R&D strength is in the manpower” (Interview, Cikarang, 28.01.2011).

As briefly outlined in the aforesaid interview excerpt, a second challenge is the issue of manpower, as expertise is required for R&D. This may be difficult as competence of manpower is usually measured by tacit knowledge and years of experience working in a specific field. The competence is built on years of production and manufacturing process on the shop floor, not in research as a focus in itself. In addition, the members of R&D unit usually are also involved in other production function of the company. The engineering manager in the second tier supplier that has an R&D unit said that he has ‘three musketeers’ working in the R&D unit one is the founder (who is also the director) of the company, one who is an expert in moulding, and he himself focuses on progressive dies. They discuss ideas on improvement within this ‘three musketeers’. Interaction with customers helped them to develop their ideas and specification of product (Interview, Cikarang, 22.12.2010).

A further complication is that companies within the Jababeka Industrial Cluster simply do not see the need for R&D. Drawings and designs are imported from the principal company in Japan, and the factory in the Jababeka Industrial Cluster is concentrated more as a production plant. This is a typical structure of foreign investment companies. In an interview with a director of a first tier company, he explained this:

Researcher: “The Industrial R&D is in Japan?”

Respondent: “Yes, now it is still based in Japan.”

Researcher: “Any plan of establishing an R&D unit in here at Jababeka?”

Respondent: “No, the facility is very expensive. In order to develop R&D we require several testing facilities. For the computers we need the software” (Interview, Cikarang, 05.11.2010).

In an informal discussion with one of the officials at the top management level it became evident there were several advances being made by a local research agency based in Bogor conducting research in a similar area. However, the director seemed hesitant about the capacity of the local research agency, and preferred to rely on the R&D from the principal company (Informal discussion, Cikarang, 05.11.2010). This supports the often-heard criticism that large foreign companies are reluctant to share knowledge with their subsidiaries in developing countries.

Product development only occurs in a restricted manner in first tier companies. Most of the ideas relating to product development are discussed in the engineering division for local companies. For

joint venture-based companies, they conduct this in close collaboration with the parent company, and material engineering testing might be carried out in the R&D located in Jababeka. Most foreign owned companies would have the know-how and technology relating to parts being produced and imported from the parent company in Japan. The supplier companies cannot directly market the parts, as they are producing them to be later branded as OEM or Original Equipment Manufacturer. Opportunities for the first tier (or in some cases second tier) suppliers arise for the aftermarket parts, which is shown in the SENADA study¹⁶² in Indonesia (Layton and Rustandie 2007). I found two different instances for the case of first tier suppliers. In one such case it is possible to sell parts they produced through an aftermarket. This view was expressed by the division head of engineering of a Japanese (origin) supplier company:

“We cannot sell these parts (with using OEM). If we sell them with OEM, the drawing must be from the parent company in Japan, this is the agreement. We do have the capacity to design our own parts. In this factory we have the complete testing material. It used to be the case that for every part we produced, we would send the parts to Japan to have them tested. Now we only send the reports. It is only possible for us to play in the aftermarket parts. If we want to go beyond this we need approval from the principal” (Interview, Cikarang, 30.08.2010).

In another case it is difficult to pursue the aftermarket part due to the solid linkage of *keiretsu*.¹⁶³ They try their best to maintain the trust of the customer. I tried asking on the shop floor why they do not sell the parts being manufactured as aftermarket parts, but in reply I received a firm shake of the head from the operators and leaders (Observation, February 2011).

Drawings of manufacturing parts are imported or transplanted from the principal or customer. There is feedback from the shop floor in the first tier companies and customers, and thus any lacking elements are developed. Engineering in the first tier companies ensures the process capability of the parts. The capability process is carried out before the product is manufactured to ensure that a manufacturing process is proficient (Deleryd 1998). This will determine that what is being produced in one production plant corresponds with the other plants. With the rise of artificial intelligence (Willke 1999) and computer software, the capability process is often carried out by using an integrated CAD/Computer-Aided Design software (see Gao and Huan 1996). Despite the usage of software, human interface interactions with customers and organisations replenish the capability process and add the required experience for the knowledge of the product (Interview, Cikarang, 06.12.2010). Therefore, the vertical interaction not only ensures that the design meets the customer’s requirements (Ittner and Larcker 1997), but also adds the experience that would represent additional knowledge for the engineering division.

¹⁶² SENADA is a study of Indonesia’s competitiveness. It was financed by United States Agency for International Development in the year 2004-2009. Further information is available on the following website: <http://dai.com/our-work/projects/indonesia%E2%80%94senada-indonesia-competitiveness-program>.

¹⁶³ *Keiretsu* is the norm that keeps the vertical linkage with key automakers/customers such as Toyota and Honda. This will be explained in chapter six.

Consequently, product development in terms of having its own design/drawing is still a rarity. When it does take place it is typically for the production of special purpose machines or the pure material engineering of parts. There is an on-going initiative in a joint venture supplier company (which has R&D in the cluster) to engineer and improve the materials used for the production of its parts. Nonetheless, it is vital to note that even when most of drawings of the specific part are from customers or parent companies, knowledge flow and learning does take place in the manufacturing process of the product. The process of knowledge flow, which I will explore in chapter six, is towards lean manufacturing, quality systems, and JIT related tools.

It has been argued elsewhere that the industrial clusters in Indonesia are not organic like the ones in Europe, that the type of cluster in Indonesia is an entrepreneurial type of cluster (see Irawati 2010; Irawati and Charles 2010; Irawati 2012). My study shows how the Industrial Cluster of Jababeka suffers a lack of industrial R&D and, consequently, may face challenges to emerging as a knowledge cluster. This is due to the difficulties relating to the absence of having such R&D need (since most of the drawings are imported from the parent company), cost allocation challenges and manpower's competence, which is mostly related to the production process. The designs of parts are mostly imported from the parent company, which indicates the restrained engineering capacity of the automotive supplier companies. In cases where there are R&D activities, they are usually related to the design of special purpose machines and pure material engineering. The importance of the Jababeka Industrial Cluster hence lies in the location, namely of spatial proximity with the customers.

d. Summary

I began this chapter by asking the locational characteristics and internal structure of the Jababeka Industrial Cluster. I showed how the cluster of Jababeka is premium due to its location, as the cluster facilitates the supply chain linkage. To pursue this argument, I looked at the issue of location and the knowledge base (i.e. industrial R&D as well as engineering capacities) of the companies in the cluster.

The first characteristic pertaining to the location shows how the cluster is emblematic of the privatised spaces and tension. It is privatised as the cluster's physical development is driven by the economic motives of the Jababeka Group, the cluster developer. The Jababeka Group focuses on selling industrial plots and providing services for the companies located within the cluster. The companies under the auspices of the Jababeka Group discharge services to its 'tenants' (companies located in the cluster), ranging from wastewater management and electricity services to shipment of goods from Cikarang Dry Port to Tanjung Priok Port. The Jababeka Industrial

Cluster itself started in 1989 after it obtained a permit issued by the West Java Province to develop the unproductive land in West Java area into industrial estates. The cluster development has been focused on the providing services and selling industrial plots, making the spaces to be privatised. Tension and rapid change are also emblematic of the location. There is a rapid shift of the land title, from agricultural land use to industrial land plots. In the past 20 years, there has been a decrease in agricultural land use of up to 5,000 hectares. Tension is also evident between some of the mid-level management of Jababeka Group and local government officials pertaining to land title management. Physical segregation is also apparent in the residential areas; the Japanese expatriates would stay in the Sahid Hotel in Lippo Cikarang, white collar workers would live in the luxurious Metropark Condominium, whilst the local indigenous Bekasi would live in *kampung* areas between the walls of Jababeka Industrial Cluster. Furthermore, tension is visible between the ethnic group of *Madurese* and the local indigenous *urang* Bekasi. The progression and development of the industrial cluster seems to have pushed locals to the brink.

The second characteristic relates to the location of the Industrial Cluster, which serves the supply chain linkage. The general description of the Jababeka Industrial Cluster shows that the cluster is divided into three main areas: Phase I Jababeka Cluster, Phase II Jababeka Cluster and the Jababeka Education Park. Phase I and Phase II of the Jababeka Cluster primarily host Indonesian companies. The cluster with the mixture of business sectors and the aggressive marketing of the Jababeka Group is formed as an industrial agglomeration; it is not pushed by Indonesian government thematic clustering policy, i.e. 35 cluster policy of the government as outlined in the Government Regulation No. 28 year 2008 on National Industrial Policy in Indonesia. The aggressive marketing of the Jababeka Group to sell industrial land plots may play a role in the mixture of the companies. The cluster holds due to the premium location. The primary reason of companies opting for the location is the geographical proximity with customers. Other reasons include the availability of facilities (such as electricity and wastewater processing) within the Jababeka Industrial Cluster as well as the reputation of the Jababeka Group. The third reason is to be in closer geographical proximity to similar industries. The internal structure of the cluster forms first a core periphery progression, and secondly there are dense 'nested cluster' areas in the Jababeka Industrial Cluster. Phase I Jababeka Cluster is the core, hosting large and medium companies. The periphery is the Phase II Jababeka Cluster and the *Ruko Bernuang* area. The clustering within cluster (or 'nested cluster') areas is exhibited in the periphery of the core of Jababeka Phase I and in the Jababeka Phase II.

As the cluster retains its magnet due to the location (whereby spatial proximity with customer company is vital), the industrial R&D is limited. The output of the cluster is the tacit experiential knowledge rather than new parts or new products development. This provides a challenging basis

for the Industrial Cluster of Jababeka to emerge as a knowledge cluster. The reasons for the lack of R&D are the lack of (organisational) need for the R&D unit, as most of the design is imported from the parent company, the cost allocation issue and the manpower's competence that is linked more with the production process than research. The automotive supplier companies have restrained engineering (design) capacity. Should R&D activities exist, they are mostly for special purpose machines and pure material engineering of the parts. Thus, new product development is still uncommon in the supplier companies in the Jababeka Industrial Cluster.

Hence the characteristic of the Jababeka Industrial Cluster reveals location is key, as the cluster functions to facilitate the supply chain network. The physical development relating to the services and infrastructure is dominated by the economic oriented interest of the Jababeka Group. The lack of activity for new parts or new product development poses the challenge for it to emerge as a knowledge cluster. However, discussions concerning knowledge cluster should also take into account the linkage of knowledge flow between industries and industries-academia. This shall be the focus of the next chapter.

Chapter 6

Academia-Industry Collaboration or Supply Chain Linkage?

Chapters three and four highlight how the science system in Indonesia is centralised. Chapter five demonstrates how the Industrial Cluster of Jababeka functions to facilitate the supply chain network. This chapter takes into account the findings of the previous three chapters. It will attempt to throw light on two key issues of the thesis: how knowledge is governed in the cluster level and whether clustering enhances industry's performance. The focus is on the knowledge flow between different organisations, i.e. automotive supplier companies and academia in the Jababeka Industrial Cluster.

Clustering still takes place among companies in a geographically bounded area, even when they can take advantage of ICT to connect with varied locations in different parts of the world (Evers, Gerke et al. 2010). Scholars have engaged in studies on clusters in Indonesia, several of which focus on rural clusters in Java (Sato 2000; Sandee and Rietveld 2001; Syahra 2004; Ismalina 2011; Tambunan 2011) such as in Klaten or in Tegal, Central Java. Research on industrial clusters located near urbanised areas in Jakarta has also been carried out (Feridhanusetyawan, Aswicahyono et al. 2000; Kuncoro 2002; Irawati 2008; ITB 2010). Kuncoro's study is based on an econometrics analysis and demonstrates how metropolitan areas offer a strong agglomeration pull for individuals or companies (Kuncoro 2002). Feridhanusetyawan, by utilising secondary data analysis, showed that companies engaging in industrial networks achieved slightly more than those that did not (Feridhanusetyawan, Aswicahyono et al. 2000). However, clustering between companies does not fully explain why cluster companies are more successful than companies outside clusters. Thus these studies do not address the significant issue of the learning and knowledge flow between horizontal firms or organisations, specifically between (a) supplier companies, and (b) between academia and companies. Existing research has highlighted how horizontal linkage between companies and academia (universities and research institutes) is still restricted in Indonesia (Wie 1998; Jaitner, Mashudi et al. 2002). The aforementioned research studies do not consider clustering as an inseparable area of their work. This study intends to contribute to the subject matter of vertical/horizontal knowledge flow within the Jababeka Industrial Cluster. For the purpose of clarity, the term 'industrial cluster' in this study will refer to industrial agglomeration in a (bounded) geographical space.¹⁶⁴

¹⁶⁴ I will use the terms 'estate' and 'cluster' interchangeably to refer to industrial clusters. As explained beforehand in chapter two, 'bounded' in this definition is used to refer to the research area of Jababeka Industrial Cluster. This includes Jababeka Phase I, Jababeka Phase II, *Ruko Bernang* area, and Jababeka Education Park.

The questions of governance of knowledge and benefits of clustering provoke further inquiry, namely: what is the type of knowledge produced in the companies in Jababeka Industrial Cluster, despite the lack of industrial R&D? Does the knowledge flow process predominantly take place within the supply chain network or via academia-industry interactions? How is this knowledge flow controlled?

The focus of the chapter is fourfold: 1) to analytically describe the typology of knowledge produced, i.e. tacit and experiential knowledge pertaining to production process, 2) to dissect how knowledge is controlled through the practices of the actors (i.e. the supplier companies), 3) to inquire about the different character of linkage enabling the flow of (tacit) knowledge between companies in the nested cluster and in the supply chain linkage, and 4) to examine the prevailing collaboration between academia and industry.

Based on my study in the Industrial Cluster of Jababeka, I argue that the flow of tacit knowledge for the production process in the cluster level is controlled by the key industries in the upper level of the supply chain linkage.¹⁶⁵ I back up this statement by looking at how in automotive industries, such tacit knowledge is controlled via the Japanese *keiretsu* linkage. Clustering, nonetheless, enhances the performance of small and medium-sized enterprises located in the ‘nested cluster’ of the cluster. The collaboration between academia-industry is limited and restricted. The extent and the rate of success of cluster on the company’s performance depend on the character of linkage between organisations in the cluster.

The structure of the chapter is as follows: the first part will discuss the knowledge production in the automotive supplier industries. The second will focus on knowledge flow and the internalisation of knowledge in automotive supplier companies located in the Jababeka Industrial Cluster. The knowledge flow between companies located in the clustering within cluster will be outlined in the third part. The horizontal knowledge flow between academia and industries will comprise the fourth part of the chapter, and finally a summary will be provided.

a. Tacit & Experiential Knowledge

The argument propounded is that the cluster produces knowledge in terms of tacit and experiential knowledge, as stated by the heading of this part. These two types of knowledge relate to the production and manufacturing process in the automotive supplier companies. I will focus on knowledge workers and tacit knowledge first. Then I shall move on to discuss the construction of an expert. After having discussed this I will look at knowledge sharing practices in the

¹⁶⁵ Other studies on industrial clusters and global production networks in Indonesia have also provided similar evidence (see for example: Irawati 2012, Dicken Hassler 2000).

(organisational) supplier companies. Internalisation of the sticky tacit knowledge in the FTR Company is outlined in the last subpart. Based on the fieldwork findings, I argue that despite the lack of industrial R&D, knowledge is produced in terms of tacit knowledge and (the training of) knowledge workers. Knowledge is tacit and gained through experience, shared through face-to-face contacts.

The tacit knowledge of knowledge workers

How is knowledge produced in relation to the production and manufacturing process in the automotive supplier companies? The discussion that follows will be on tacit knowledge production pertaining to manufacturing process and the training bestowed on knowledge workers.

The type of knowledge produced in the automotive supplier is related to the tacit 'know-how' of parts manufacturing. The know-how is not made explicit through manuals, and it is usually shared by an expert with the individuals in the company. I shall illustrate this by the providing an example of welding that required a special process. The director in an Indonesian supplier company highlighted the tacit knowledge in an interview:

“I will give welding as an example. If we see it is just a normal process, but in welding there are defects that cannot be captured by the mere eyes. This is the process, the penetration. It may be impossible for 100 percent penetration, but we have to make sure that the product is acceptable. The expert in welding from customer came here for a visit and we asked detailed questions, namely, what to do with the equipment, the steps of the process, the type of welding, how many strokes, the duration of freeze shipping. These elements are not written in manuals or textbooks” (Interview, Cikarang, 06.09.2010).

Also included in the tacit knowledge is a set of techniques of organisational practices and routines, particularly in lean manufacturing, in implementing quality control/QC (Sato 1998) and quality control delivery (QCD) of the parts produced (Observation, Cikarang, 21.01.2011). Lean manufacturing and problem solving at the production line are also included as companies learn a set of techniques pertaining to production lining and cutting production costs. These techniques may incorporate (but not be restricted to) the following: *kanban*, standardised work, production lining, *poka yoke*, just-in-time (JIT) systems, on the job training, engineering/expert visits, *heijunka* (Interview, Cikarang, 05.11.2010).

There are stages of the career ladder for the knowledge workers. Although there are varieties to this ladder depending on the company size, this would normally span from operator, supervisor, and leader to manager or division head. The entrance level for operators would normally be at the level of *Sekolah Teknik Menengah* or Secondary Vocational Education (Interview, Jakarta, 10.08.2010, Observation February 2011, see also Grace 2010). For supervisors, a vocational

higher education is usually required. Some are alumnae of *Polman* Bandung (Manufacturing Polytechnic located in Bandung), or the ATMI-St Michael Polytechnic located in Solo or Cikarang (Interview, Cikarang, 17.06.2010). It seems that the apparent involvement of academia in terms of manpower is in educational training (undergraduate degree of vocational training) for the knowledge workers (see also Aminullah and Adnan 2011).

However, in line with a statement from one Japanese expert: “*in Japanese companies we train our own manpower*” (Interview, Cikarang, 08.08.2010). There is an extension of the Japanese corporate practice of quasi-lifetime employment¹⁶⁶ (Hatch and Yamamura 1996; Tarmidi 2001) in Indonesia, including in the training provided for the suppliers in Jababeka Industrial Cluster. This is indeed the case with the knowledge workers in the companies; once they are recruited they are trained internally within the companies.

Training for the knowledge workers is mostly held via on the job training (OJT) or internally within the company. The OJT usually takes place in the principal company in Japan or in the group company headquarters, for example in the Dharma Group training centre in Tangerang, Banten. Alternatively, it could take place in the form of being directly involved in an initial training for new operators (Interview, Cikarang, 18.11.2010) or in the form of a different field of production, in the case of new parts to be manufactured (Interview, Cikarang, 25.01.2011). The internal training is organised within the company with trainers usually from those who have worked for many years in major automaker companies such as Honda, or Yamaha. An engineering head airs the reason why the company where he works prefers to recruit these trainers. It is due to the orientation of the applied knowledge in the shop floor in company where he works. He adds that university is just too theoretical and cannot be practical (Interview, Cikarang, 28.01.2011). The training is also organised internally; for this purpose some of the companies establish training centres. The common ground of these trainings is the nurturing of tacit (individual) knowledge and the minimal role of experts from academia in providing the training material.

The imprint of the internal training for the individuals is made explicit in the matrix skills and visualisation. Each individual would ideally have a matrix skill as evident in several first tier¹⁶⁷ companies (Interview, Cikarang, 25.11.2010). This skills matrix has a distinct component for each division, such as engineering, quality or production divisions, and may have its own measurement and training. The manager usually carries out mapping and levelling for junior technicians or

¹⁶⁶ This refers to semi-lifetime or long term employment. As suggested by Tarmidi (2001: 8), Japanese management style is distinct due to the lifetime employment system and the promotion to high level positions that is made on the basis of seniority system.

¹⁶⁷ The terms first and second tier refer to the company's position in the supply chain network of the vertical linkage of knowledge flow. This is clarified in chapter two of the thesis.

operators (Interview, Cikarang, 06.12.2010). The availability of matrix skills for second tier suppliers is not a general occurrence, as out of 35 second tier suppliers interviewed only 44% had matrix skills. On the contrary, there is also visualisation of the level of expertise in some of these companies. Someone who is a leader in production, for example, has two horizontal stripes on his hat (Observation, February 2010). Since problems in the shop floor require a quick solution, visualisation becomes more helpful rather than referring to matrix skills. Matrix skills are helpful in providing further (advanced) training and finding a replacement when an employee has to take a leave. For quick problem solving, however, visualisation is more useful.

Linkages for manpower training are made early on. The company has a role for this linkage. The first and second tier companies are often members of the Indonesian Mould and Dies Association (IMDIA). IMDIA not only offers a forum for knowledge sharing for supporting industries, but also a forum where industry members can interact and attend training to achieve a certain standard of competence in milling or die-making-basics in automotive manufacturing processes. Most of the respondents (companies in the first and second tiers at the micro level) acknowledge the importance of IMDIA in building networks, to learn more and attain technical knowledge via trainings, and most importantly for information sharing (Interview and informal discussion, September 2010). Based on the ethnographic fieldwork in the automotive supplier company, IMDIA appears to actively assist the automotive sector knowledge base through various training.

Alumnaeship also plays the subsequent role for nurturing the linkage in ensuring there is a connection between the type of training undergone and the function of the job. Several of the manpower is alumnae of the IMM (International Manpower Development Organisation- Japan) training programme. IMM is managed by the Technical Intern Training Programme (TITP) instituted by the Government of Japan. Indonesia is one of the countries participating in this programme (Saputra, Setiawan et al. 2008).¹⁶⁸ Saputra Setiawan et al. (2008) show that there is a link between previous training in the form of internships or graduate studies and the current work carried out at the supplier companies. This ensures that there is a match between previous training and the current job function. My fieldwork also indicates the presence of this linkage. Cases in two Japanese supplier companies located in Cikarang showed how the individual and company have built linkages beforehand. They had already undergone the matchmaking in Japan,

¹⁶⁸ In their survey of the training on two PWEF (Japan Wide Entrepreneurship and Banking Training) in Nagoya and Saga, Japan, Saputra, Setiawan et.al (2008) show that the majority of industries where they are interning/working is automotive (spare-parts) 47.5%, second place is food processing (including agriculture and fisheries) of 24.69%, the rest are chemical industry (5.02%), paper (4.60%), metal (4.18%), textile (2.93%), pharmacy and medicine (2.51%). This indicates the possibility of linkages in the automotive industry early on, even before the workers are working in the automotive industries in Jababeka Cluster.

as during the internship he was asked whether he was interested in working in a subsidiary plant based in Cikarang (Interview, Cikarang, 08.12.2010, 11.10.2010).

The previous paragraphs stated that the type of knowledge produced in the supplier company is tacit knowledge. The training for knowledge workers is mostly organised internally and/or via OJT; these processes harness the tacit knowledge on an individual basis. Linkage made on the individual and the company basis also enables the training and the matchmaking of the training with the actual work in the supplier company. This definition of knowledge shall guide the discussion of the chapter.

Expert as experienced knowledge worker

An inseparable question of knowledge worker training is in regard to expertise. To frame it as a question: what makes an expert an expert in the automotive sector? I contend that experts have experiential knowledge validated through years of experience and the diverse projects of improvement, which he or she has managed. There are also two types of experts: symbolic experts and ‘internal experts’ (i.e. those nurtured and trained within the company).

Findings in the fieldwork demonstrate that experts within the supplier companies are mostly those who have undertaken advanced training. They would initially be well experienced in various areas such as quality control or tooling, before specialising in a particular area such as quality control or progressive dies. An expert in quality control recruited to give training in the quality control circle of the FTR Company has worked for more than 10 years at Toyota before moving to work in a supplier company, which manufacture parts for Toyota (Observation, Cikarang, February 2011). In an interview, a division head in engineering explains how this expertise is built through time and through experience in managing various improvements on the shop floor:

“We did a training on the culture of the company, safety, then we have basic trainings, such as measurement... Then they will have on the job training in different sections, for three months in each section. Expertise is build through time... As an engineer, I see that I could improve this part. So we propose an activity or proposal should funding be required. We did this. So this ranges from building a machine, or other technology that we have, or we could cut unnecessary waste from five operators to one operator, to save money....In here we have machines that we built on our own. The suppliers make them based on our own design.” (Interview, Cikarang, 30.08.2010)

There are two types of experts in the automotive supplier company: one is a ‘technical’ expert who is recruited by the company, dispatched from the group companies or principal company in Japan, and the other is an expert trained and nurtured from within the company (the ‘internal’ expert). The former are mostly Japanese in nationality. The latter are visible from the structural position they hold, for example senior technician or senior engineer, or in some cases president

director. A quality assurance department head in a first tier company describes the pivotal role of the latter form of an expert:

“There is one expert in our company holding a structural position. We asked him to develop manpower group by group. He focused on those who have potential, leadership and commitment and of course a strong willingness. So he initiated a Best Quality programme, every six months the expert carried out evaluations, every year he evaluates the first group, and then carries on to the next one as a form of re-generation in our company. For the first group in terms of career they are now quite promising. So from this first group 13 people are taken, then they are dispatched to different specialisations. Some of these 13 people have gone far off in terms of career. Various forms of awards such as certificate of appreciation are given” (Interview, Cikarang, 08.10.2010).

In this case the expert holding a structural position can initiate changes, train and evaluate the manpower, allow a regeneration of manpower and assist the knowledge assets of the company where they work.

The former functions more in its symbolic power¹⁶⁹ (Bourdieu 1989; 1985), as these Japanese experts are considered as the symbolic capital of their companies. This type of expert is to be found both in first tier and second tier companies, and such individuals are often referred to as an advisor. The marketing head in a second tier company explains the reason why his company invested in recruiting this ‘technical’ expert:

“We do need experts for symbolic purposes. He is an advisor in our company. We need him for communication, as most of our customers are Japanese companies. We acknowledge that we need to tap in to the communication network of these expatriates. We have no idea about their culture, so when there is this advisor, we feel more trusted” (Interview, Cikarang, 25.11.2010).

The symbolic capital of the presence of Japanese advisors is required to overcome the difficulty of tapping into the network, and in having subcontracting proposals approved (Interview, Cikarang, 16.12.2010, 25.01.2011). The recruitment decision was largely made based on the informal ties that might result from matchmaking efforts for subcontracting deals or through the previous occupational network of the engineering head or the director. This is not to downplay the expertise of expert nationals trained in the company. However, the symbolic role of being Japanese enabled the companies’ trust and communication network.

Hence, expertise is gained by individuals through experience in handling various projects over time after initial training.

¹⁶⁹ According to Bourdieu (1985:731) symbolic capital: “...is nothing other than capital in whatever form, when perceived by an agent endowed with categories of perception arising from the internalisation of the structure of its distribution i.e. when it is known and recognised as self-evident.”

Knowledge sharing through visualisation & face-to-face contacts

Supplier companies, due to the orientation of the parts manufacturing, would have the process of knowledge sharing tied more with the problem solving process. Problems in this context would include problems regarding the flow of information and flow of parts. The process of knowledge sharing thus attempts to seek solutions to solve the problems. This process of knowledge sharing within the company, as substantiated by the interviews and ethnographic fieldwork, takes place more through visualisation and face-to-face contacts.

The ISO system describes the normative conditions in terms of the knowledge sharing process. Companies may apply ISO to standardise their quality management systems within the process. The documentation in ISO enables the problem-solving activities to be documented. Furthermore, ISO 9001 contains the element of critical knowledge and intellectual capital (Heng 2001). Based upon interviews and observation, the majority of the companies in the first tier have adopted ISO 9001, including those outside of the *keiretsu*. Only one company has not adopted ISO 9001. There are two companies at the first tier who have adopted the ISO TS 16949 specifically for automotives. Amongst the second tier companies the situation is more cumbersome in terms of ISO. The majority of the second tier (17 companies) has no ISO system in place. There are 12 companies, which have ISO 9001 in place. These ISO may describe the normative conditions in terms of the knowledge sharing process. Furthermore, companies in the second tier are often restricted in terms of resources, including human resource allocation (Interview, Cikarang, 13.10.2010). The audit mechanism prescribed in the ISO system of the first tier companies in the subcontracting process to the second tier also provides a means of knowledge sharing (Interview, Cikarang, 21.12.2010).

What I found interesting is that despite the ISO practice of auditing, after this practice, there will be knowledge sharing sessions. This is more commonly found in first tier companies. *It is an informal practice*, as this is not normally prescribed in the ISO 9001 system. I will give an illustration of knowledge sharing that takes place between two actors: the engineering head/staff with the assigned purchasing staff from Yamaha as the customer company. The engineering head shares his experience of this informal knowledge sharing:

“We used to sit in the driver area, it could be for hours after the auditing session. Usually after the minutes of meeting is written. We could talk and relax. I could discuss in that corner with the purchasing staff... From this discussion, I could discuss problems including why I cannot be so strict in my decisions...I also get valuable information, information that is not yet official but may benefit the company” (Interview, Cikarang, 25.01.2011).

This discussion would take place during lunch or dinner with an expert in quality control, or coffee session with a purchasing staff member from the Japanese automaker. The intricate

information sharing and problem solving discussion takes place not via auditing, but more by means of informal knowledge sharing.

Within the organisation itself, knowledge sharing may occur via meetings. Problem solving meetings often facilitate knowledge sharing. The problems are usually related to customer complaints, machines, quality and processes in manufacturing (Interview, Cikarang, 25.11.2010). There are a number of meetings held ranging from division meetings (such as engineering meetings), morning *choree* meetings, and management meetings as a forum of communication between different layers of company's management. The idea is to have flexibility within an organisation by making this organisation more organic (Burns and Stalker 1961; Burawoy 1979). An organic system as posed by the paradigm of lean production pursues the aim of being flexible in its work. Yet what is evident on the shop floor is that it is primarily the face-to-face interaction and visualisation that function as means of knowledge sharing. These two elements support the way work is organised on the shop floor, managed through the Japanese lean production system.

The first element of face-to-face interaction is evident in the *genba*, *genchi*, *genbutsu*. *Genba* refers to the walk on the shop floor to check any problems. *Genchi* is to look at the actual process. *Genbutsu* is to look at the parts being produced (Observation, February 2011). The face-to-face interaction is visible in the *genba* process whereas the problem is discussed directly between the leader and operator. In severe cases of defects or no-good (NG) parts the president director or the director will directly perform *genba* (Interview, Cikarang, 25.11.2010). They would usually provide advice after *genba* on the shop floor (Interview, Cikarang, 30.08.2010). The face-to-face interaction and the *genba* also allows the calibration of the data taken, including the interpretation of the data taken and the observation of the gap between the data available with the reality at the shop floor (Interview, Cikarang, 28.01.2010).

The face-to-face interaction also facilitates the process of tacit knowledge exchange, as the *genba* results would normally be kept in the head. Based on my ethnographic observations, the typical scene would be that the engineer or director or expert would perform *genba*, and if there was a problem they would then exchange stories about experiences by looking at the problem reflected in the part (Observation, February 2011).

The second element is the visualisation of data and manpower, which is apparent in the process of knowledge sharing. The JIT training by OMCD-Toyota would also produce a set of visualised data referred to as Parts Manufacturing Flow Chart (PMFC), where cycle time, stagnation and lead time are shown. This PMFC is used internally as an information 'checkpoint' between different divisions in the supplier company. The visualisation within the shop floor is depicted

also in the chart, the line per part, loading of parts data, daily data, weekly data, and monthly data. The manpower data is depicted not only in terms of how many people are working, or the matrix skills of trainings, but also with symbols. Information is not only 'single loop' as argued by Niepcel and Mollemen, i.e. to sense deviations from fixed standards of production (Niepcel and Molleman 1998), as daily decision-making at the shop floor level is also influenced by shop floor interactions between leaders, *mizusumashi* (line keepers) and operators (Observation, February 2011). The levels of manpower are visualised in different stripes or colours on the hat or helmet (Interview, Cikarang, 19.10.2010). The notion behind such symbol usage is transparency on the shop floor. In some cases the symbols being visualised are transplanted from the principal company in Japan, or developed organically within the company. Meanings attached to the symbols, however, are not visualised, and should be understood within the context of the organisation. Thus although there is visualisation in knowledge sharing including the usage of symbols, not all the meanings of the symbols can be understood by an outsider.

I have demonstrated how knowledge sharing takes place in the informal means, although normatively included in the ISO 9001 system. The process of knowledge sharing takes place through visualisation, and through the face-to-face contacts.

The case of FTR Company: sticky tacit knowledge in *heijunka* tool

Previous paragraphs have outlined how the production of knowledge is tied more with tacit know-how and organisational routines. The recipients of this type of knowledge are, ineluctably, individuals. They are the bearers of the tacit knowledge. The next question that arises is if knowledge sticks with the individuals, how do companies internalise such knowledge? Poaching engineers (Howells 2002) or job-hopping (Nordin 2012), for example, may cause the loss of tacit knowledge.

Based on the ethnographic work in FTR Company, I argue that company internalises the knowledge by involving the expert in the real problem solving situation on the shop floor. Access to the expert is enabled through the company's network. By network I refer to the *keiretsu* network (which I shall describe in part b of this chapter). I elaborate on this argument by giving an illustration of *heijunka* as a tool to implement lean manufacturing.

Heijunka is a tool that can be used to level the pulling of ordered parts from the customer. It is a part of the TPS that allows the levelling of the production of different parts in an even manner over a defined time period (Furmans 2005). In order to use *heijunka*, *kanban* is required. *Kanban* is a system for the dissemination of information and material handling (Mitra and Mitrani 1990).

There is no strict rule for the implementation of *heijunka*. Each line in the *heijunka* post, as explained by the expert, contains three to four parts produced with the designated time and minutes. Photo 6.1 portrays the *heijunka* slots. In each of the lines there are two slots: the above slot is for the *kanban*, and the under slot is for the random number. In total there are 40 slots used in accordance with the pulling from the customer, and these 40 slots will be divided into two cycles. The remaining 20 slots will become random numbers attributed in the under slot.



(Source: Author's field documentation, 2011)

Photo 6.1 *Heijunka* Post

Among the peers of TPS circle, the person who designed the *heijunka* slot is referred to as the expert in *heijunka*. He informed me that one line in the *heijunka* post is ideally for one part, though this is difficult in practice. He shared that most of the components regarding how to design the post, the random numbering and the flexibility of how many parts are within one slot are tacit know-how, given that there are no detailed manuals for this. He is also in charge of designing another *heijunka* post in another company in the *jishuken* group. In one instance he shared his experience designing the *heijunka* post in another company:

Respondent: "It is more difficult in that company as there are a hundred parts produced every cycle. So I had to design each slot for 23 parts. It is still possible. But there is still one complication in the shop floor of the company."

Researcher: "What is it then?"

Respondent: "Mindset, the operator refuses to use the tool I have designed for them. He told us if we change the system using *heijunka* post it is better for him/her to be reassigned in a different department/production line. From my experience involved in *jishuken*, we have a contentious issue with changing the mindset of the people. That the people realises that the alterations we made is good for them " (Informal discussion, February 2011).

Through involving the expert in designing *heijunka* posts in another company during the *jishuken* study group, changes are implemented. These changes implemented in the shop floor are internalised in the design and the usage of *heijunka* post. Due to the actual pull of parts, which are abundant, each slot has to be made for 23 parts. This matches the actual reality in the company. Part of the potential problem is the resistance from the operators to use the tool itself, as it is more tiring to go back and forth based on the customer's pull/request. The expert who designs this will have to bear this problem in mind when designing the post. The monitoring of the usage of *heijunka* is usually overseen by the engineer from Operations Management Consulting Division (OMCD) Toyota in Indonesia.

This highlights two interrelated issues; first, that the component of *heijunka* contains tacit knowledge that is not written nor made explicit. The know-how in designing and utilising the *heijunka* remains with that one person. Second, implementing the *heijunka* requires involving the expert in the process of the design of the tool in the shop floor. This will match it to the actual practice in the shop floor.

Summarising, the type of knowledge produced (or created) in the Jababeka Industrial Cluster is tacit and experiential knowledge. This type of knowledge sticks with the knowledge workers. They are the human capital. Training is usually held internally, in the principal company, or through OJT. Experts are nurtured through many years of handling improvement projects, making knowledge experiential in character. Informal means of knowledge sharing (outside of office hours or after auditing) also play an important part of the flow of essential information. Knowledge sharing pertaining to problem solving occurs by means of face-to-face contacts and visualisation. Internalising the tacit knowledge of expert would mean involving the expert in real shop floor situation, whilst the access to expert is gained through the company's network.

b. Control of Tacit Knowledge in the Vertical Linkage

Despite the tacit character of knowledge it does not mean knowledge travels easily. My study in the automotive supplier industry indicates the opposite. Tacit knowledge pertaining to the production process is controlled in the vertical linkage.

To begin with, as explained in chapter two, the term vertical linkage refers to the supply chain, i.e. a network between automakers with the suppliers (see also Layton and Rustandie 2007; Irawati and Rutten 2011; Irawati 2012). The two are tied in the production process, connecting the global-local industrial network (Irawati 2012: 173).

The flow of tacit knowledge in this vertical linkage is channelled through the supplier development programme supported by the Japanese automakers and their production networks in Indonesia. I will focus on supplier development of Toyota and Honda in Indonesia. This remains the channel of intensive knowledge flow in the Jababeka Industrial Cluster. It is not geographical proximity that motivates the collaboration between suppliers-automakers, but more of a cultural space. The control of the linkage is managed via the Japanese *keiretsu* of the major automakers. But it is not the *keiretsu* itself, which as a norm restricts the flow of knowledge. Due to the thick (cultural) Japanese lean management practices and the dominance of the industrial network between the first tier and the automakers, language and trust (from first tier to second tier) restrict knowledge flow processes in the vertical network. I shall substantiate these findings in the subsequent discussions.

Supplier development from Toyota & Honda

The channels through which tacit knowledge flows from the automakers to the suppliers of Honda and Toyota will be examined in this part. By supplier development, this can be defined as a 'procedure undertaken by a company to help improve its suppliers capabilities' (Sako 2004, 282). It is a form of knowledge flow within the supply chain that, according to Sako, is located outside of the continuum of market/hierarchy (Sako 2004). Toyota and Honda in Indonesia each has a different style, limits and strengths in its supplier development activities. This supplier development is indeed the intensive form of knowledge flow in the Jababeka Industrial Cluster.

Toyota Supplier Development

The supplier development activities in Toyota are managed through the Toyota Production system (TPS). TPS was conceptualised following the minimisation of waste. Indeed the identification of waste marks the preliminary step of TPS. The following is identified as waste by Ohno, the *Guru* of TPS: waste of overproduction, waste of time in hand (waiting), waste in transportation, waste of processing itself, waste of stock in hand (inventory), waste of movement, and waste of making defective products (Ohno 1988; Sako 1999).

The two key pillars of TPS are just-in-time (JIT) and automation with a human touch, referred to as 'autonomation' (Ohno 1988). The automation does not replace human workers, rather the simple automation assists tools and opens the possibility for worker involvement (Pil and MacDuffie 1999), signifying a greater degree of ownership when engaged in the production process. JIT infers that the parts need to arrive at the precise time required, to enable the minimising of waste and prevent overproduction (Ohno 1988). The tool used to utilise the system connecting parts delivery between customer-supplier is called *kanban*. It is a piece of paper that more or less includes pick up information, transfer information and production information

(Ohno 1988). Companies in the first tier usually have this *kanban* in place to show how many parts are delivered to the customer. The following picture (Photo 6.2) highlights this, where once the parts are picked up by customer the operator counts the *kanban*:



(Source: Author's Field Documentation, February 2011).

Photo 6. 2 Personnel Sorting Out *Kanban* for Delivery

The TPS in Indonesia is managed by the OMCD of PT. Toyota Manufacturing Motor Indonesia (TMMI). OMCD, along with senior engineers in Toyota, oversee and evaluate the activities relating to TPS in Indonesia. Unlike Honda, Toyota has a separate division to ensure that the tools of TPS are implemented by its suppliers. OMCD is not formally linked with the purchasing/procurement division of Toyota. This enables suppliers to communicate any internal problems without the fear of being regarded as too intrusive, especially in regards to the price of materials and labours. The activities enabling knowledge exchange are mainly twofold; first through the *jishuken* activities to share the JIT related tools, and secondly through engineering/expert visits from Toyota to its supplier companies.

The *jishuken* activities in Indonesia started in 2008. Defined literally, *jishuken* means self-study, and it may refer to a group-based study activity comprised of Toyota suppliers to enhance the shop floor by utilising TPS (Sako 1999), which contains the JIT. A manager in the first tier supplier company explains this JIT in an interview:

“ JIT means producing the parts as needed, not more. If one thousand is needed, then only one thousand are produced. If two are needed then we do not send the customer one or three parts. If they ask us to send it now, if we send it in the morning then this will be rejected. So at the requisite time, the parts needed must be there, in the volume exactly as required and accordingly with the type that is needed. That is just in time. This is JIT. We attain the knowledge of JIT through *jishuken*. It may be simple from the outset, but it is tough. The first time of adapting may require sixty working days. Toyota would come here dispatching two or three personnel. Then we will be assisted by other suppliers two or three of them” (Interview, Cikarang, 05.11.2010).

The group activity consists of a kick off meeting, mid-report presentation, and a final review presentation (Observation, February 2011). Within the group activity, the six to eight different suppliers will be grouped into one company and given the task of solving a problem relating to lean production in a given time of forty days (Interview, Cikarang 30.09.2010).

The identification of data for this *jishuken* activity starts from the warehouse and continues up to the storage of materials. Thus the complete implementation of JIT changes the paradigm of the shop floor *from the push system*, which starts from raw materials, the process of production, delivery, *to the pull system* from warehouse as marked in the supermarket system, to production and raw materials. A gap in this case can easily be identified in the supermarket or storage of parts waiting to be delivered. Indeed, *jishuken* activities allow the investigation of the problem in the lines without the feeling that the customer/assembler company is too intrusive in the supplier company's internal problems. The vice president of a supplier company in an interview explained to me how the company needed this to stay competitive (Observation, Cikarang, 28.01.2011)

Engineering visits from Toyota are also a part of the supplier development activities. They actively oversee the progress of the implementation of JIT in the supplier companies. In some cases they visit the factory to observe the lining and to evaluate whether the checklist and tools are actually being used on the shop floor (Observation, February 2011). They conduct *genba* directly to match up the plan and practice. The TPS agents are normally in close communication with the OMCD engineer regarding progress and monitoring. In one case, a new TPS department consisting of the TPS agents was established. The leaders in this department are TPS alumnae who are in charge of several production lines. In another case, a team of TPS agents was formed (Interview, Cikarang, 05.10.2010). The post *jishuken* actions and implementation of JIT depend on both the TPS agents and also the willingness of the management in the companies themselves to implement such changes, as this requires considerable resources and commitment not only from the top management but also the operator level.

Similar to Japan (Sako 1999; 2004), the geographical proximity and grouping of different suppliers are the factors to be considered in the establishment of groups in the area of Cikarang, Cibitung in Bekasi area. During the fieldwork, it was possible to identify two *jishuken* groups in these areas of Cikarang (Observation, February 2011). Within the Jababeka Industrial Cluster itself, this interaction within the *jishuken* group enhances informal communication between the TPS agents of different companies located in close geographical proximity. There are neither barriers nor competition between these companies. In fact, in these sharing of experiences (often through story-telling), one respondent shared the challenges faced by a company and how the company he

worked for could learn from them (Informal discussion, February 2011). The frequent face-to-face interaction, shared terminology and systems used in the JIT system, and in some cases the local language used (such as that of Sundanese or Javanese) among TPS agents from the *jishuken* group (Observation, February 2011) form a *cultural space* (Meusburger 2000) within the Industrial Cluster of Jababeka. Toyota itself has two production plants; one is located in Karawang, Purwakarta and the other one in Sunter, North Jakarta (Irawati 2012, Observation February 2011). Some of its suppliers are located in Cikarang or Cibitung areas. Indeed, closer geographical proximity with automakers may be the reason why companies choose to be located in the Jababeka Industrial Cluster. Nonetheless, the cultural space allows more frequent interactions between the first tier companies with the engineers/experts in the Toyota, and less interaction for tacit knowledge flow is made with the neighbouring supplier companies.

There are also limits to the vertical collaboration of knowledge flow between Toyota and its supplier companies. First, although the production lines of Toyota might be mostly open for suppliers to learn the manufacturing practices, some products are well kept. Second, *jishuken* itself as a group study only works in suppliers with different lines of business. Thus the know-how exchanged is in mostly in lean production and JIT related tools, and not the know-how relating to the product. One supplier expressed reluctance about being grouped with the same company, stating that the technology is enough to be imported from the principal company in Japan. Based on ethnographic observation, the suppliers of Toyota are likely to be dominated by Japanese joint venture companies or foreign owned companies (Observation, February 2011).

Honda Supplier Development

Honda (PT. Astra Honda Motor or AHM) produces motorcycles as its main product. One motorcycle requires a considerable number of parts, with each part in turn requiring dozens of subparts/components. Such parts containing different subparts or components are produced by the first tier industries, with Honda acting more as an assembler.

Distinct from the *jishuken's* Toyota Production System, Honda suppliers are grouped according to sector-specific technology. For example, stamping-based companies will be grouped with other similar companies (Sako 2004), and this is also the case in Indonesia. In Honda the suppliers are differentiated based on the product namely; welding, standard component, machining, electric. Besides this, it also makes five differentiations on the basis of the competence in engineering: casting, machining, press, painting and assembling (Interview, Cikarang, 25.01.2011). One of the supplier companies explained how this grouping enables the company to assess and evaluate the type of material used for the part (Interview, Cikarang, 06.12.2010). This is the particular strength

of the Honda supplier development activity; due to the sector-specific grouping, the company can assess and evaluate the strength and weaknesses of the part produced.

Interestingly, it is as if there is no barrier to stop for Honda from accessing the supplier companies' factories/shop floor for an inspection of its products. An engineering manager in a supplier company describes this to me in an interview:

Respondent: "For Honda (AHM), this factory is like a second home for them. We are close also with the local experts in Honda. Our language is the same. Also we have frequent meetings. This helps knowledge transfer. For a quality problem, before it snowballed and became troublesome, they (Honda) will give warning in advance. Honda treated our products just like they were their products. Our products indeed are their products."

Researcher: "Is this because your company is part of the Honda *keiretsu*?"

Respondent: "Yes that helps the personal proximity (*kedekatan personal*) between us. We are a local company, not like the supplier company, which has a parent company based in Japan. If there is problem, the parts will be put aside before the problem trickles to a voluminous issue. Then we discuss with them" (Interview, Cikarang, 06.12.2010).

By viewing the parts produced in the position akin to their products, Honda experts have access to them in the supplier factory.

The expert visits to the factories enable the knowledge exchange in quality system. During such visits, the experts would perform *genba*, which is a walk among the shop floor to evaluate the flow of production. If there were a problem due to, for example, several processes in the parts manufacturing that are being missed, a meeting would be held with the experts from Honda. The supplier companies often adopt the quality system and *kanban* from Honda internally in the organisation (Interview, Cikarang, 06.12.2010). Thus the tacit knowledge exchanged (and to a certain degree transferred) from Honda is in the form of the quality system and the production tool, i.e. *kanban*. The implementation of *kanban* in their warehouse enables a timely delivery, managing the required stock to be picked up by the assembler.

Furthermore, Honda also carries out training for the new projects or new products for the supplier. An improvement assessment system is applied, enabling knowledge to be exchanged both ways from Honda and its suppliers (Interview, Cikarang, 06.12.2010). The know-how regarding the product is usually retained by the supplier, yet Honda gains mastery of the quality system. The capacity building from Honda is closely related with new projects, such as new motorcycles to be launched.

There exists a Maru I Study Group in Japan, which is a supplier forum for upgrading parallel engineering (Sako 2004). Conversely, the one that is available in Indonesia is *not of a study group* but *of a meeting between the assembler and suppliers once or twice a year in an Astra Honda Technical Meeting*. This

meeting would be attended by approximately 120 suppliers from a range of different areas in Indonesia (Interview, Cikarang, 08.10.2010). Therefore, rather than a study group such as that is exercised in the *jishuken* Toyota Production System, the meeting takes place rather shortly to discuss specific matters. The knowledge exchange process among suppliers and assemblers covers a range of issues, including mechanical problems, advice on how to react to and handle customer complaints, and handling customers by responsive means (Interview, Cikarang, 08.10.2010).

The frequent interaction between the supplier company with experts from Honda due to the opening of the shop floor, the shared frame of reference in the quality and lean manufacturing paradigm, as well as the *keiretsu* linkage foster the *cultural space* (Meusburger 2000) between the first tier supplier companies and the Japanese automakers. Based on the fieldwork, Honda has production plants in Sunter, North Jakarta and in MM2100 Industrial Cluster in West Cikarang. The engineers and quality assurance staffs in CHN Company's production plant in the Jababeka Industrial Cluster would interact more with Honda in these plants, either in the form of experts visit or through the Astra Honda Technical Meeting, rather than discussing with the other automotive supplier companies located nearby.

Despite this frequent interaction, it does not mean that there is no limit in the knowledge exchange between Honda and its suppliers. Honda's factory is only open in its production lining (Interview, December 2010, August 2010). Suppliers are not allowed to access the first and second pilot products for mass production, as the two areas are restricted. The capacity building and review of suppliers as well as supplier development is managed by the procurement division of the Astra Honda Motor (Interview, Cikarang, 25.01.2011) akin to the one practiced in Honda's headquarter base in Japan (Sako 1999; 2004)

Thus, the interaction between Honda's assemblers and its suppliers predominantly takes place through engineering/expert visits dispatched to the shop floors of its suppliers. Through such face-to-face meetings, advice on issues relating to quality issues or tools pertaining to lean production system is discussed. Know-how relating to the product and drawings usually is transplanted from the principal company of the first tier companies.

Summing up, despite the variety, the limits and the strengths of each of the supplier development programmes from Toyota and Honda, this programme provided the intensive means for supplier companies to reduce cost, to implement changes, and most importantly to capitalise on the tacit knowledge for the production process. The exchange of knowledge in these supplier development programmes weaves a cultural space between the Japanese automakers and their suppliers.

Japanese *keiretsu* : 'the rule of the game'

Knowledge flow is thus enabled along the vertical network supply chain of the Japanese *keiretsu* of assemblers, as explained in the preceding paragraphs. Yet, what are the features of this *keiretsu*?

Keiretsu is a form of a 'relational contract' (Nagaoka, Takeishi et al. 2008) or 'hands interlocked in a complex networked of formal and informal interfirm relationships' (Hatch Yamamura, 1996: 69), outside of the terrain of the firm or transaction cost. This can be traced back historically in Japan to the *zaibatsu* holding company, with a type of control structure. The companies, which were liquidated post Second World War, were owned by the *zaibatsu* family. These family members held the stock in companies that today consist of *keigo sbudans*, that of horizontal group member firms and the associated *keiretsu* firms, which are vertical in character (Scher 1999).

A key feature of *keiretsu* is mutual shareholding among their constituent firms and consultation between the firms' top managers (Karan 2005). The term *keiretsu* might explain the strong ties between suppliers and automakers (Karan 2005), as a vertical hierarchy between the automaker/assembler with the supplier (Scher 1999). In Southeast Asia, the Japanese automakers quite dominate the market (Wad 2009). Hatch and Yamamura referred to the rise of a regionalised *keiretsu* production structure enabling Japanese automobile firms to expand to Southeast Asia, and tagged on by their Japanese suppliers (Hatch and Yamamura 1996; Wad 2009). The creation of production plants by the Japanese, joint ventures, and in some cases locally owned *keiretsu* suppliers in Indonesia, bring about learning and knowledge flow within this vertical hierarchical *keiretsu* network (see also Irawati 2012).

It is important to emphasise that the horizontal *keiretsu* (such as in Japan's political alliance) is different than the vertical *keiretsu* in Asia/Indonesia. As identified by Hatch and Yamanura (1996: 140), the relationship between Japanese elites and their Asian counterparts is vertical in the way that the large manufacturer remains closely over a group of smaller companies. My analysis derived from ethnographic fieldwork and interviews indicates that the following are the features of the vertical Japanese *keiretsu* in Indonesia: *first* that it is likely that important decision-making pertaining to purchasing is likely to be done not in Indonesia, but in the principal company of the automakers. This is most likely to be in Japan or another important geographical axis, such as the R&D Centre in Bangkok, Thailand. This important decision-making will include affairs such as if a customer is disappointed with the performance of the top-level management of the supplier company. *Second*, the automakers wield significant power to 'scold' the suppliers if parts are not delivered on time, or if there is a misreading of *kanban*. *Third*, it is vertical because a supplier is relatively stable in its position *as a supplier*, rather than moving up the ladder. Thus, these suppliers are developed to be relationally attached to the automakers in an asymmetrical relation. In turn,

the know-how for lean manufacturing and long-term cooperation for the subcontracting of parts is given. Tacit knowledge as capital is controlled and swivelled in this chain of vertical hierarchical *keiretsu* network.

If a first tier supplier supplies parts to a Japanese automaker, it generally cannot supply them to another automaker. This is the first ‘rule of the game’ that I found in Honda, Yamaha and Toyota linkage. A supplier company stated there is a ‘code of ethics’ that they (the employees working in the company) have to adhere to. In an effort to retain the trust from Yamaha, they cannot supply to Honda, one of Honda’s rival competitors. The engineering manager explains this to me in an interview:

“We understand the rules of the game, that there is the factor namely if we supply a specific product to Yamaha there will be a specific evaluation. This is why we never make a move to Honda” (Interview, Cikarang, 25.11.2010).

Exception, although rare, can be made to the ‘rule of the game’. In such cases, the product being produced is normally of such specific character that there is only one supplier available in Indonesia and hence the factory or production plant will be split for each. For example the factory located in Karawang will be concentrated on supplying the parts for Yamaha, whilst the one in Cikarang will be for the Honda (Observation, 26.10.2010).

Apart from its function as the rule of the game, it also creates a norm that gives a sense of identity to the suppliers. This sense of identity is that they are members of a certain group. Indeed, *keiretsu* has been useful in promulgating the shared frame of reference and social context to accord meaning to knowledge within industrial clusters located in Java (Irawati 2009). However, in some cases I found that it is also of a shared mental structure (Bourdieu 2007), which produces and reproduces practices of parts production. The *keiretsu*, which is a term known among the top management of supplier companies and OMCD Toyota, may not be a known term among the TPS members (Observation and informal discussion, February 2011). However, they *do identify themselves* as belonging to the group/cluster of Toyota. TPS members refer to some parts of production not as *keiretsu* but as ‘vendor to vendor’. In a case of a bracket part production, I asked a TPS member if it is possible to have the outer part produced by supplier companies not from a Toyota supplier group. The reply that I received was fairly stern. This is captured in the following dialogue:

Respondent: “No, that part is vendor to vendor. Toyota specifically requested the part from one vendor to be used by another vendor. We are the vendors supplying to Toyota.”

Researcher: “Why not using the outer part from supplier of Honda?”

Respondent: “That is impossible, their specification will not match the required standard.”

Researcher: “Is that the only reason?”

Respondent: “It is the *norm*, the *practice*, that we produced with vendor-to-vendor, between suppliers of Toyota. This is as requested” (Informal discussion, February 2011).

Hence, *keiretsu* acts as a norm that can restrict the process of tacit knowledge flow. It enhances the process of knowledge flow within the supplier development programme, but at the same time it excludes access to this knowledge for other supplier companies not belonging to this network.

Limits of knowledge exchange

There are limits to knowledge exchange processes within the supply chain linkage. The first one is trust, which is difficult to be accorded to new supplier companies in the second tier. The first tier has to maintain the design (drawing) of the part, the tacit know-how attained from in house company process, principal company and/or the subcontracting from Japanese automaker. This is expressed by the senior marketing officer working in a first tier company:

“Trust is the most important factor. There are sometimes matters that we should keep to ourselves, when we are giving the drawing that is the know-how. We cannot give that to someone whom we are not aware of, especially competitors’ right? So this drawing must be provided only to those (suppliers) whom we can trust. Take for example this part of a brake system, if we give the order and drawing to them, they can sell it directly to the market or other parties. Yes there is agreement with the supplier companies. But still if we do not know them, it will be problematic. With the present competitive condition we should not do a trial and error with the supplier companies. Our time is of the essence” (Interview, Cikarang, 30.08.2010).

Therefore, there is a strong preference for the first tier companies to work with their ‘old’ suppliers. Drawing does entail knowledge in the form of information about recent trends of the Japanese automakers’ projects. Access to the drawing and the tacit know-how manufacturing the part is limited by the element of trust.

The second limiting factor is language. The usage of fluent Japanese is needed to tap into the JIT, the know-how in lean manufacturing and production system, and essentially to engage in problem solving discussions with the experts. Most of the Japanese experts speak relatively limited Indonesian language. The process of problem solving in the shop floor carried out through *genba* by experts often requires a verbal explanation. This is where the restriction arises, as they mostly speak Japanese. This issue was also raised by an engineering manager in a first tier company in an interview:

“Language is one of the barriers, it can be a communication problem. No matter how smart the Japanese expert is, still this will limit the explanation. Sometimes there is a misunderstanding. I am used to communicate in Japanese language, I have been working in this area for 20 years from 1988. I am used to communicating with them. I used to communicate using sign language. They are willing to share their knowledge but

language is the barrier. Thus we have to be smart. Sometimes they do not explain but instead provided examples, this and this is how to do it” (Interview, Cikarang, 05.10.2010).

Companies try to remedy the language limitation by organising a free Japanese language course for the employees (Informal discussion, Cikarang, 05.08.2010). Another strategy endorsed by the company is directly involving the Japanese experts to be involved on the shop floor. They are asked to point out directly where is the problem, and show the problem. By visualising the problem, they hope to understand the problem and then figure out the solution (Interview, Cikarang, 26.10.2010).

Having discussed supplier development programmes from the Japanese automakers of Honda and Toyota, the features of Japanese *keiretsu* and the limits of knowledge exchange processes, I assert the argument: the tacit knowledge flow through the supply chain remains an intensive linkage of knowledge flow in the Jababeka Industrial Cluster. Access to this knowledge is controlled by the Japanese *keiretsu*.

c. Tacit Knowledge Flow in the Embedded Horizontal Linkage

The map¹⁷⁰ shown in chapter five exhibits the clustering within clusters areas in the spatial peripheries. By spatial peripheries I specifically refer to the areas of periphery of the core in Jababeka Phase I, and the periphery in Jababeka Phase II. Taking into account this clustering within cluster, this part investigates whether there are knowledge flow interactions or collaborations within these areas beyond that of the supply chain linkage between Japanese automakers and first tier suppliers, and, if there are, how does the knowledge flow in this horizontal linkage?

During the fieldwork I discovered that there are in fact three areas of nested clusters whereby there are interactions and collaboration enabling knowledge flow between the companies. Embeddedness (Granovetter 1985; Polanyi 2001) is the salient character of the horizontal knowledge flow in these areas. It is the social relations weaved by means of personal networks and organisational needs that facilitate the knowledge flow. Knowledge refers to activities of problem solving in the production process and the sharing of information on subcontracting activities between these second and third tier companies.¹⁷¹ The type of knowledge is tacit and exchanged through face-to-face contacts. I argue, in these dense ‘nested clusters’ the dynamic of the Jababeka Industrial Cluster lies, as companies exploit the geographical proximity to benefit from the flow of tacit knowledge (see also Evers, Gerke et al. 2011; Menkhoff, Evers et al. 2011).

¹⁷⁰ See Map 5.3 on chapter five part b on location facilitating the supply chain network.

¹⁷¹ The terms second and third tier companies also refer to the position of the company in the supply chain network. The clarification is available in chapter two.

Most of the companies within the cluster within cluster or ‘nested cluster’¹⁷² (Gordon 1998) have manufacturing business lines, exemplified by one company producing wiring harnesses whilst the one adjacent produces moulds and dies. These companies located in the nested clusters typically are second and third tier companies. In terms of size, they are small and medium companies.

The type of knowledge that is exchanged between the companies is related to the problem solving of the parts and advice on the manufacturing process. This includes, for example, in performing a trial for a part before the requested amount is produced (Interview and observation, Cikarang, 22.12.2010). Apart from that, this knowledge also includes the information about subcontracting activities. In one case I talked with an engineer who has moved out to work for another company located in Jababeka Phase I. He explains that there are at times exchanges of information about subcontracting activities between the companies located in *Ruko Beruang*:

Researcher: “Are you still in contact with your friends in *Ruko Beruang*?”

Respondent: “Yes up to now. We are in contact also in terms of order (subcontracting). They are exchanging orders between themselves.”

Researcher: “Is there competition between you and your friends?”

Respondent: “Yes there is competition, but we know our weak element, they have their strong element, but we compete with each other. In here I do not have milling machine“ (Interview, Cikarang, 01.09.2010)

Although he did not have a milling machine, when he was still based in *Ruko Beruang*, his former company can have access to this machine from the neighbouring companies. The subcontracting information is indeed of value, as it would potentially open up market for parts manufacturing in the small and medium-sized companies located in the third or second tier companies. The technique of checking the surfaces of parts produced (Interview, Cikarang, 17.12.2010, 22.12.2010) and information on subcontracting prospects are likely to be kept in the employees’ heads, thus making it tacit. As interactions are associated more with part production requiring the tangibility and/or visualisation of problems, face-to-face contacts are the means of collaboration between these companies.

The companies in the *Ruko Beruang* in choosing to be located in their current location would take into consideration the existence of similar industries in the manufacturing sector situated nearby. They prefer to stay in their current location because it is less expensive than the price of factories in the (planned) SME cluster offered by the Jababeka Group (Informal discussion, Cikarang 24.09.2010).

¹⁷² Gordon (1998) also used the term ‘nested cluster’ but I shall use the term to refer to clustering within cluster.

Embedded social relations are the elements that weave the interaction in this horizontal linkage. Several of the knowledge workers know each other due to previous work experiences or alumnae-ship. The alumnae-ship, for example, is from the ATMI Polytechnic in Solo. A plant manager in a company explained how he collaborated with *Pak B* (Mr. B), whose president director is a former director in the place where he used to work:

Researcher: "I have interviewed *Pak B*. He works in that company closely located with your company."

Respondent: "That is my friend. They (referring to the different companies located nearby) are all my friends."

Researcher: "Do you contact each other frequently?"

Respondent: "(Smiling) I just got off the phone, talking to *Pak B*. My staff is now in that shop floor (in *Pak B* factory). He is performing a dies-trial. The number one person in that company used to be my director in the company where I used to work and I have another friend who works in there."

Researcher: "Then how about this company C?"

Respondent: "We went to company C yesterday, I know they are supplying to this automaker."

Researcher: "Can you then go inside the shop floor look at the process and discuss problems with them, your friends out there?"

Respondent: "Yes, yes (nodding head)" (Interview and observation, Cikarang, 22.12.2010).

Furthermore, the interaction is also driven by the lack of company facilities and machines for production. The engineering manager in Company C for instance informs me how their company often borrow forklifts for transportation of parts from *Pak B* (Interview, Cikarang, 07.12.2010). Different from the circumstances of first tier companies, these second tier companies often have limited company's facilities and machines. Being in close geographical proximity with the companies, and due to the organisational needs as well as personal networks, the tacit knowledge flows are enabled in the nested cluster. Whereas first tier companies have more procedures (possibly due to the ISO or strong *keiretsu* linkages with the automakers), these companies are more flexible in terms of discussions with their counterpart companies located nearby.

Thus the clustering within cluster occurs between small and medium-sized companies, normally belonging to the second or third tier industries. Within such areas there is information sharing about outsourcing, and knowledge sharing relating to problem-solving activities. The knowledge flowing is usually tacit in character and exchanged via face-to-face meetings forged by personal networks. Proximity is defined by geographical propinquity. Embeddedness (Granovetter 1985; Polanyi 2001) is the central character of the horizontal knowledge flow. Hence, clustering in Jababeka facilitates the tacit knowledge flow between these small and medium sized companies.

d. Restricted and Limited Academia-Industry Collaboration

An inseparable inquiry of the discussion of the linkages of knowledge flow in an industrial cluster should be aimed at the academia-industry collaboration. The subject matter of academia-industry cooperation in the Jababeka Industrial Cluster will be the focal point of discussion in this part. Academia-industry collaboration for the knowledge flow and exchange is, unfortunately, restricted and limited in the Jababeka Industrial Cluster. This does not mean that the collaboration is non-existent, a case study of CHN Company – UI collaboration shows how it exists on the level of pure material engineering of parts. Collaboration for material testing also takes place pushed by alumnaeship and the expertise of the knowledge workers in the academia; this nurtures the social space enabling interactions not on the basis of geographical proximity. However, by exploring the experiences of the engineers and QC staffs of supplier industries, I intend to demonstrate how this cooperation is both limited and restricted.

CHN Company – UI collaboration: knowledge as expert advice

The collaboration between CHN Company and Department of Metallurgy – University of Indonesia (UI) elucidates on what type of knowledge is exchanged and how this knowledge is incorporated into the shop floor. The type of knowledge that has a bearing on the production needs of CHN Company is expert advice (from UI). Furthermore, the support and authorisation from top level management of the company enable this cooperation and internalisation of knowledge. Their cooperation started in approximately 2004. One of the Japanese automakers' production plants located in West Java Province was about to be visited by the metallurgy department of UI. However, since the automaker had a special visit from a Japanese expert, they decided to shift the visit of UI to CHN Company, one of its key first tier suppliers. CHN Company itself produces brakes (braking systems).

CHN Company benefits from the advice of the experts from UI about the pure material engineering of the part. This is the knowledge being exchanged by the two parties. Of course, there are other forms of collaboration, which consist of problem solving activities with the metallurgy team from UI in CHN Company's shop floor. In addition, the employees of CHN Company may attend lectures in UI (Interview, Cikarang, 26.10.2010). In this aforementioned variety of collaboration, it is the expert advice that has a direct bearing on the process of parts manufacturing. A staff in QC shared the experience he had working with UI in the following interview excerpt:

“The scope of the cooperation is with material science, metallurgy. In there, they are involved in material treatment, for example, when it is being heated, what are the factors that may cause the part or material more solid. I got input from them. We share knowledge on materials. Sometimes if we need it they (UI) also open the access (for

lecture in UI) for us already, if we want to carry out a study or research further, usually my friend in this division often shared ideas by phone. So we meet each other quite often” (Interview, Cikarang, 08.10.2010).

Conversely, UI may observe processes in the shop floor, use the testing facilities available in CHN Company, and they can access the factory for the purposes of their study. The UI team can apply theories that they have learned on campus in the factory (Interview, Cikarang, 26.10.2010). The CHN Company itself has relatively well-equipped facilities in its R&D Unit, based in the Jababeka Industrial Cluster (Observation, Cikarang, 26.10.2010).

The collaboration that affects the (improvement of) parts would be the UI expert advice. Yet this is restricted to the pure engineering of materials and treatments of materials. The QC staff that I interview highlight that in terms of technical know-how of the product being produced the advice that can be incorporated directly into the product does not come from experts at UI, but rather from the advisors or technical experts based internally in the company (Interview, Cikarang, 08.10.2010). Thus, the internal source of knowledge in the form of CHN Company’s technical experts advice is the one sought first should there be a problem in the parts production.

There is a limit to cooperation. It is, as explained by the one of the top-level management board members, solely for the purpose of the non-profit of the knowledge being attained. The cooperation with UI is facilitated with an agreement. He elaborated in detail about the limits of the cooperation, as follows:

“I do not talk business with them...In here we make braking systems, whilst in there they study materials. Metallurgy is only one component. Material is one out of the 5M (Man, machine, material, method, money). We have an agreement that specifies we cannot share the data such as drawings. There will be no sharing of data with industry competitors of this company. We have data sharing on process of production with UI, this is the data (being shared). This is the limit. But we can share (process of) engineering of materials with UI, although this means some of our processes (result) are missing but UI can teach us. I asked the group company and no problem” (Interview, Cikarang, 26.10.2010).

There are further limits, not explained in the agreement. There is less readiness of the lecturers or experts in the metallurgy department of UI in responding to daily problem solving issues. These professors working at UI, as explained by the QC Staff and high-level manager, are not ready to have specific discussions about the parts being produced; they are only able to offer advice in regard to pure engineering process materials.

Instead of the formal contract between UI and CHN Company that enables this incorporation of expert advice to the shop floor, it is the support and authorisation from the key official at the top level management board in CHN Company. The cooperation with UI is directly facilitated by a key official at the top management level. He actively supports the collaboration with UI. This

enables the access towards expert advice from UI. This official helped to “open the access and provided a special avenue to UI, with the access and the gateway being open, the workers in CHN Company can interact with UI” (Interview, Cikarang, 26.10.2010). The support fosters the access of experts’ advice for the CHN Company staff to discuss problems relating to parts.

Authorisation is also central to this collaboration. The key official represents someone who is an embodiment of both an expert and a structural position in the organisation. Due to the expertise nurtured by more than 21 years of experience he has in the braking system (Observation, Cikarang, 26.10.2010, Interview, Jakarta, 31.05.2010), he can evaluate the scope and merit of the collaboration. At the same time, owing to the position in the management board that he has, he could lobby the group company based in Japan to ensure that data concerning production process can be exchanged with experts in UI (Observation, Cikarang, 26.10.2010). Experts in UI would need to take into account this data in providing (accurate) advice for the material improvement needs in the shop floor. Authorisation from the group company is required to enable a smooth production process and communication with the other Japanese advisors based in the company.

The support and authorisation provide acceptance of the expert’s advice on the shop floor. They are quite active in contacting experts in the metallurgy department in UI, including making phone calls or organising meetings, should they encounter problems concerning the materials for the parts (Interview, Cikarang, 08.10.2010). Thus, the process of interaction between academia and industry requires this authorisation and support from the top level management of the company.

Geographical proximity, though, is not an issue in this type of cooperation. CHN Company prefers to work with UI located in Depok, rather than working with ITSB (located in Cikarang, it hosts many ITB alumnaes working as lecturers) or ITB (located in Bandung). I posed the question to the QC staff and received a blunt answer in return:

“It is a matter of urgency (rising tone) and what we in this company need. Maybe it will be possible to have cooperation with ITB, but in this company the relation (with ITB) is not as good as the one with UI. For the UI cooperation it is facilitated directly from our top management” (Interview and observation, Cikarang, 08.10.2010).

In contradiction to horizontal linkage in the nested cluster, where the companies benefit from the geographical proximity to enable tacit knowledge flow, for knowledge exchange between academia-industry geographical proximity is not a barrier. The company prefers to cooperate with UI rather than ITB or ITSB, as there is support and authorisation from the top management of the company.

Hence, the collaboration between CHN Company – UI underlines the level of cooperation, which is purely in regard to material engineering. The authorisation and support from the CHN Company's management level is central for the incorporation of expert advice from UI in the company's production process. Geographical proximity is not a decisive factor for this academia-industry collaboration.

Material testing fostered by alumnaeship & expertise

What are the elements fostering interaction for material testing? I bring forth this question as most of the companies interviewed in the fieldwork have this requirement of testing the materials for the production process. The result of material testing is typically information concerning the mix of materials for the parts produced. However, this interaction does not only bring knowledge in the form of a sheet of paper containing information (as a result of material testing). It also creates the possibility for companies to discuss ideas or ask questions to the academia. When they (the companies) do not have the testing tools or testing facilities, then such internal organisation needs bring the possibility of interaction with academia, such as ITB, or UI or ST Polymer (Polymer Technology Center, or STP). I assert that this type of interaction is driven primarily by alumnaeship and expertise.

The first factor of the linkage relates to the expertise of the knowledge workers in the R&D institute or university (both termed as academia). IMV is a company located in Jababeka, Cikarang, which went to the ST Polymer, located in PUSPIPTEK, Tangerang in 2010 for material testing purposes. It carried out product testing at ST Polymer. There was knowledge sharing for the information pertaining to the material. I had the chance to discuss directly with the QC manager in IMV Company who is responsible for the cooperation. He explained his experience working with ST Polymer:

“The cooperation between us and STP was for product testing. We share our problems in regards to the TVC material, I do not understand this type of material, and so I take advantage of this testing and sharing opportunity. That type of part we produce for our automaker has several problems. So perhaps there are materials from Japan that might have some issues. Local materials on the other hand are all right. So I met the marketing in charge in STP, she linked me up with the expert in that office. He then explained to me the difference of character of the materials, that this type of material is more heat resistant. That I just found out. Based on this information I give them to the supplier and the automaker” (Interview, Cikarang, 09.12.2010).

The expertise of the researchers or engineers working in ST Polymer is the factor considered as to why he went to ST Polymer for material testing.

The second factor is that of alumnaeship. SGS (a first tier company supplying Yamaha) also carries out the testing of parts produced in the Metallurgy department of UI. There have been various tests carried out since 2009, including a microstructure test, metal test, and composition test. They required the testing for the purpose of parts production, typically in the trial process after the drawing is received from the customer. Below is the response that I received when I asked why they prefer to work with UI rather than ITB, despite the latter being more reachable in terms of less traffic jam, i.e. better geographical proximity.

“It is the factor of alumnae, we are running a business here. So yes we prefer to be competitive in several aspects: price, and timing. Indeed if anyone asks why UI because some of us are graduates of that university, but then in addition to that UI is also fast in providing the results, the Laboratory in UI is credible for the testing results as well” (Interview, Cikarang, 25.11.2010).

Yet discussions about how to integrate the testing results to improve the manufacturing process between SGS and UI have yet to materialise. An illustration is the interpretation of the result of microstructure picture of a nickel (Interview, Cikarang, 25.11.2010) based on the result of Laboratory of UI where they potentially would face some problems. For the problems relating to result interpretation and parts production they still rely on their internal technical experts and engineering department. This additional dialogue has yet to take place, yet as a factor the alumnaeship certainly bears influence.

The prominence of alumnaeship is also the case with another second tier company located in *Ruko Beruang* near Phase II of Jababeka Industrial Cluster. The interviewees working in the industry are mostly alumnae of the Manufacturing Polytechnic of Bandung. They identify themselves differently than the Manufacturing Polytechnic in Jakarta, referring to themselves as ‘*Polman Swiss*’¹⁷³ (POLMAN 2010). Lab testing for the mass production of parts would normally be accorded to *Polman Swiss*, to observe whether the material complies with the customer’s request. Some of the trainees for the production process are also from *Polman Swiss* (Interview, Cikarang, 18.11.2010). It is likely due to the same training background and shared frame of reference that they cooperated with *Polman* in material testing (Interview, Cikarang, 18.11.2010).

My fieldwork and interview results indicate that the consideration of having materials tested is not due to geographical propinquity, but based on shared alma mater and expertise of the lecturers/researchers in academia. In fact, the thickness of the alma mater linkage would weave a social space for this cooperation.

¹⁷³ The Swiss government played a role in establishing the Manufacturing Polytechnic in Bandung. The *Polman Swiss* was established initially with the name of *Politeknik Mekanik Swiss-ITB* referring to the bilateral cooperation between Switzerland and Indonesia (Polman: 2010).

Hence, the linkages facilitating the material testing between academia and industry are due to factors of alumnaeship, plus the expertise of the lecturers and researchers in the academia.

Why is it restricted and limited?

Despite the existing collaboration on the level of material testing and pure material engineering, I contend that the academia-industry collaboration is restricted and limited. By restricted I refer to the fact that there is no organisational need to engage in such collaboration as it relies more on knowledge from the experts within and/or the 'import' of drawing from the principal company. By limited I point out the internal factors of the academia and/or industry itself, i.e. the uncertainty in providing services from the academia and the lack of technical expertise of researchers/lecturers in the academia. This part will outline the impediments to collaboration between academia and industry, from the angle of automotive supplier companies based in Jababeka Industrial Cluster.¹⁷⁴

The first impediment relates to the uncertainty of services discharged by the academia. This uncertainty arose several times during interviews in the field. Timely delivery of testing results (either calibration or material testing) as requested by the supplier company is essential to be able to produce parts in a designated period of time (Interview, Cikarang, 09.12.2010). An engineering manager shared his experience of the testing process in LIPI. The respondent ascribed the fact that there is no connection with LIPI as the reason why cooperation for testing will be difficult. He explained his experience in the following interview excerpt:

Respondent: "We did testing once in LIPI located in Serpong, to check on the material composition. The material of A, for example, is of a certain content percentage. We do not want to be caught up with the wrong specification of material, particularly in cases where suppliers were not honest with us. In the past we had this with suppliers, he said it is material 316 but it is 201, that is a worthy lesson for us. So we periodically check this in *Polman Bandung* (Manufacturing Polytechnic in Bandung)."

Researcher: "Not with LIPI?"

Respondent: "LIPI is too complicated (shaking head). We only did that twice, I am not too fond of it (of LIPI). I only want information on the composition of material. Just to let you know I was informed that I have to have a friend in there, if not then there will be a problem. That is the problem, as we do not have any connection there. This is the problem with public services. One factory that produces cable related parts located in Tangerang also dislike the services in LIPI, they prefer UI in Depok" (Interview, Cikarang, 06.01.2011).

The lack of connection or association (i.e. having a friend) with academia hinders collaboration between academia and industry. The personal network of alumnaeship may minimise this uncertainty.

¹⁷⁴ Since the angle or experiences explored in this chapter are from the automotive supplier industries, thus they are different from the academia ones as outlined in chapter three.

The second impediment is the lack of technical expertise of the knowledge workers in university/research institutes (academia) as required by industries. This may be attributable to the different social construction of an expert between the 'worlds' of academia and automotive industries. An expert in academia may be marked or measured by scientific publications, patents or trademarks. The career orientation of an academic organisation would ideally be horizontal with specialisation of profession and publication showing the level of expertise. Conversely, an expert in the automotive industry is generally someone who has many years of experience in a specific field. This tacit knowledge is measured through the varieties of improvement projects, the competence in *genba* and/or problem-solving activities on the shop floor. I found that in Japanese companies the expert is typically the senior advisor, director, vice president, or president director. They are familiar with problems on the shop floor, and with the specificities of the parts being produced. This is signified by the fact that problem-solving activities operate according to a sort of 'severity scale' as a rule of thumb (Observation, February 2011). The more severe the problem is, the more likely that someone who holds a higher structural position would do a *genba*. Therefore, there is a vertical orientation of the organisation, yet woven tightly with expertise derived from past experiences.

The lack of expertise can also be driven by the focus of production inherent within manufacturing supplier companies. Their organisational need for an expert does not match the qualification of an expert in academia. Within industries the focus falls much more on the applied (tacit) knowledge associated with day-to-day production process and improvement projects (*kaizen*) (Interview, Cikarang, 30.08.2010). In an informal discussion with an engineering manager in a first tier company, he underlines the type of research that the company requires is short-term research or a project for the problem solving of parts being produced (Interview, Cikarang, 06.09.2010). This is preferred over long-term research. By contrast, in universities or research institutes such as LIPI, research can often take up one to three years. Hence, the lack of expertise of the knowledge workers due to different constructions of what an expert is as well as the production orientation of the industries may contribute as the limiting factor.

The third impediment is that there is no organisational need to engage in such collaboration. Most of the drawings and training come from the principal companies, or in some cases from the customer. This issue arises with first tier companies with a joint venture, or foreign owned companies. Engineering is not obligated to make drawings/designs for parts, despite having such capacities. Furthermore, the supplier companies also have their own experts or advisors that cater to their daily production needs. This is normally the case with Japanese 'transplant' companies (Observation February 2011, Interview, Cikarang, 05.10.2010).

Summarising, academia-industry cooperation are restricted due the fact that such cooperation is not necessary, as organisationally the companies already satisfied their needs by importing knowledge related to the production process. It is also limited as caused by the uncertainty of services relating to material or part-related testing provided by academia and the lack of the technical expertise of the researchers or lecturers in the academia. The collaboration between academia-industry does not constitute a strong linkage of knowledge flow in the Jababeka Industrial Cluster. Existing collaboration takes place more on the basis of pure material engineering and material testing. In this 'seeds' of academia-industry collaboration, geographical proximity does not motivate the cooperation. In fact, it is the alumnaeship and the degree of expertise that make up the social space of interaction (between actors). The thicker the degree of alumnaeship, the more likely the company will prefer to work with a particular university.

e. Summary

The 'meso' level study of Jababeka Industrial Cluster attempts to answer the question of knowledge governance asked as the central question of the thesis. At the same time it probes the second line of inquiry as to whether clustering yields its promised benefits of capitalising knowledge to increase company's performance. Jababeka Industrial Cluster unfolds the story of how tacit knowledge relating to the production process and lean manufacturing is controlled by the leading firms of the supply chain linkage. I substantiate this by looking at the control of the Japanese automakers in the supply chain network of *keiretsu*. This is how knowledge is governed in the Industrial Cluster of Jababeka. The promised benefits of clustering seem to be reaped by the small and medium sized enterprises located in the 'nested cluster' of the cluster. In fact, the dynamic of the cluster lays in the tacit knowledge flow between companies in this clustering within cluster (or 'nested cluster'). The collaboration between academia and industry is limited and restricted.

In order to support the argument, I divided the chapter's discussion into four parts. In the beginning it is shown how knowledge in the automotive supplier industries is produced in the format of tacit and experiential knowledge. The tacit knowledge includes the know-how of knowledge workers and a set of techniques or organisational practices and routines associated with the lean manufacturing, QC or QCD implementation. The trainings would mainly be organised internally, via on the job training (OJT) either in the principal company or the group company headquarter. Experts in the automotive suppliers own experiential knowledge established by means of many years of experience as well as the varied projects of improvement that he or she has managed. Knowledge sharing in the companies would take place through visualisation and face-to-face contacts. Auditing as part of the ISO system may function as a

means for discussion, but it is the informal knowledge sharing session after auditing where one can share intricate information as well as problem solving. Moving on the 'micro level' the case of FTR Company shows how the company internalises tacit knowledge at the individual level. The strategy employed involves the expert who has tacit knowledge in devising a *beijunka* tool in actual problem solving situation in the shop floor.

Next, it is also demonstrated how the tacit knowledge associated with the lean manufacturing process is controlled by the Japanese automakers through their *keiretsu* network. The supplier development programme of Toyota and Honda in Indonesia makes up the intensive means of knowledge flow in the Jababeka Industrial Cluster. The supplier development activities and the form of the tacit knowledge linked to the Japanese lean manufacturing system provide the grounds for interaction on the basis of cultural space. The control of knowledge flow in the linkage is managed via the Japanese *keiretsu* of the major automakers. *Keiretsu* is 'the rule of the game' that is vertical hierarchical in character. The suppliers are developed to be relationally connected in an asymmetrical relation with each of the Japanese automakers. However, it is not the *keiretsu* itself that functions to restrict the flow of knowledge. Due to the thick (cultural) Japanese lean management practices and the dominance of the industrial network between the first tier and the automakers, trust (from first tier to second tier) limits the knowledge flow processes in the vertical network supply chain. In addition, language also limits the process of knowledge exchange and internalisation in the company as most of the experts convey their advice in Japanese language.

Furthermore, the dynamic of the Industrial Cluster of Jababeka lies in the nested cluster located in the spatial peripheries. The tacit knowledge flow is associated with the information sharing of subcontracting, and knowledge exchange relating to problem-solving activities. These activities occur between second and tier supplier industries (particularly small and medium-sized companies), which are geographically close to one another. In the spatial peripheries, nested clusters are formed where companies reap the benefit of tacit knowledge flow and frequent interactions due to geographical proximity. These frequent interactions are due to face-to-face meetings between the engineers or QC staffs forged by embedded social relations of the knowledge workers. Hence, clustering in Jababeka Industrial Cluster facilitates the tacit knowledge flow between these small and medium-sized companies.

Another essential horizontal linkage is the academia-industry cooperation, which exists but is restricted and limited due the fact that such cooperation is not needed organisationally, as the companies already cater to their need by importing knowledge related to the production process. They normally import them from the principal companies. It is also limited because of the

uncertainty of services delivery related to material or part-related testing provided by academia, and by the lack of the technical expertise of the researchers or lecturers in the academia. In cases of existing collaborations, they occur on the level of pure material engineering and material testing. Being closely located with a research centre or university does not mean that companies would interact with them. My fieldwork analysis unfolds that these collaborations are situated in the social space. Firstly, CHN Company-UI case study highlights how interactions are driven by the support and authorisation provided by the top-level management. This enables the incorporation of expert advice given by UI lecturers to the shop floor. Furthermore, it is the alumnaeship and the degree of expertise that motivates the interaction between academia-industry for material testing.

Thus, based on the analysis presented in this chapter, developing a strong knowledge cluster in the Jababeka Industrial Cluster will require strengthening both the horizontal linkage between companies and the academia-industry interactions. Furthermore, one needs to reflect on twofold issues. First is the issue of space and scale (Perry and Harloe 2007) that fosters interaction between horizontal and vertical linkage. Space can range from social, cultural to geographical spaces; in turn, these different conceptualisations will restructure the notion of scale. Second is the issue of social relations, i.e. embeddedness (Granovetter 1985; Polanyi 2001; Evers and Gerke 2007) in facilitating the knowledge flow on the industrial cluster level in Indonesia. This may well be a specific cultural trait of the economy of Southeast Asia (Schiel 1994).

Chapter 7

Liberalisation and Bureaucratisation of Academia: The Case of PU & ATMI Polytechnic Cikarang

How does academia¹⁷⁵ in the Indonesian science system produce, share and exchange knowledge with industries? To answer this question, I aim my investigation at two ethnographic organisational studies, namely the case of President University (PU) and ATMI Polytechnic Cikarang¹⁷⁶. Both organisations are located in the Jababeka Industrial Cluster. On the grounds of the analysis from both case studies, I argue that liberalisation and bureaucratisation of the academia hamper the scientific knowledge production and knowledge sharing. To do this, an engagement with two level of analysis is carried out: first is regarding the epistemic culture of the organisation, second is how the academia responds to the conception of space and scale.¹⁷⁷ In terms of knowledge, I explicitly focus on what the knowledge workers, i.e. lecturers, do on an everyday basis in regard to knowledge production, sharing, and exchange with industries in this chapter.

The terms ‘liberalisation’ and ‘bureaucratisation’ call for clarification. I use both terms to capture the process of organisational change faced by academia in Indonesia. Liberalisation is the process whereby academia is integrated further into the market (for a discussion of market, see: Evers and Gerke 1997; Evers and Gerke 2007). Bureaucratisation is the process whereby academia’s day-to-day activities resemble the work in government offices¹⁷⁸ (for a discussion of bureaucratisation, see: Geertz 1974; Evers 1987). By mobilising the two terms I intend to show how knowledge is governed on an organisational level.

PU, the first case study, is an expansion of a Polytechnic, i.e. *Sekolah Tinggi Teknologi Cikarang*. Established in 2001, it is located in the Jababeka Education Park of the Jababeka Industrial Cluster. One of the founders (who holds a position in the top managerial level of the Jababeka Company) plays a pivotal role in the expansion and re-establishment of PU. PU envisions becoming a world class university, applying an international standard curriculum developed by world class academics (President-University 2010). As informed by PU’s website, the tuition fee is around 25 million IDR (ca. 2083 Euro) per semester. A bachelor’s degree would require taking 9-

¹⁷⁵ The definition of academia is explained in chapter two.

¹⁷⁶ Unless otherwise stated, I will refer to ATMI Polytechnic Cikarang as ATMI Polytechnic or polytechnic in this chapter.

¹⁷⁷ This is also explained in the analytical framework in chapter two of this thesis.

¹⁷⁸ The process of bureaucratisation of government organisation is exemplified in chapter four of this thesis.

10 semesters,¹⁷⁹ with each academic year consisting of three semesters. Scholarships are available for bright students; however, students from the Bekasi area are limited in numbers.¹⁸⁰ There are six faculties in PU; the Faculty of Computing, Faculty of Economics, Faculty of Communication, Faculty of Engineering, Faculty of Business and International Relations, and the Faculty of Law. The classes are organised using English language as the medium, with the exception of ‘night classes’, which are part of the Extension Programme. These classes are designated for those workers who can only afford to attend classes at night; Indonesian language is used in such classes. There are other institutes and centres, such as the Research and Community Development Institute (established in 2008) (Informal discussion, Cikarang, 21.08.2010), which formally handles the community development and research activities.

ATMI or *Akademi Teknik Mesin Industri* Polytechnic in Cikarang, the second case study, was established in 2001 by the same organisation as the ATMI Polytechnic in Solo, the Karya Bakti Foundation (Triatmoko 2009). The Karya Bakti Foundation is a Catholic organisation of which the Indonesian Jesuits are members (Triatmoko 2009). The ATMI Polytechnic in Solo was initiated in 1963 (Casutt 1991), with the help of the Franz Xaver Foundation in Zurich, and the cooperation of the Swiss Ambassador; in this case the Swiss government covered some of its production costs (Triatmoko 2009; Teiseran 2010). *Romo* Casutt played a decisive role in continuing the education programme both in the polytechnic in Solo and in Cikarang (Teiseran 2010). In 2009, *Romo* Casutt was awarded the Klaus Jacobs Best Practice Award *Preistraeger* (Casutt 2009) for setting up Indonesia’s most successful vocational school modelled on the Swiss dual occupation training model of 70% practice, 30% theory. Both polytechnics, ATMI Solo and ATMI Cikarang, pursue a production-based academic training system (PBET). This academic system supports itself through production activities, accepting job orders from industries. The majority (almost 80%) of the costs of education are subsidised by production activities (Jacobs-Foundation 2009). Two directorates play a key role in the knowledge production and sharing, namely the Directorate for Production and Industrial Cooperation (i.e. the production directorate) and the Directorate of Teaching (i.e. the academic directorate). The ATMI Polytechnic in Cikarang is a formally separate entity from the ATMI Polytechnic in Solo. It is located in the Jababeka Education Park, part of the Jababeka Industrial Cluster, to support manufacturing training and academic education for the workers in Jakarta and Bekasi (Triatmoko 2009).

¹⁷⁹ Based on a discussion with a respondent, one of the reasons that it is difficult to get accreditation from DIKTI is because the programme is condensed to three years. Furthermore, on the basis of informal discussion, none of the study programmes have received accreditation but they are listed (*terdaftar*) in status (Informal discussion, Cikarang, 02.11.2010).

¹⁸⁰ Data of student admissions in 2010 shows that only 13.25% of students graduated from high schools in the Cikarang-Bekasi area, and only 3.6% of the students enrolled were born in the Bekasi region, indicating that the vast majority of students are from outside this region.

To support the argument of liberalisation and bureaucratisation, I have organised this chapter into five main parts. The first part describes the bureaucratisation process by observing how and why PU cannot exert control over its own resources. The second part looks at the impact of bureaucratisation on the internal mechanism of knowledge production and sharing, which is to maintain an academic decorum. I then move on to the issue of liberalisation of academia, i.e. how the polytechnic explicitly rely on the market to subsidise its costs. The dominant production system in the ATMI Polytechnic subsumes the entirety of knowledge production, as discussed in part three. The academic facet of the ATMI Polytechnic, which in fact functions more in its entrepreneurial character, is the focus of part four. Part five summarises the chapter discussion by reflecting back on the pull of bureaucratisation and liberalisation in the Indonesian science system.

a. PU Deprived of Control

Does PU have control (over its own resources) as an academia? This is the central question of this part. To delve further, I discuss the question as two issues. The first one is the issue of how a study programme is created. I show how the creation of the study programme is pushed by the agenda of the strategic group. By way of this linkage in the strategic group, a bureaucratised space is formed with Jakarta as the centre (of power). The second issue is the exercise of power that the founders (i.e. the patrons) have over the day-to-day management affairs of PU. It is by means of securing the administrative positions and the control of finances or funding at PU that the patrons yield their grip. PU is deprived of control over its resources; it is *de facto* acting and functioning as the ninth company of the Jababeka Group.

The attempt to establish a defence strategy programme: strategic group analysis

It was held that the stage of pluralism or monotheistic knowledge conceptualisation may be attached to the country's political system as well as its government (Hornidge 2007). Indonesia is undergoing this transition by embracing a formal decentralised system. In this wider context, a power analysis of one of the units of knowledge production (namely a university) (Menkhoff and Evers 2005) may shed light on whether a university like PU can exercise control. I carried out a strategic group analysis to probe the issue of the power analysis of the attempt to establish this defence strategy programme. It was not the programme itself that was of interest at first, but rather the tightly knitted communication among the alumnae of LEMHANAS/National Defence Institute (herewith abbreviated as LEMHANAS), who happened to be lecturers at PU. In an interview with one of the prominent figures of the foundation, which manages PU, it was stated that apart from the competence of the lecturers, the alumnae of LEMHANAS have the advantage of networking that could be capitalised upon (Interview, Cikarang, 02.11.2010). Such networks may influence the formal structure of an organisation. I therefore posit: to what extent can this

formality be bent in an effort to secure a resource? Furthermore, can this network restrain the control that a university may exercise?

The resource is in the form of the production of graduates in the area of defence study. At this point a strategic group analysis becomes viable in analysing the capitalisation of the network. Whenever new resources are attainable for appropriation or distribution, strategic groups may surface (Menkhoff and Evers 2005; Evers and Benedikter 2009; Evers and Gerke 2009; Heberer and Schubert 2012). Strategic group analysis may be useful as an interpretative sociology approach to reveal the ‘hidden transcript’ of social history (Evers and Gerke 2009), or in my case to understand the series of actions needed to secure a resource. The rising numbers of undergraduate students of PU can be noted in Table 7.1:

Table 7.1 The Development of Number of Students Based on Study Programme

Study Programme	Year					Total
	2006	2007	2008	2009	2010	
Accounting	29	22	63	92	107	313
Management	136	110	163	185	244	838
Electronic Engineering	15	3	3	10	11	42
Industrial Engineering	36	16	28	38	30	148
Informatics Engineering	52	28	46	75	65	266
Information System	16	4	4	4	7	35
Communication Sciences	32	27	48	76	107	290
Business Administration				12	45	57
International Relations				36	72	108
Law					8	8
Total Number	316	210	355	528	696	2105

(Researcher field note, 30.09.2010)

The idea of setting up the study programme came from both the military and the foundation of PU. A key informant who was involved in a meeting with a high-ranking military general described this in an interview:

“That defence strategy idea started, well initially we wanted to make a security academy, no it is not *sekolah satpam* (security/guard officer school) but beyond that. We wish to produce graduates, where if we may describe back then during *Pak Harto* (former President Soeharto) era, there were a lot of special guards (*ajudan*) to the President. We wish to produce outputs who can be this special guard, physically he or she may be able to protect the boss, but intellectually able to participate in meetings. This initially was our expectation” (Interview, Cikarang, 02.11.2010).

Following this plan, a meeting was held with a high-ranking military general during an event in 2009. The military general advised PU not to design the programme as a security, but rather to establish a defence strategy programme at the undergraduate level. What they (i.e. PU and the foundation) had in mind previously was at the diploma level. The chancellor, vice chancellors of PU as well as the foundation were willing to facilitate it. They did so by collaborating with *Universitas Pertahanan* (Defence University). They (the *Universitas Pertahanan*) will establish the postgraduate programme, and PU will establish the undergraduate programme (Interview, Cikarang, 02.11.2010).

The content and the design of the study programme ostensibly reflect the interest of different parties: LEMHANAS alumnae network, military and the PU Foundation. It is detailed in the blueprint that the defence strategy's study programme will be managed by PU's Business and International Relations Faculty. The programme aims to educate students to gain knowledge of nationality insight (*wawasan kebangsaan*), integrity, character, leadership and the soft skill/life skills development, which will be useful in societal, nation and state-based life. The focal point of this programme is that it will be based on a network to empower nationally competent public figures (*memberdayakan tokoh nasional*) whereby they will undertake the role of advisors (Observation, Cikarang, 30.09.2010). Based on this document and interview, it seems that the programme was designed to facilitate the interests of the top official of the military and the LEMHANAS alumnae network. They are united by the common goal of designing the study programme and producing graduates within the field of defence strategy.

The creation of the strategic group emanates from three groups: the LEMHANAS alumnae network, the military and the foundation. The LEMHANAS alumnae network in PU is vital for the communication and exchange of information between these three groups. During the internship period it is also shown how the lecturers and the supporting staff at the Chancellor's office (some of which are alumnae of LEMHANAS or used to work for either the military or national police) play a role in supporting and establishing the study programme. This includes preparing the application process to establish the programme (*ijin program studi*) to DIKTI.¹⁸¹ The actors of LEMHANAS alumnae, the military, the foundation and PU are creating a pattern matching the description of Evers and Gerke as a strategic group, collaborating to establish the programme. Although the proposal was later rejected by DIKTI, this shows a concerted effort by actors to try to secure a new study programme. It was established without any assessment of the needs of industries in the industrial cluster. Yet this seems to be dictated by the needs and

¹⁸¹ A quick assessment with key informants carried out in September 2011 showed that eight out of the 68 listed lecturers working at PU are either associated with the police (*berpangkat kolonel*) or are alumnae of LEMHANAS. Sometimes they make themselves visible prior to the start of seminars by saluting each other in a military manner, or by using symbols of the military or police training (parachuting for example) in the slides of presentations (Observation, Cikarang, 10.11.2010).

interests of the strategic group. PU needs to tap into the experts within LEMHANAS for teaching and academic activity since it is a newly established university. Likewise, the military requires human resources within the defence strategy. Thus, the strategic group analysis infers on how a decision on study programme is made. First, it is not made solely by formal meetings but rather through a series of events that may be informal. Second, informal networks show how the state (manifested through the military) has an interest and uses this linkage to produce graduates. This practice of how the state controls a university through its informal linkage contributes to creation of a bureaucratised space in an organisation. It is a process whereby a consideration of the establishment of a study programme is made from the centre, i.e. Jakarta, rather than the characteristics of the industries located nearby PU. These two mechanisms point out how PU is not an organisational unit acting on an independent basis.

Hence, I argue that the attempt to establish a defence strategy shows collaboration between different networks of military, foundation of PU and LEMHANAS alumnae to acquire a source of knowledge in the form of graduates. This seems to be an 'out-of-the-blue' initiative, especially bearing in mind the character of the industries in Jababeka is not defence-related business lines, but more manufacturing-based industries.¹⁸²

The informal shape of organisation

The section beforehand has described analytically how a decision concerning a study programme was made. To provide a further understanding of how PU is deprived of control, I inquire about how decisions regarding resources such as funding (money) and administrative positions (*jabatan*) are settled on in PU. The context of PU's informal shape is key to making sense of the way decisions are made about funding. PU's informal shape is as the ninth company under the auspices of the Jababeka Group. By effectively inserting PU as the ninth company, the university yields control over these resources.

Grasping the informal underpinning of the way an organisation manages its resources would require an understanding of key everyday terms used by the lecturers and administrative staffs. At the outset the usual chain of command of university management is visible, with the chancellor and vice chancellors, each carrying formal written responsibilities. Yet the term management means something different from the actors' perspective. They coined the term 'management party' (*pibak manajemen*) to refer to the foundation, chancellor, vice chancellors, and marketing (Informal discussion, 23.09.2010). They are those who are normally involved in the 'Monday meeting' in PU. The Monday meeting is a high-level meeting attended by a different range of participants, including the chancellor, vice chancellors, the head of the foundation, head of the

¹⁸² See chapter five for the characteristics of Jababeka Industrial Cluster.

academic bureau and certain lecturers (Observation, Cikarang, 02.08.2010). Another term is 'shareholders', which denotes, as literally put by a key informant, those with income and money (Informal discussion, 11.11.2010). The key informant essentially pinpointed the term to the founders of PU, who also hold positions in the Jababeka Group. There exist 'backdoor' meetings¹⁸³ for negotiation and consultation with the shareholders. The founders of PU indeed exert a considerable influence over resource allocation in PU.

The term founders is used to signify those who were historically linked and played a key role in the establishment of PU as a university in 1997 and/or those who are involved in the finance related matters mediating the (informal) connection link between PU and the Jababeka Group.

The founders through the Jababeka Group have provided backing to PU in the form of assisting PU in covering the operational support and in funding for event activities. The operational support is noticeable in the usage of PU's campus building, which was built by Jababeka Group. One key informant who works in one of the Jababeka Group's companies informed me that up to the end of 2010 there has been continued assistance with operational costs for PU. This included the cost of electricity, water and gas (Informal discussion, Cikarang, 13.11.2010). Similarly, the backing is also visible in the form of funding. There are no formal guidelines with regards to applying for funding to finance the event organised by PU, yet the practice follows a certain trajectory. The proposal for an event or academic activity is sent to the vice chancellor in charge of finances. Afterward, it is sent to the foundation. The foundation is the one that forwards it to Jababeka Group. The Jababeka Group will provide an answer (of how much it can support in regard to the proposal) to the foundation. As soon as a reply is received, the foundation will then inform the chancellor and vice chancellor in PU. This loop exists in practice for organising various events such as seminar and graduation ceremonies.

They, i.e. the founders, act as the patron¹⁸⁴ (Scott 1972; Eisenstadt and Roniger 1984) under the semblance of Jababeka Group. How do these patrons exercise control over PU? To commence, the founders exert control and have the final say about the allocation of finances accrued by PU. In terms of finance, since 2010 PU has largely depended on the tuition fees charged to their students. Spending this income depends on what the founders say, and often they would reject the proposals for investing in laboratory facilities or in research funds (Informal discussion, Cikarang, 10.02.2011). When budgeting for activities such as a breakfasting event during the fasting month, the respondents mentioned that the budget would wait for approval by one of the

¹⁸³ An example is the 'shareholder meeting' in *Menara* Batavia, where over 26 lecturers signed a petition and met with the founder in 2011 to appeal, *inter alia*, for a measure to remove one of the lecturers from an administrative post and inform conditions of a lack of references in the library for students (Informal discussion, Cikarang, 11.11.2010).

¹⁸⁴ For a discussion on the concept of patron in patron-client relations see Scott (1972) and Eisenstadt and Roniger (1984).

key figures in the Jababeka Group (Observation, Cikarang, 25.08.2010). These facts highlight the control exerted by the founders in Jababeka Group over PU's spending.

The subsequent control is the influence the founders have on the appointment of administrative positions in PU. Several appointments of these administrative positions in the upper level management of the university are steered by the founders. A senior lecturer with access to the Monday meeting described this in the following interview excerpt:

“The whole system is quite complicated. PU is supposed to run independently from Jababeka (Group) but because Jababeka (Group) created PU or the founders (created PU) we just could not get away from the clause. So everything here, every administrative position (*pejabat*) here is assigned by A (the founder), okay, your *pejabat* here except us. Every *pejabat*, every vice chancellor, chancellor is appointed by A (the founder)” (Interview, Cikarang, 28.09.2010).

Thus the appointment and replacement of *pejabat* in PU are steered by the founders. They (the founders) would normally designate individuals who used to hold positions in state-related agencies, such as RISTEK, or LEMHANAS. The fact that founders maintain their grip also contributes to the uncertainty of the position itself. This makes the post's incumbent unable to thoroughly perform his or her tasks. During my internship at the university, there was one occasion where I saw one of the vice chancellors airing his worries that he might be replaced. I had heard this news beforehand from my key informant, that one of the founders asked the vice chancellor to be replaced (Observation, Cikarang, 28.09.2010).

It is not only the administrative positions in PU that are controlled. This is also the case with the PU Foundation, or *Yayasan Pendidikan Universitas President-YPUP*.¹⁸⁵ The appointment of the head of the foundation itself was due to one of the founders asking him to manage PU (Informal discussion, Cikarang, 02.11.2010). Frequently during interviews with lecturers and informal discussions with the staffs, they stated that the head of the foundation is the one who understands the concept of education (Interview, Cikarang, 27.08.2010). The Monday meeting is often chaired not by the chancellor but by the head of the foundation. This practically forms a marriage between PU and the PU Foundation: they may be formally two distinct organisations but practically, in everyday realities, they are merged into one (Interview, Cikarang, 02.11.2010). Moreover, one of the key figures in the Jababeka Group also holds a position related to finances in the foundation. I discussed this issue with a key informant, who acknowledged that this creates ambiguity as to whether the individual is acting as a member of the foundation or of Jababeka Group (Informal discussion, 19.09.2010). B, a pseudonym for the incumbent who holds this position, exerts a certain charisma and steers the decision making process for finances in the foundation (Observation, Cikarang, 01.09.2010). By way of securing and discharging the function

¹⁸⁵ I shall refer YPUP or the PU Foundation in this chapter as the foundation.

of this position, a linkage is then built connecting between Jababeka Group and PU. This linkage effectively reinforces the steering capacity of the patrons of PU.

Nonetheless this form of ‘controlled governance’ via patronage is not without reason. In 2007 and the preceding years, the structure of management had not been fully formed. There were only three vice chancellors, with no vice chancellor IV managing external relations and cooperation. The position and administrative support for vice chancellor IV came into being in 2008 (Interview, Cikarang, 27.08.2010). The assistance in the form of direct financial support or cross-subsidies from Jababeka Group was evident prior to 2007 (Interview, Cikarang, 20.10.2010).

Hence, after all the assistance provided, the patrons are unwilling to relinquish their control of PU. They are keen to maintain its control grip as a part of the ‘check and balances’ of the past resources invested in the university. The informal shape of the day-to-day interactions of this organisation thus indicates that PU is one of the entities apart from the other eight companies of the Jababeka Group.¹⁸⁶ The patrons are up to now tightening their grip in PU through curbing of resources.

I have so far highlighted how PU as an academia is deprived of its control over resources through the strategic group analysis and the patron’s control. Part b (of this chapter) shall focus on how knowledge is produced and shared in PU.

b. Maintaining an Academic Decorum in PU

Knowledge sharing and exchange with industries, as will be shown in this part, are held as a routine to keep the academic decorum in PU. The knowledge production in PU is constrained to teaching and hampered by the competition for administrative positions (*jabatan*). The organisation lacks ‘agency’ to steer the process of income supplementation by the lecturers. The discussion will be divided according to: 1) the issue of teaching and the competition for *jabatan*, 2) the issue of knowledge sharing, and 3) the issue of how cooperation with Mattel Company with PU is mediated by a gatekeeper. The competition for *jabatan* and the current routines of academic decorum disguise the rate of bureaucratisation of PU as a university. PU in its current work is mimicking the work of state-like agencies or *jawatan pemerintahan* (Nugroho 2012).

Teaching & the competition for administrative posts

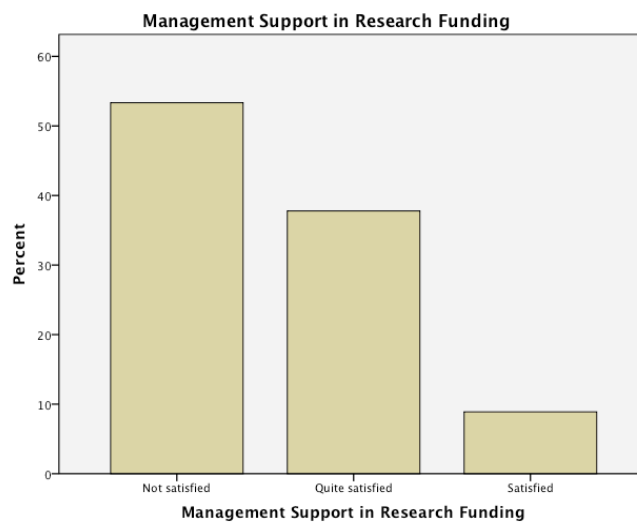
How is knowledge produced by the knowledge workers in PU, a university that suffers from a lack of control over its resources (as previously shown)? I posit this question by looking at the

¹⁸⁶ See chapter five for information about the cluster developer/company managing the cluster, i.e. the Jababeka Group.

practice of the knowledge workers (i.e. lecturers) in producing knowledge and in pursuing the progress of their profession. Knowledge production in PU is limited to the activity of teaching.

PU has a relatively strong knowledge base as suggested based on the formal education background of its lecturers. Based on the list produced in 2009, there are a total of 63 lecturers employed by PU.¹⁸⁷ Forty-eight point nine percent of lecturers hold postgraduate/master degrees and 29.8% have doctoral degrees. Nineteen point one percent of lecturers have bachelor degree education, with just 2.1 % of the lecturers holding the diploma education.

Scientific knowledge production by means of research and publication activities is not the central everyday activity in PU. Publication activities are limited. As listed in a 2010 report, there were three scholarly articles published in journals (one of which was in an international journal) and around 18 books mostly on business and education-related themes in Indonesian language. ¹⁸⁸ Research-related activities are also restricted, as shown in the result of the statistical inferences. Only 36.4% of the lecturers stated that they have been engaged in research activities. This lack of participation and engagement in research-related activities might be perpetuated by minimum support from the management of the university.¹⁸⁹ Figure 7.1 depicts the general dissatisfaction of the lecturers in regards to research funding.



(Source: Author's field data in 2010-2011)

Figure 7. 1 Support in Research Funding in PU

The entire rubrics of knowledge production are tied and limited to teaching. The lecturers devote most of their time at PU to teaching undergraduate students. This fact also distorts the 'Mode 1'

¹⁸⁷ A total of 47 lecturers participated in filling in the questionnaires. The majority of these lecturers were male (85.1%).

¹⁸⁸ The dates of the publications range from the year of 2004-2009. Most of these publications particularly books are of single authorship, for journals they are mostly with foreign researchers based in the U.S.

¹⁸⁹ The Faculty of Engineering currently has no laboratory facilities, and often works with the ATMI Polytechnic to complement the practical component of the teaching curriculum.

(Gibbons, Limoges et al. 1994) disciplinary production of knowledge. Based on my observation, the entire machine of knowledge production is reduced only to preparing the syllabus, teaching presentation, and occasionally updating teaching modules. This is confirmed by the percentages of knowledge output as depicted in Table 7.2:

Table 7. 2 Ranking of Percentage of Knowledge Output¹⁹⁰

No	Output	Yes	No
1	Teaching Syllabus Writing	88.9%	11.2 %
2	Teaching Module Writing	77.8%	22.2%
3	Book Publication	42.5%	57.5%
4	Article in Newspaper Publication	40%	60%
5	Conference/Journal Article Publication	37.2%	62.8%

(Source: Author's field data in 2010-2011)

What are the reasons for this distortion, i.e. the fact that knowledge production is reduced to these routines pertaining to teaching? To begin with, there is abundant teaching work, as the academic year is divided into three semesters. The aim is to enable students to complete the study in 3.5 years, including an internship period (Interview, Cikarang, 08.06.2010.) When asked why they spend most of their time on teaching-related activities, most of the respondents replied that their work is overloaded with teaching tasks (Interview & Informal Discussion, Cikarang, 28.10.2010). One lecturer had previously taught 27 SKS¹⁹¹ (credit per semester) in one semester of four months (Informal discussion, Cikarang, 10.02.2011). This overload is contributed to by the poor ratio of lecturers acting as academic supervisors (*wali*). The current ratio of academic supervisors and students is 1: 100-260. Throughout the period 2008-2010 only five lecturers were permanently recruited, with all others being either contract based or part time-based. Teaching, however, is essential for the lecturer. It functions as an additional source of income. The rationale is that the more SKS, the more income one would have (Interview, Cikarang, 29.07.2010).

Minimum research funding (due to the lack of control over funding in PU) and lack of motivation of the lecturers (to apply for research grants) are the next key reasons as to why teaching becomes the sole daily agenda of lecturers. In an interview with the head of the Research and Community Development Institute (RCDI) (*Lembaga Riset dan Pengabdian Masyarakat*) PU, it was noted that a total budget of 200 million IDR (ca. 16,000 Euro) was proposed in 2009. However, it appears that such funds were never disbursed or received (Interview, Cikarang, 29.07.2010). In an informal discussion with a lecturer, he also explained the challenges of day-to-day academic life in PU, from the lack of research funding to the fact that the research group has no power (Informal discussion, Cikarang, 24.06.2010). The lack of transparency at the management level is the reason

¹⁹⁰ This ranking is based on the valid percentage of the questionnaires. A total of 47 questionnaires were analysed.

¹⁹¹ SKS (*satuan kredit semester* or teaching units per semester).

why he is reluctant to commit to other activities other than teaching (Informal discussion, Cikarang, 24.06.2010). In addition, there is also the lack of motivation of the lecturers to apply research grants. The survey findings reveal that only 10.5% of respondents applied for research grants from external organisations (such as RISTEK, or DIKTI).

A central (and perhaps unintended) feature among the knowledge workers is the competition for *jabatan*. The ethnographic fieldwork reveals two types of lecturers: a) those who hold multiple positions and accrue the related benefits, and b) those who carry out the routine of teaching on a full time basis and voluntarily subject themselves to being overloaded with the SKS/teaching units. Despite such differences, one similar strand arises: the widespread competition for *jabatan*.

The entrenched competition for the administrative posts may allude to the control that the state has via the informal linkage. The participant observation carried out during my internship indicated that apart from teaching posts, some of the lecturers take up other jobs at other organisations such as universities or government agencies and/or hold several administrative positions (*jabatan*). One example is the competition for the post of the head of RCDI (Research and Community Development Institute/*Lembaga Riset dan Pengembangan Masyarakat*). There were at least two meetings held for this appointment nomination (Observation, Cikarang, 30.08.2010). My discussion with key informants revealed that the candidates proposed were mostly from other external agencies, including a professor based at Indonusa Esa Unggul University, one from the LPNK in Jakarta and another from a government research agency based in PUSPIPTEK, Tangerang (Informal discussion, Cikarang, 07.09.2010). Soon after this, there was a candidate proposed internally. In the final round, a candidate from an R&D government agency was chosen to head RCDI. The fact that the individual works on a state affiliated agency is vital for the consideration of the individual for the administrative post. The dual nature of having the *jabatan* in the university and the government, thus enabling the information to flow within, is characteristic of the linkage. It is informal as it is the individuals within the government agency that pursue these positions and as the information that flows at times pertain to research grants. *It is thus a form of state control*. In addition, what is evident is that there is competition for the administrative position. The positions are more favourable than simply holding the position of a lecturer. Therefore, I posit that the competition for *jabatan* mobilises the bureaucratisation of the university and in turn creates a bureaucratised space that may be controlled by the state and where the actors invest their energy, time and resources to preserve and compete for *jabatan*.

Additional monetary compensation ranging from the *tunjangan*/allowances of the administrative position is indeed a factor contributing to this competition. A lecturer's salary ranges per month from around 375 Euros to 650 Euros, yet additional income is to be expected once an administrative position is taken up alongside the lecturer position. A vice chancellor's salary per

month, for example, reaches 1,500 Euros (Informal discussion with key informants, 31.08.2010). The issue of the attachment of *jabatan* with more income was firmly expressed by a lecturer who had previously held two administrative positions in the interview excerpt below:

“In here if you have *jabatan* you have to have more. It is like additional work, and more (*tambah*). But for them it is like the more quantity (of *jabatan*) I have the more money I should be having. But they did not say the more *jabatan* I have the more responsibility (*tanggung jawab*) that I have, the more they learn new things it is up to your experience. I was a coordinator in here for a year of additional work. I manage the whole unit. Because there is no one in faculty for that right. I managed it for a year. I only get one million IDR (ca. 75 Euro) extra” (Interview, Cikarang, 28.09.2010).

This extra allowance is not the sole benefit. There is also some additional income including participation in seminars or conferences or opening speeches. These events/*proyek* also add additional sources of income. Attachment and holding added administrative positions at the university of other institutes enhance such chances for these *proyek*.

It is also a matter of symbolic capital, namely the prestige that is attached to administrative positions. During an interview, a lecturer explained the administrative position that he holds, and that he was not allowed to take study leave from PU and leave his position:

Researcher: “Have you received any support from PU?”

Respondent: “Not yet.”

Researcher: “Not in any form?”

Researcher: “Well quite often since in PU, having the permission to pursue further study is an incentive for me, with a note that I cannot leave my administrative position (*Jabatan*).”

Researcher: “So are you a director in this programme?”

Respondent: “No, well not Director *lab*. But as Caretaker (*Pengasub*) *lab*. But the Chancellor (*Rektor*) does not want me to be replaced. For me this is an honour, this is a reward for me. Although this means work is more difficult to deal with (*repot*). But that, that I have to do, for me this is an incentive” (Interview, Cikarang, 27.08.2010).

The administrative position here consequently serves as symbolic capital (Bourdieu 1989; Bourdieu 1992). It is prestigious and rewarding to hold such a position, not only in terms of the monetary compensation that it may bring, but also for the perception of the value attached to the position itself. The symbolic capital acquisition also brings a relational element to the structure. Based on various consultative meetings organised by the state (Observation, 20.08.2010, 30.07.2010) and FGDs (Observation, 05.08.2010, 27.08.2010, 09.11.2010) that I observed, they invited individuals holding administrative positions from government ministries, associations and universities. In one consultative meeting, there was a sharing of information on projects relating to funds that had not been disbursed (*dana anggaran yang belum terserap dalam kegiatan*). This can be valuable information as it opens up possibilities for earning more resources. This is the economic capital of holding such a post. The administrative positions, combining several jobs at the same time, may have contributed to the “too much load work” situation.

Responding to the situation, PU's management introduced a flexible time ("flexi time") policy for lecturers working full time in October 2010, to curb the condition of part-timing and the lack of human capital availability. Each lecturer is obliged to commit to work-related matters at least 40 hours per week at PU.¹⁹² The idea of this flexi time is to install a sense of professionalism amongst lecturers (*dosen*). Yet how this problem can be tackled by merely installing such a flexi time policy is problematic.

To start with, this measure does not address the constraining problem of a lack of lecturers. A brief assessment when I was distributing the questionnaires showed that almost half of the written names of lecturers are not in the office after teaching. This shortage and lack of manpower inhibits the creation of professions and an atmosphere conducive to knowledge sharing. The routine created is a 'one-stop and go' such as in fast food restaurants: one comes before teaching, or attending meetings, then after that he or she leaves.

However this is not the only *raison d'être*. The academic-enabling environment for the career promotion of lecturer is not given the adequate support for it to thrive. The credits¹⁹³ attained from previous positions in another universities are not directly transferable to PU. The regulation in PU, as stated by one of the lecturers who is keen on publishing, is that a new employee's credit points cannot exceed 300. This means credit points accrued beforehand from the publication cannot be used to file a proposal for higher career promotion. In addition, the cost of journal publication has to be borne by the lecturers themselves (Observation and informal discussion, 26.07.2010). Lecturers are then subjected to the uneasy condition of having their career promoted internally within PU.

Consequently, whilst the machinery of the knowledge production of the lecturers is reduced to teaching, the Mode-1 knowledge production is interrupted by the competition for administrative positions. This competition forges the bureaucratisation process, whereby the actors, including state actors, are competing for posts that are not related to the profession's development (as a lecturer) but more related to the attainment of resources. It tramples the chances of candidates from within to have a clear career promotion. Furthermore, the competition inadvertently creates an environment that resembles government offices or bureaus. The bureaucratisation process could transform into a form of state control when one of the candidates competing for the position also holds a position in a government-related agency and benefits from the informal

¹⁹² What I noticed is the symbolic presence of a key figure in the management. The person in charge of finances would be present at 7.00 am standing near the finger print machines. He was standing as if monitoring the absence of employees, deliberately making himself visible (Observation, Cikarang, 30.09.2010).

¹⁹³ The credits attained denote the functional position (*golongan kepangkatan*), such as junior lecturer in the *golongan kepangkatan* of IIIa, or Professor in *golongan kepangkatan* of IVd.

linkage. This linkage is fostered by way of alma mater or previous working relations (due to the relational element of the administrative post itself).

Knowledge sharing as an administrative practice

With the constraints that PU has as an academia, knowledge sharing is held to maintain an academic decorum. The process of knowledge sharing is kept for the formality and (albeit may not be intended) for disguising the process of bureaucratisation of the organisation. It is not a mere issue of a lack of knowledge sharing. I intend to pursue this line of argument through the study of meetings (see Schwartzman 1987; Schwartzman 1989).

Forums for exchanging information and knowledge can vary from formal meetings, informal meetings and even lunchtimes. There are various meetings in PU. The problem solving related to teaching as an academic exercise is usually discussed during faculty meetings. These are meetings every two weeks at the faculty level, where the dean listens to issues raised by the lecturers (Interview, Cikarang, 24.06.2010). Apart from that, there is also the Monday meeting facilitating information exchange. This meeting usually runs from 9 am to 11 am, with participation restricted to those holding administrative posts (including the head of the foundation, chancellor, vice chancellors, deans and other related individuals). However, decisions regarding resource allocation are not usually taken in these formal meetings (Interview, 28.09.2010). There exist other 'backdoor' meetings for negotiation and consultation (Informal discussion, 11.11.2010). Meetings may exclude or include participants based on their hierarchy or role, or might exclude certain groups due to the topic. Informal meetings act more as a forum for discussion between the lecturers, with 84.1% of respondents responding positively to this question in the survey. The formal meetings only act as an administrative-bureaucratic practice, making the university visible as a formal organisation as enacted by the actors.

I focus on the case of research meeting. The topic of the meeting would formally be the presentation of research that has been carried out, or a scientific paper that was written.

The Case of Research Meeting¹⁹⁴

How is the research meeting organised? And what are the subject matters discussed in light of the lack of research activity in a meeting tagged as 'research meeting'? These are the questions guiding the case study. The research meeting is hosted and organised by the RCDI in PU. It was organised every month during my internship in the Innovation Centre-PU. All of the lecturers are invited to this research meeting. In total there are nine participants including three from the staff of the RCDI. This was the first meeting after the resignation of the former RCDI Head, and there

¹⁹⁴ This research meeting was held on 10.11.2010.

was already a newly appointed successor. The topic of the presentation is as follows: “The Learning and Mastery of Operating System and Application program of Computer Staff at the *Kecamatan* of North Cikarang” by one of the lecturers. He was a former police officer, as obviously shown through the usage of colonel infantry rank in his presentation. He informed the audience that lecturers should perform *Tri Dharma* activities to attain credits for KUM (credit points for promotion). During the question and answer session, the participants were not drawn into the research that he presented, but more towards airing their disappointment. I hereby provide an excerpt of the Q&A session:

Participant A: “Is this possible to digitalise the campus in PU? I went to STMIK (ICT Polytechnic in Dago Bandung), the IT has been integrated in there.”

Presenter: “I told PU about campus digitalisation but they told me (what we have here) this is already sufficient. I will deliver this message that PU needs improvement for IT to even the founder apart from the chancellor. I did not raise my hand you know when (there was a meeting) and we were asked who agreed PU is the best university. For internships (one could see) the students are often employed to photocopy papers in the so-called 1,500 companies. The Faculty of Engineering in PU has no machines and equipment.”

Participant F: “In PU tuition fees are expensive, over 70 million IDR (ca. 58,333 Euro) for three years of undergraduate study. This is the minimum (cost).”

Presenter: “For the research presented in here, in here the information system study programme will be accredited, *KUM* (credit unit for promotion) is required for the accreditation process. I also need it to move up from assistant lecturer to lecturer. So this is why I had this research. But this has yet to be published.”

Participant A: “In here of course anyone can present their work. There will be certificate provided. You know, I was not introduced to the (new) director (of RCDDI). I found out from the vice chancellor’s secretary. I was shocked when we exchanged name cards and he told me that he is my boss, and I am his staff.”

The meeting was cut short, as there were no further questions. At the end of the meeting there were few participants discussing the disappointment on how they do not know who is the new Director of RCDDI. Most of them have not been introduced to the new director by the management of PU (Field notes of meeting, Cikarang, 10.11.2010).

These meetings do act as information sharing by general means between the participants. However, what draws the participants to these research meetings is not the research presentations, but rather the fact that they function as a forum for the participants to air their grievances concerning the lack of facilities and infrastructure (such as laboratories and machines for Engineering Faculty), and about the appointment of a new director whom they had never met. This is the subject matter being discussed. The persistence of having these research meetings from time to time despite the content being filled with frustration and concerns, i.e. not focusing on topical discussions, showed the importance of sticking with the decorum. The theatrical decorum of having a research meeting is vital to maintaining the presence of the university as an academic organisation for its members.

The role of gatekeeper: Mattel Company –PU collaboration

Bearing in mind that PU as an academia functions primarily in teaching, collaboration for knowledge exchange is possible for two types of knowledge: first is the involvement of lecturers

in PU for problem solving projects, second is the cooperation for teaching activity of Mattel Company personnel. This is the content of the knowledge exchange collaboration between PU and the Mattel Company¹⁹⁵ (herewith referred to simply as Mattel). However, what enables the collaboration? And how is the knowledge (attained by the lecturers involved in the cooperation) being retained in PU? My analysis reveals that the collaboration is enabled due to the personal linkage nurtured by the guest lecture programme. Yet what precipitates the cooperation based on a personal linkage into cooperation between an academia-industry is the strategic role of the knowledge gatekeeper in PU.

In the survey that was carried out, 78.3% of respondents highlighted the cooperation with Mattel as cooperation with industries located in the Jababeka Industrial Cluster. This cooperation with Mattel was further probed by asking whether there are alterations or new ideas being gained from it. The results are detailed in Table 7.3.

Table 7. 3 Cooperation between Mattel and PU¹⁹⁶

No	Question Asked	Yes	No
1	Cooperation brings new ideas or changes in the method of teaching.	74.1%	25.9%
2	Cooperation brings new ideas or changes in the teaching syllabus.	70.4%	29.6%
3	Cooperation brings new ideas or changes in the writing of new scholarly article	31.6%	68.4%

(Source: Author's field data in 2010-2011)

Table 7.3 demonstrates that changes arise mostly in the method of teaching, and teaching syllabus—part of the Mode 1 knowledge production. Nonetheless, it does not explain what propels the cooperation, and how the knowledge attained is kept at an individual or organisational level. These pertinent issues shall be dealt with in depth in the following paragraphs.

The cooperation with Mattel takes place in two distinct but interrelated projects. The first is the involvement of the industrial engineering team in the improvement (*kaiizen*) of the production process project. The second is the establishment of the corporate classes for selected employees of Mattel at PU.

In the first one, the team from engineering was involved in *genba* on the shop floor of Mattel in February 2010. There were problem solving and engagements between PU and other teams on the shop floor of the factory. In this project, the lecturers and several students from the industrial

¹⁹⁵ PT Mattel Indonesia is a global company specialising in producing toys. It is located in Jababeka V Bl G/4-6 in the Jababeka Industrial Cluster. It is in close proximity to PU, which is situated in Jababeka Education Park.

¹⁹⁶ The percentage and figures are based on the valid percent of the descriptive statistics.

engineering department in PU were involved in a symposium. The symposium¹⁹⁷ was held to find problems in the production process in Mattel. Along with the team from Mattel and an expert from Singapore, they discussed how efficiency could be achieved. As a result of the symposium, they managed to save 15 minutes time in the production process (Interview, Cikarang, 28.10.2010). The PU team was involved in creating a tool to enable efficiency in the production process. This was expressed by a lecturer who was a part of the PU team:

“The most interesting part was during stamping in the boxes. They produce the boxes and then the operators stamp it. With *genba*, all the stamping procedure we produce a tool for stamping 1-2- 3 with a handle. There is a handle in the tool. So before the operator had to stamp three times. With the *genba*, the stamping 1-2-3 all handles are put together, we can enable the stamping of three steps into one step. How much can we save? We skip the process stamping the box individually, to all three in one go.” (Interview, Cikarang, 28.10.2010)

The knowledge attained by the lecturers in this form of cooperation relates how to make the process of production leaner by reducing costs (Interview, Cikarang, 28.10.2010). Knowledge is being kept in a tacit format in the form of knowing based on the lecturer’s experience of the problem solving on the shop floor. This is stored on the individual level, and is made explicit by means of adding a component to the syllabus of the course being taught. The ‘innovation’ (i.e. the stamping tool for the boxes) was inserted into the syllabus and the curriculum thus changed (Interview, Cikarang, 28.10.2010). Consequently, the knowledge attained goes back to the way knowledge is being produced in PU, namely through teaching activities (Interview, Cikarang, 28.10.2010).

In the second one, there is an establishment of teaching classes at PU for selected employees of Mattel. The teaching classes¹⁹⁸ are carried out for the undergraduate courses in the Business Administration and Industrial Engineering major. The lecturers refer to the classes as corporate classes or in-house Mattel classes (Interview, Cikarang, 20.10.2010). Some of the lecturers from the extension class also teach the programme. This leads to the next question: what propels the collaboration between Mattel and PU? There are two drivers of the collaboration’s materialisation, the knowledge gatekeeper and the personal network arising from frequent interaction between actors (i.e. lecturers and the senior manager of Mattel) due to the guest lecture programme.

Past work has been carried out to observe the role of gatekeepers in the industrial cluster or science park (see for example Giuliani and Bell 2005; Boschma and Wal 2007; Kauffeld-Monz and

¹⁹⁷ During the symposium, they went to the shop floor, performed *genba*, and carried out a thorough observation of the production process.

¹⁹⁸ This is based on a joint agreement for the establishment of President University classes at Mattel during the Academic Year 2010/2011, signed by the parties on 8th February 2010. These classes are held at Mattel for three days and PU for one day. The classes are organised post-office hours, namely from 16.00-19.30 or 17.15-19.30, for four days per week. This enables the employees of Mattel to pursue their education after their work hours.

Fritsch 2008; Capello and Morrison 2009). Knowledge gatekeepers may play a key element, even a strategic role, in the facilitation and blockage of the circulation of a specific typology of knowledge (Long 2001). Some of these works have discussed social capital in relation to the gatekeeper (despite having discussed this in a brief manner), such as the work of Burt (2004) and the study carried out by Capello and Morrison (2009), yet this work focuses on intra-organisational relations and social networks. They do not address the question of what makes a gatekeeper, and what enables them to broker the collaboration?

The gatekeeper acquired social capital in the form of good relations with one of the patrons in Jababeka Group (who controls the resource) and also with a key official in the management of PU.¹⁹⁹ He does not act alone, but in tune with the other actors (Observation, Cikarang, 20.10.2010). The person holds symbolic capital in the form of four administrative positions at PU (Observation, Cikarang, 02.11.2010) and often being present at the Monday meeting. The acquisition of this symbolic capital allows the gatekeeper to broker the decisions and to tap into informal communication networks. The patron is only one phone call away, and is not defined by the distance of Jakarta-Cikarang.

It is not exclusively due to the gatekeeper. Personal network with one of the key officials in Mattel also is a significant factor. The establishment of the corporate class was requested by Mattel, specifically by one of the senior managers who used to be a guest lecturer in the extension class/night class programme. A lecturer who is involved in the Mattel teaching class explained the corporate class request from Mattel. It initially started as trainings offered by PU to one of the managers in Mattel who teaches in the extension class in PU. The manager then forwarded the idea of having a formal education training (leading towards an undergraduate degree) instead (Interview, Cikarang, 27.08.2010). Prior to the contact with the manager, there was another Mattel employee who taught at PU. It was individual, and based on communication starting from 2005-2006 (Interview, Cikarang, 28.10.2010). This personal network also contributes to the collaboration with Mattel. This corroborates the embedded character of social relations (Polanyi 2001), which is essential for a collaboration between academia-industry.

The combination of personal network and the role of the gatekeeper drive this collaboration. The gatekeeper actively mobilised the social and symbolic capital in the social relations. However, the knowledge attained is restricted to the routines of teaching and to the lecturers who are in the same linkage with the gatekeeper. The collaboration does not reshape the organisation as a unit, due to the thick linkage between the gatekeeper and the patron. Despite the inherent limitations,

¹⁹⁹ Based on my observation, they rent and sometimes live in the same house near PU (Observation, 29.09.2010). These key actors, including those in charge of finances, share the same ethnicity; they are Chinese. The gatekeeper identifies himself as *Tionghoa*, different from the other *cina peranakan* who are from Magelang, Central Java. The patron is also a Chinese Indonesian.

the cooperation with industries, including the set up of the business incubators funded by RISTEK, is to be maintained.

In prior paragraphs I have shown the following: 1) knowledge workers produce knowledge more in teaching activities and the competition for administrative positions pushes the bureaucratisation process of the organisation, 2) despite the bureaucratisation process and PU's lack of control, the academic decorum needs to be reinforced through meetings, including research meetings, and 3) the collaboration between academia-industry, as illuminated by the PU-Mattel case, is enabled by the role of gatekeeper and personal linkage. However, due to the thick linkage between the gatekeeper-patrons, the knowledge is likely to circulate exclusively in this linkage. These premises built the foundation for me to argue that PU faces the threat of losing its scientific character as a scientific knowledge-producing organisation due to bureaucratisation.

c. Education based on The Production System in ATMI Polytechnic

It is not only bureaucratisation that remains a threat for academia in Indonesia. Liberalisation of higher education (as a part of the science system) also poses a challenge, as academia has to lean on the market help to cover its costs. By focusing on the organisational ethnographic analysis of ATMI Polytechnic Cikarang, I posit the question of how knowledge is produced. It was established with an explicit orientation towards production-based education. This is how the education process is ideally designed to function. By carrying out production, the cost of education is subsidised and students will be able to learn from the actual production process. In practice, *the organisation functions on an education based on the production system*. The production system is what is prioritised. This is the contrary of what was intended. Knowledge is produced when the organisation functions as a production system. In order to substantiate this argument, I discuss various elements pertaining to knowledge production in ATMI Polytechnic Cikarang (herewith shall be referred to as polytechnic). They include: 1) parts manufacturing as the central machinery of knowledge production, 2) the social factors governing the way parts are produced, and 3) the collaboration between the polytechnic with the ISE company for parts production.

Parts manufacturing as chief machinery of knowledge production

Parts manufacturing managed via the job order (i.e. subcontracting process) is a prominent channel of knowledge production. Job order is normally carried out by tier one or tier two supplier industries. The strategic knowledge of relevance with the industry is gained by the instructor through these routines of parts manufacturing.

There are generally two groups of knowledge workers in ATMI Polytechnic, the instructors²⁰⁰ and the lecturers.²⁰¹ The focus in the industrial facet will be on the instructors, as they are the ones involved in the production process whilst concurrently teaching students. The instructors, apart from teaching the students, are also involved in the manufacturing of parts for the industry (Interview, Cikarang, 08.12.2010). Specifically, there are three segments involved in the parts manufacturing in the polytechnic, with the first being the students of the polytechnic (notably second year students) fully involved in production (Observation, Cikarang, 07.02.2011). Secondly, the instructors of the polytechnic are involved in the teaching practice of the students and at the same time the manufacturing of parts. Third are the employees in the Production Directorate, in particular at the Independent Business Unit (*Unit Bisnis Mandiri/UBM*), Engineering (Design), and Production Planning Inventory Control (PPIC).

Parts as a term is used to denote goods produced in the assembling mode, such as moulds, blow moulds, die casting, dies, special purpose machines and jig fixtures. Also component spare parts, which include shafts, gears, flanges and parts composed of ferro as well as non ferro-based materials (Email communication with key informant, 03.07.2011). This part can be a complete part whereby no further process is required (*barang jadi*), or an incomplete part whereby further processing and additional manufacturing is necessary (*barang setengah jadi*)” (Informal discussion, Cikarang, 02.02.11). A common strand is that the production of these parts is based on the needs and orders made by industries (Interview, Cikarang, 17.06.2010).

Parts manufacturing is indeed the prominent channel of learning for knowledge workers, not only the instructors but also the lecturers. This is based on statistical inferences from the questionnaires²⁰² distributed to the lecturers and instructors. The majority of respondents (60.6%) are involved in the process of parts manufacturing. Of this share, most of the respondents (85.7%) who are involved in the manufacturing of parts stated that they learn from the manufacturing process.

²⁰⁰ The instructors are divided to teach students from the first to the third level. In the first level, the instructors are in charge of teaching the students the basics of technical manufacturing engineering including milling, tooling, grinding, drawing and heat treatment, including the practice. The second level, the instructors assist the students in full production of parts in the second level. The second level consists of two cycles (*putaran*), each of which would include grinding (*bubut*), milling, and learning at centres for tools, welding and heat treatment (Informal discussion, Cikarang, 08.02.2011). The emphasis is again on production. The third level, the instructors assist students in parts production and in training them in different areas such as pneumatic, and electronics. These activities take place mostly in the production. The activities of instructors are orienting towards the practice rather than theory in teaching. The competence of instructors is assessed from an understanding of how to operate machines and producing parts from machines with the required standard of quality (Interview, Cikarang, 22.11.2010).

²⁰¹ The lecturers work within the theoretical part of teaching. The curriculum for teaching for polytechnic has a 30% component for theoretical part and 70% for the practical part. The lecturers teach the required 30% component. The lecturers are involved in class-based teaching for various subjects ranging from material sciences to *Pancasila*. Some of these lecturers are professionals from the industrial sector, such as a professional in the field of progressive dies.

²⁰² There were 33 questionnaires returned from 40 being distributed. The total number of lecturers and instructors is 43.

To what extent does this learning from parts manufacturing affect the academic facet? The results suggest that the learning of parts production bears an imprint on the changes in teaching methods rather than the writing of new scholarly articles.²⁰³ A large proportion (88.9%) of respondents affirmed that the manufacturing process brings new ideas and changes to the methods of teaching. However, there is no change in terms of the production of new scholarly articles in the polytechnic. Only 37.5% stated that the manufacturing process brings ideas and alterations to the publication of new articles. This indicates that the process of learning is kept and not codified in written form. The fact that learning in parts production brings alterations to the methods of teaching is prevalent in the workshop. My ethnographic investigation yields that most of the instructors provide advice and techniques to the students on how to manufacture the parts through direct face-to-face communication. The learning from production of parts does not have a significant impact on the scientific knowledge production in the polytechnic.

Product development and standard parts are still non-existent in the polytechnic. The absence of a standard part is also due to the job order, as the parts being produced changes according to the order placed. This affects the assessment of the students who are involved in the process. As stated by the director of the polytechnic, what can be assessed under these extenuating circumstances are the skills in operating machines and the process of learning (Informal discussion, Cikarang, 01.02.2011). Assessment of the skills of students thus requires a closer observation of the parts produced and the output of the part itself (i.e. whether it is 'good' or 'no good'). Similarly, product development is not an overarching feature in the picture as the varieties of the job orders accepted are related to the manufacturing industries placing the order. Research and development are absent, and most of the production process focuses on the manufacturing of parts whilst the academic directorate is occupied with the classroom teaching. The new ideas for the development of products rarely surfaced in the workshop, as parts are made based on the order/request of the customer (Informal discussion, Cikarang, 07.02.2011). Despite such absences, there are three units that may have access to product-related knowledge. They are PPIC, UBM and Engineering units – all are part of the production directorate, which often interact with the customers. There is an effort by these units of production, however, to gain as much as possible information from customer companies to add to the product-related knowledge (Interview, Cikarang, 22.11.2010).

The closer his or her work is to the production process, the more likely he or she is able to access strategic knowledge relating to the parts. This notion is demonstrated in the assembling area, which functions as an entrepreneurial space. The assembling area is a physically open area located

²⁰³ The description of respondents answering this part is as follows: only 18 respondents who answered these questions are the ones who are directly involved in the manufacturing process, i.e. lecturers. The remaining 15 are lecturers who are mainly involved in teaching activity in the ATMI Polytechnic.

in front of UBM office and 3rd level instructor in the polytechnic. It is forbidden and it is not the norm to take pictures, as the parts produced are usually of commercial confidentiality in nature. Although seemingly open, I did notice while I was sitting for my internship in the 2nd level and after that 3rd level instructor's office that the lecturers hardly went there. It is *restricted and open only to* those who were involved directly in the production of parts, namely the employees in Production Units, specifically Engineering, UBM, PPIC and also the 2nd level instructors. I began to understand this 'silently agreed norm' on the second day of my internship for the 2nd level instructor. I tried going there once to ask questions about the part, and received only a nod and smile from one of the UBM staff. Soon I realised it was also restricted to me – as an outsider of the system. The assembling is an entrepreneurial space as it excludes actors not involved in the production process.

The entrepreneurial space itself is not impervious to the surrounding industrial cluster. In fact, as this polytechnic was established bearing in mind the industrial clusters located near urban areas (particularly in Jakarta) (Interview, 17.06.2010), the polytechnic actively exploits the geographical proximity to industries to market and place their job orders. This is exemplified in the collaboration with the NT Company (Interview, Cikarang, 21.12.2010), the IMV Company (Interview, Cikarang, 13.02.2011) and TC Company (Observation, Cikarang, 27.01.2011) whereby the marketing of the polytechnic played a pivotal role in attaining the subcontracting deal. These companies are located in the Jababeka Industrial Cluster and near Jababeka Industrial Cluster.

The knowledge attained from the process of assembling and parts manufacturing is kept in the head. As put by one of the instructors: "It is better to see it directly through their eyes, and hence this makes it easier to stick in the head" (FGD, Cikarang, 19.02.2011). Problems are visualised in the parts in the assembling rather than described in a scientific paper. Discussion and question and answer sessions do take place in the assembling area and sometimes with an engineer or quality control staff from a customer. The participants who are included in the project are discussing, detailing and visualising problem by using parts (Distant observation, Cikarang, 08.02.2011). The 2nd level instructors who had access to the area were a resourceful source due to this restriction. In an informal conversation they told me:

Respondent A: "So there is drawing and there are parts, that is one side. The other side is how you assemble the parts. I think this is more valuable and important. This is where the knowledge lies."

Respondent B: "Yes, it (assembling) is better than library, production directorate has more knowledge."

Respondent A: "That is true, what we have there is not in the textbook."

Researcher: "Then how do you codify the knowledge?"

Respondent A: “Well you see it cannot be codified.”²⁰⁴,

Researcher: “After you learn from assembling, you will not change the teaching syllabus?”

Respondent A: “No, why should we?” (Informal discussion, Cikarang, 08.02.2011).

Hence a drawing may be open for learning, but the know-how of how to assemble parts is restricted. Membership is governed by the function where he or she works. If the actor is involved in production directly then he or she may be given access. *This is tacit strategic knowledge; it is not open for sharing and is distributed unevenly depending on the membership of actor.*

The ‘non-technical’ factors governing parts production

What are the factors that govern the logic of parts being produced in the polytechnic? This question surfaces because there is no formal written policy endorsed by the production directorate at the polytechnic for this job order (Observation, Cikarang, 24.02.2011). There is a working instruction for internal order requests²⁰⁵, but this document nonetheless does not explain the actual flow of processes between one unit in the organisation and another. The flow is in fact quite networked and depends to a large extent on the practices in the workshop (*bengkel*) (Observation, Cikarang, 24.02.2011). The selection and priority labelled to parts are to a certain extent subject to social relations governing the logic of parts production. The polytechnic retains its central character as a production unit so much that the education would be dependent on this production.

The social factors are understood by the actors as non-technical factors. This term is often associated with the priority of parts produced and came up persistently since the start of the internship in the polytechnic in November 2011, during the lunch conversation with key informant, or during numerous informal discussion when I was interning in the instructor’s office at the workshop. During one informal conversation in the instructor’s office, an instructor illustrated what non-technical factor means:

“Non technical factors are the decisions relating to materials-parts for work (*benda kerja*) and decisions regarding the compensation hours for student (if they manufacture NG or faulty parts)” (Informal discussion, Cikarang, 08.02.2011).

The dimensions described by the instructor show how the non-technical factor relates to the education process: the parts are used as an exercise for students (in addition to being an output of the production process). The compensation hours for faulty parts produced are to be imposed on the student who made the error in the production.

²⁰⁴ Initially I used the term codification or *kodifikasi*. But then I tried to explain it by *membakukan* or standardise, based on learning in the assembling, then put in writing in the teaching module of syllabus and renewed regularly based on these job orders. This is knowledge codification in its contextual meaning based on my observation.

²⁰⁵ The working instructions specify among others: the customer order, steps to take when accepting an order or when rejecting an order, what to do when parts are not good (NG) or when they are good (G).

Indeed, *pedagogy ignasiens* is one of the non-technical factors of parts production, which is related to the academic facet. Utilised as an exercise (*latihan soal*) for students, which part to manufacture is dependent upon the difficulty level. If the parts are too complex, then it can be postponed and other relatively simpler parts are to be produced (Informal discussion, 08.02.2011). This is consistent with the *pedagogy ignasiens* inherent with the Catholic based system in the polytechnic. The head of the 3rd level instructor describes this in an interview:

“Well, I can only describe the basics, humanising humans, so more to *cura personalis*. Each individual is different, so some sort of individual approach is used. When we face groups for example we may generalise like a machine but with this (*pedagogy ignasiens*) we can differ the approach, for those students who are a bit slow to learn, or require particular approach we can personally approach them” (Interview, Cikarang, 08.12.2010).

It is a rule of thumb that for faulty part (NG) that the students produce, they will be ‘punished’ with hours of compensation. The hours of compensation imposed depends on the price of the materials of the part, the condition of the student and the condition of the part that can still be repaired (Informal discussion, Cikarang, 06.12.2010).

Furthermore, a good relationship (*hubungan baik*) is also a non-technical factor. This is associated with the production facet of the polytechnic. An employee in UBM explains how a good amicable relation with the customer is key in parts manufacturing, if the collaboration is seen as potential and will not disrupt the overall production then the part ordered can be prioritised (Interview, Cikarang, 14.02.2011). Social ties among those who share the same alma mater (i.e. from the ATMI Polytechnic in Cikarang or in Solo) can facilitate the *hubungan baik*. This may yield the outcome that the parts requested are prioritised and the flow be accelerated. In other words, the parts ordered from actors sharing the same alumnaeship can be prioritised (Informal discussion, Cikarang, 21.11.2010).

The problem is that once a part is labelled as top urgent, i.e. a top priority, then lack of time persists. Usually in this case briefing to students is lacking. This has been evaluated by the unit in charge of production in the polytechnic in the monthly meeting:

“The NG level has a high percentage during the period of March-December production in 2010. The main cause is due to human error from students and employees. Why are there mistakes from students? It is due to lack of supervision, moreover tools are limited so students improvising ended up with NG parts. Lack of detailed briefing also contributes to the mistakes, which brings the insufficient competence of students for machine. This is because the basic is from manual machinery, there is no adequate basic in CNC machine” (Field notes during monthly meeting, Cikarang, 27.01.2011)

The causes of NG (or no good parts) are due to error from the students' lack of briefing and lack of supervision. I brought up this issue to an instructor involved in parts manufacturing in the 2nd level. He elaborated on the reason in the following informal discussion:

“Lack of briefing? Oh that is because we do not have much time in here, and the parts we have to manufacture are urgent. Orders came from PPIC and UBM. I know the function and tolerance of materials and machines, the standards are fixed. Look, some students in here can work on grinding, some cannot” (Informal discussion, Cikarang, 01.02.2011).

There seem to be two non-technical factors coexisting with each other, namely *pedagogy ignasiens* and *hubungan baik*, however the parts to be manufactured are of great significance in that they would compromise students' learning process. It is inevitable that the polytechnic as an organisation promotes learning and enables the process of knowledge production by way of its production facet. When a part is labelled top urgent the *pedagogy ignasiens* is to be compromised, and the entire system of the organisation functions more like a manufacturing industry focusing in the output of parts production. However, in some cases when such pressure to produce parts (of top urgent) is not prevalent, the academic facet returns and *pedagogy ignasiens* approaches prevailed again.

The lack of briefing and supervision for the students is emblematic of the dominant production character of the polytechnic. Paradoxically, when the production facet takes over the entire functioning of the organisation, as it has to financially support itself, the emphasis is on the parts. In one discussion where a network was drawn by participants, the word 'students' was written as one of the actors with least influence and in the end though, they become objects. In here one of the participants came forward and stated:

“We often said that the product of the polytechnic is the students. In reality they are the ones who carry out the system. The parts are the measurement of their competence (*pembanding*). We evaluate the parts they produce. But for the priority in parts manufacturing, they become the object” (Informal discussion, February 2011).

The prevailing non-technical factors and the dominant production facet of the polytechnic consequently subjugate the students and prioritise the parts. This suggests how education hinges on production system in the polytechnic.

The collaboration between ISE Company²⁰⁶ - ATMI Polytechnic: the focal role of alumnaeship

The collaboration between the polytechnic and the ISE Company is enabled due to the subcontracting process. The linkage is harnessed through alumnaeship, as quite a number of

²⁰⁶ ISE Company is a Japanese transplant company, with the parent company located in Tokyo, Japan. It is supplying to Honda (PT. Astra Honda Motor). It manufactures automotive lighting equipment, dies and moulds as well as electronic equipment.

employees in the ISE Company are alumnae of the ATMI Polytechnic in Solo. This indicates the embedded social relations fostering the academia-industry cooperation.

The collaboration between ISE Company and ATMI Polytechnic Cikarang takes time to flourish. Historically the ISE Company has assisted the polytechnic since 2006, in terms of training employees of the polytechnic. One of the director assistants described how the interaction with ISE was difficult at first, owing to differences in their language. In this case the language used in the ISE Company was Japanese, but also in respect to the organisational culture, which was coined as the language in terms of the corporate culture of ISE Company. It took more or less two years to fully comprehend the organisational culture, and then be able to work with ISE. In the early years of the consolidation of polytechnic in Cikarang, a Japanese language course was offered to the employees. Despite the fact that most of the companies filling the job order are Japanese foreign-owned companies, a lack of interest were shown. A contrasting case is shown with the German language, where most of the employees, instructors and staffs speak German as some of them have been sent for training to Fischer A.G in Zurich, Switzerland for a one-year internship. This deficiency in the mastery of Japanese serves as a barrier to accessing the know-how in ISE Company (Informal discussion, Cikarang, 22.11.2010). It also contributes to the two-year period of time for adaptation towards learning with ISE.

The parts manufactured by the polytechnic for the ISE Company are mould. This mould is utilised for producing motorcycle lamps, and accessories for the equipment associated with the motorcycle's light-lamp system. The engineering staffs in the polytechnic come to be informed of the development of Honda products by means of the design provided by the ISE company (Interview, Cikarang, 21.11.2010). It is by virtue of the design (the drawing) that the engineering in the polytechnic becomes acquainted with the new models requiring complex mould. This is what the engineers in the polytechnic learn via the job order. The staff in the engineering indicated a dint of amicable interest when describing the mould techniques of which he attains the know-how. The tacit know-how includes the shape, the dimension, the standard used, and the assembly process (Interview, Cikarang, 21.11.2010, Observation, Cikarang, 13.02.2011). Through the design of mould the production units in the polytechnic managed to grasp the know-how from the ISE Company.

Apart from design, know-how is acquired by face-to-face meetings with the ISE Company. The company's engineers often visit the assembling area of the polytechnic. They discuss problems mediated through visualisation of parts manufactured in the assembling area of the UBM. Conversely the staffs of UBM would visit ISE Company's shop floor (Interview, Cikarang, 03.12.2010). My observation of the day-to-day routines in the polytechnic demonstrate that the

meeting for discussion would take place either in an informal setting in the canteen or in the assembling area. When there was a discussion occurring with engineers from ISE at the assembling area, the focus of the discussion would be the problems as visualised in the parts. Frequently the staff from UBM comes forward to inquire in length about the dimension of the mould, the bending (*lekuk*) – the techniques that may not be written in the design (Observation, Cikarang, 13.02. 2011).²⁰⁷ Thus, this engineering visit and direct meeting are the key features of knowledge exchange between ISE Company and the polytechnic.

As shown in the earlier paragraphs, the production units that interact more with the ISE Company are UBM and engineering. The students, the instructors and the employees in the production directorate are the ones producing the moulds. The students work as operators, and the instructors function as the supervisors whilst the production units manage flow of the production. The interaction and collaboration with industry is made possible only when the polytechnic operates in totality as a production-based organisation.

Alumnaeship allows the thick linkage of the social tie between the polytechnic and the ISE Company. This social tie is not defined by geographical proximity. The ISE Company is located in the Tangerang, Banten, Indonesia. The polytechnic itself is located in Jababeka, Cikarang-Bekasi, Indonesia. Quite a number of ATMI Polytechnic Solo²⁰⁸ graduates work in the ISE Company. A key informant puts it rather bluntly: “*Mbak* (Madame) did you know there are more alumnae (of ATMI Polytechnic Solo) working in the ISE Company, than in the polytechnic (in the ATMI Polytechnic Cikarang) itself?” (Informal discussion, Cikarang, 03.12.2010). He then explained in detail how ISE is open for the learning for polytechnic, including in *genba* and in accessing the shop floor. This alumnaeship grants access to learning on the shop floor. The ISE Company once offered on the job training for the employees of the polytechnic, however due to a restricted amount of resources this opportunity has not been taken advantage of (Interview, Cikarang, 03.12.2010). The character of the relation is embedded. It is built on the basis of alma mater.

The case illuminates how knowledge as tacit know-how of moulds manufacturing is exchanged by using design, mediated through direct meetings with the individuals in the company, and visualised by way of parts in the assembling. These meetings mostly take place in an informal setting. Nonetheless, lack of mastery of Japanese language serves as a barrier to knowledge

²⁰⁷ I found it hard to observe in close proximity. Despite this I attempted to make ends meet by discussing with the key informants subsequently after the meeting.

²⁰⁸ The ATMI Polytechnic in Solo is often referred to as *saudara tua* (elderly brother), or *simbok* (the mother). The meaning they accorded to these terms indicates the tie with the organisation that gave birth to the ATMI Polytechnic in Cikarang. Several collaborations with multinational companies with the polytechnic in Cikarang are initiated and/or managed by the *Karya Bhakti* Foundation and the ATMI Polytechnic in Solo. In cases of designing the academic teaching syllabus, the reflection or standard would be with the polytechnic in Solo. Alumnae of the polytechnic both in Cikarang or Solo is trusted in the shop floor and deemed faster to learn (Observation and informal discussion February 2011).

exchange. The know-how from ISE Company is retained in the tacit form, sticking to those who are directly involved in the production process in the polytechnic. Alumnaeship enables the embedded social relations for the interaction between academia-industry.

So far, I have illustrated the following: 1) The strategic tacit knowledge is produced via the parts manufacturing, 2) the priority given to parts production over the training of the students when a top urgent label is given, and 3) the collaboration between academia-industry enabled when the academia (i.e. the polytechnic) functions as a second tier industry. Each of these sections in this part corroborates the argument that the ATMI Polytechnic functions, produces and internalises knowledge more in its production facet. The further the polytechnic is integrated into the market (thanks to the liberalisation of the academia in Indonesia), the more likely will it function in a production system risking the scientific character that it should have.

d. ATMI Polytechnic Surviving in its Entrepreneurial Facet

The question still prevails, what does the polytechnic do in its academic facet? I take up two issues in this part: the first is regarding the knowledge workers' training and specialisation, and the second is regarding the process of knowledge sharing in the organisation. As the organisation faces challenges in the specialisation of profession, codification of tacit knowledge as well as process of knowledge sharing, which is tied more with the production facet, the polytechnic survives in its entrepreneurial facet. The term entrepreneurial in this text refers to industrial. The process of knowledge sharing by means of visualisation and/or storytelling and the predisposition to hoard knowledge in a tacit format signals how the organisation resembles the work orientation of an industry rather than an academia.

Knowledge workers in the polytechnic: practice oriented & collective structure

I will focus on the trainings provided for the knowledge workers and the collective structure of the organisation. Here I restrict to two groups of knowledge workers, the instructors and lecturers working in the academic directorate of polytechnic.

Upon entrance, it is visible that the building where the lecturers are based is located in the left wing, whilst a separate building for the instructors and production is situated in the right wing. In the middle one can see IGI ATMI Company's building (Observation, Cikarang, 17.06.2010). This is a separate building for instructors and lecturers. These two groups are also separated in function, as the instructors are the ones who are involved in the production of parts, whilst the lecturers are more engaged in classroom-based teaching. Moreover, the FGD result shows how in respect to learning, the instructors assign more weight to learning in the production directorate (FGD field notes, Cikarang, 19.02.2011). This means they identify themselves more as a part of

production directorate than academic directorate. The physical building that separates them actually represents the real division of work orientation.

Results from the descriptive statistics reveal that in regard to academic background, 60% of lecturers and instructors have a diploma (equal of a three year diploma) as academic background. Thirty-three point three percent of respondents have bachelor degrees, whilst the rest have a master degree (3%) and a vocational high school certificate (3%). The large majority of respondents are male, 93.9%, with female of only 6.1%. This statistical result confirms the observation finding that men dominate the work at workshop, and a majority of them have a diploma background.

The polytechnic provides short-term academic training to both lecturers and instructors. The descriptive statistical analysis demonstrated that: first, the technical training has the largest percentage of participation, second is workshop training and lastly short courses training. The technical training in which the respondents participated ranges from on the job training for one year in Fischer A.G, at Zurich, Switzerland (Informal discussion, Cikarang, 25.01.2011), to internal training held at each division such as engineering division (Interview, Cikarang, 21.11.2010). In the training provided in Fischer A.G, most of the instructors that have undergone such training mentioned the difficulties in integrating the previously acquired knowledge in the polytechnic teaching activities and/or job order. The training in Zurich is in the field of drawing for plastic moulding while in the polytechnic they are required to deal with basics in drawing (Interview, Cikarang, 03.12.2010). In the internal training, the necessity of such training arises from the needs of the division, especially when there are cases of misreading of the measurement scale, of inaccurate reading of drawing. Thus training is a must in this case (Interview, Cikarang, 21.11.2010). These trainings are, as a matter of fact, practice-oriented (Interview, Cikarang, 22.11.2010). The emphasis of practice over theory is the intended consequence of a production-based academic and training of the polytechnic.

Unlike the case of President University or several research-based organisations²⁰⁹ in Indonesia where the knowledge workers are supplementing their income by working in several organisations or taking up multiple administrative positions, in the polytechnic from Monday to Friday, based on my observation, there are no activities where lecturers or instructors are leaving their posts for other income-generating activities. This is not due to the high income received. In fact, one instructor informed me that his salary was barely enough to sustain a minimum standard of living (Informal discussion, Cikarang, 06.12.2010). This is due to the collective character (see also Knorr-Cetina 1999) being built by the everyday activity of the knowledge workers in the structure of

²⁰⁹ See chapter three on science policy for the in-depth discussion on supplementing income by researchers in research-based organisations.

organisation. This collectivity is cemented by: shared commonalities of work, shared ethnicity (Javanese), the usage of Javanese language, alumnaeship, and the fact that most workers and their families also live in a designated area²¹⁰ (Observation, Cikarang, 15.02.2011). This socially fabricates a tightly knit collective structure that will not allow a deviation from the current structure of organisation.

The training provided for the knowledge workers is practice-oriented, the division of the work of these knowledge workers reinforces a division whereby the instructors are in their work orientation associated more with the production directorate. The organisation has a collective structure where the knowledge workers do not supplement their income with other jobs during office hours.

The challenge of tacit knowledge codification & specialisation of profession

I have described how the production of tacit knowledge is tied more with the parts manufacturing. There is a propensity to hoard such knowledge in a tacit format. I will describe this in the context of codifying knowledge to the teaching syllabus. I will also discuss the challenges of specialisation of profession in the polytechnic. These elements are related to the academic facet of the polytechnic.

For the issue of tacit knowledge, I limit the focus to instructors in the second level who are both teaching students and fully engaged in production. They reiterated their concerns about the problematical process of codifying the learning in the teaching syllabus. The academic directorate has been pushing this to qualify for the DIKTI accreditation programme. An instructor expresses his reservation of this proposal in an interview:

“I was bewildered by this requirement of teaching syllabus *mbak* (Madame), including for the second level instructors. Although I have spent a long time in the polytechnic, the minute I heard that there should be teaching syllabus for the second level, how will we make it since we are in fact producing parts. What is teaching syllabus? It is a process if I am correct. Analogous with subjects, physics for example have various formulas, models. It is a competence that needs to be understood and attained” (Interview, February 2011).

The know-how of parts production in the second level instructors is stored in the tacit form. They are kept in the head, managed through stories with their peers or through parts visualisation. To codify in writing, with the exception of drawing, is even at odds with the current practice of knowledge production and sharing in the workshop.

²¹⁰ Most of the workers live in the same area in Cikarang with an inevitable sense of *satu kampung* (sharing the same village). As the neighbours in front and at the left and right side would be the people whom you worked with in the office. They converse in Javanese language, and not in the vernacular language of Bekasi residents.

This is due to the absence of a standard part. The nonexistence of a standard part manufactured on a mass-based production is often coined as the reason for the lack of teaching syllabus and main guidelines for teaching (GBPP). It is difficult to codify the learning in teaching syllabus and main guidelines for teaching because the products and parts being manufactured change according to the orders that come from industry.

The lack of willingness of the instructors is also a reason why they prefer to hoard their knowledge in a tacit format. I capture this in the response of the instructors (participant L) when asked by the assistant director of the production directorate (participant I) to codify the process for a repeat order since several of the industries placed the same order. They were lukewarm about the idea of codifying the repeat order as demonstrated in the excerpt of the monthly meeting:

Participant L: “We tried (for codifying repeat order), we codified for gear.”

Participant I: “When I mentioned the products/parts we manufacture must have SOP (standard of operating procedure), which then needs to be translated to a teaching syllabus (*Satuan Acara Pengajaran/SAP*), maybe one should also look at the process. Whatever the product is, the process should be codified²¹¹ in accordance with the competence of students in the second level. You mention the repeat order, and only a little that can be codified through SOP should this be the case what are the barriers? And then what are the *kaiizen* (*improvement*)?” (Field notes of conversations, Cikarang, 27.01.2011).

Then there was silence from the second level instructor. It was clear there was tension in the air during the meeting. The assistant director from the academic directorate was not pleased with the resistance to codification for repeat orders from parts being manufactured.

The next reason is attributed to the minimum organisational incentive, especially from the academic directorate. The possibility of career route is an upward one, which is hierarchical. An achievement incentive is rewarded with monetary compensation after the yearly performance appraisal. What is practiced is very technical and applied. Drawing, assembling and parts manufacturing are the daily techniques practiced by the instructors (Informal discussion, February 2011). I proposed the idea of having the academic positions regulated by DIKTI and that DIKTI may well be providing monetary incentives for these positions. The instructor was quite resolute in explaining his lack of interest to the academic position or support from DIKTI. He stated that he cannot be confined. The workshop (*bengkel*) provides more freedom, more knowledge, and more space in learning for instructors (Informal discussion in January and February 2011).

Nevertheless, the academic directorate organises efforts to tackle this issue. Several instructors and lecturers have in fact attended training. This *Pekerti* training is organised by DIKTI to equip

²¹¹ Codified here is in the context of standardise or *membakukan* (in *Bahasa Indonesia*/Indonesian Language).

lecturers (*dosen*) with skills related to teaching. An instructor shared his experience of the *Pekerti* training in the an informal discussion:

“Indeed, I have participated in the Training by DIKTI. The *Pekerti* Training in West Java, I have asked the trainer with the learning that we have in ATMI Polytechnic Cikarang, which mostly takes place in the workshop (*bengkel*), then how do we codify them in SAP & GBPP? They, i.e. the trainers from *Universitas Pendidikan Indonesia*, Bandung, cannot answer this question” (Informal discussion, February 2011).

Another effort that took place during my internship in the polytechnic was the comparative study initiated by the academic directorate to learn more about codifying learning and know-how in the teaching syllabus. A group of instructors and lecturers decided to go to the ATMI Polytechnic in Solo. It was not the Manufacturing Polytechnic in Bandung, which is closer to the polytechnic in Cikarang, it had to be the polytechnic in Solo, since this polytechnic is perceived as having more experience (Informal discussion, February 2011). After they returned from Solo, I asked what they got out of the trip most in regards to the teaching syllabus, to which one of the instructors replied:

“The problem in the polytechnic in Solo is similar with us in here. There is no teaching syllabus and main guidelines for teaching (SAP & GBPP). No teaching syllabus for machines, only standard operating procedure. It is difficult to codify the learning process for students, to move from theory to practice or practice to theory” (Informal discussion, February 2011).

Hence, the remedies do not fulfil their assigned tasks. Neither of these efforts has been able to address the issue of codifying the learning and know-how in teaching syllabus. This is partly because the *Pekerti* training does not respond to the issue of changes in parts manufacturing and strategy of codifying such learning. Moreover, the yardstick that they take up is the polytechnic in Solo, which has not successfully dealt with the issue yet.

Consequently, it is the lack standard product, lack of willingness and minimum organisational incentives that serve as the main causes of difficulty of codifying tacit know-how into a teaching syllabus.

Specialisation of profession as an academic position is also troublesome. The yardstick for assessing the performance of lecturers and instructors is the same with the other employees. The human resource division assesses the performance based on work quality, work quantity, competence, work behaviour, independence in working, and initiative in office, health and safety, cleanliness as well as neatness. The term of competence is not defined further in the yardstick (Interview, Cikarang, 10.01.2011). When I inquire about specialisation, there was no satisfying answer provided. Achievement assessment is based on work performance and will be rewarded with monetary incentives (Interview, Cikarang, 08.12.2010).

The lecturers face challenges in regards to research and development. The emphasis has been on skills: students' skills or individual skill. A lecturer tried to convince the academic directorate, but was given a response doubting the function and result of research (Informal discussion, February 2011) toward the overall progression of the polytechnic. As phrased by one of the key informants: "If we do research, what is the reward for us?" (Interview, Cikarang, 22.11.2010). Currently there are no credits provided for lecturers when they produce work such as writing scientific journal articles or updating their teaching modules.

This is also the case for instructors who perform class-based teaching. There is reluctance to update the teaching module based on their tacitly kept know-how due to lack of organisational incentives in either the form of monetary compensation or credit points (Informal discussion, January 2011). In fact, the job order routines demand instructors take up the role of supervisors apart from teaching. This leads to two complications: first they have to master a wide array of skills required for fulfilling the job. Second, due the first complication, it would be a demanding task for them to achieve specialisation. This has caused confusion regarding the identity of the instructor as stated by one of the instructors during a discussion:

"The job order usually comes by the PPIC. I also teach in the classroom. I am confused though, am I an instructor or a lecturer? I feel more like an industry supervisor. This has an impact on my motivation. In here there is no specialisation, such as drawing, or mould or dies or precision parts" (Informal discussion in February 2011).

It is quite burdensome to acquire an academic position in the polytechnic for the instructors and the lecturers (Informal discussion, February 2011, December 2010). These academic positions are at the moment non-existent. The polytechnic pushes the agenda of having academic positions predominantly due to the demand of accreditation from regulation of DIKTI (Interview, Cikarang, 17.02.2011). The non-recognition of academic positions within the internal structure of human resources management has a significant impact. The lecturers cannot apply for scholarship opportunities provided by DIKTI, nor can they move up the horizontal ladder, achieving academic specialisation in a certain field. What exists in the academic facet thus is a hierarchical ladder of upward mobility in career. A person is readily moving up from instructor, to section head, coordinator of the level/*tingkat* and division head (informal discussion, Cikarang, 13.12.2010). The current job evaluation and job-grading programme also does not capture the horizontal mobility allowing specialisation and ranking of different level of competence. However, academic position is planned as a priority for the polytechnic starting in 2012, along with the accreditation process (Interview, Cikarang, 08.12.2010).

The current structure exhibits the academic aspect of the polytechnic as a hierarchical-administrative one, making it tough to achieve a specialisation. This might indicate a bureaucratised feature in the academic aspect. The instructors in the second level tend to hoard their knowledge in a tacit format. These are the challenges of the polytechnic.

Knowledge sharing through project meeting

The process of knowledge sharing among knowledge workers is mostly through face-to-face communication mediated through storytelling and/or visualisation. The first means of knowledge sharing is by means of storytelling. This is in line with the 'oral tradition' as pointed out by a lecturer (Informal discussion, Cikarang, November 2011), which makes it difficult to assess this process of knowledge sharing by quantitative measurement *per se*. Storytelling acts as a way for the actors to share the barriers they have faced beforehand in working with other industries (Interview, Cikarang, 22.11.2010). Such stories are shared between those who share the work relating to the function of production and upon whom trust is bestowed. This enables the actors to share their tacitly kept knowledge and solve problems in the assembling. Another distinct feature of this knowledge sharing process is visualisation via objects²¹² (see also Knorr-Cetina 1999). Instead of working with representations of object for knowledge sharing such as publishing papers or books, or through patents, the knowledge sharing process is mediated with visualisation of the parts or problem faced. The problem in some cases is exemplified by pie charts, flow charts, pictures or signs on the wall (Interview, Cikarang, 13.01.2011). This mode of knowledge sharing resembles the industry mode of knowledge sharing.²¹³

There are various meetings organised to facilitate knowledge sharing in the organisation. This ranges from monthly meetings to project meetings that are organised in an informal environment setting such as the canteen.

Despite the range of meeting types, it is the project meeting that functions more as a forum for knowledge sharing. I posed the question of whether (according to the experience) it was the usage of formal meetings or informal meetings that acted as a forum for problem solving in the survey, and 87.8% of respondents replied that the informal meeting is used most as a forum for problem solving. Thus, it can be inferred that informal meeting has more prominence than formal meeting.

My observation of the monthly meeting demonstrates that the monthly meeting serves as a vertical problem-solving forum, yet participation is restricted among those who hold the administrative (hierarchical) positions in the polytechnic. Conversely, project meetings are the

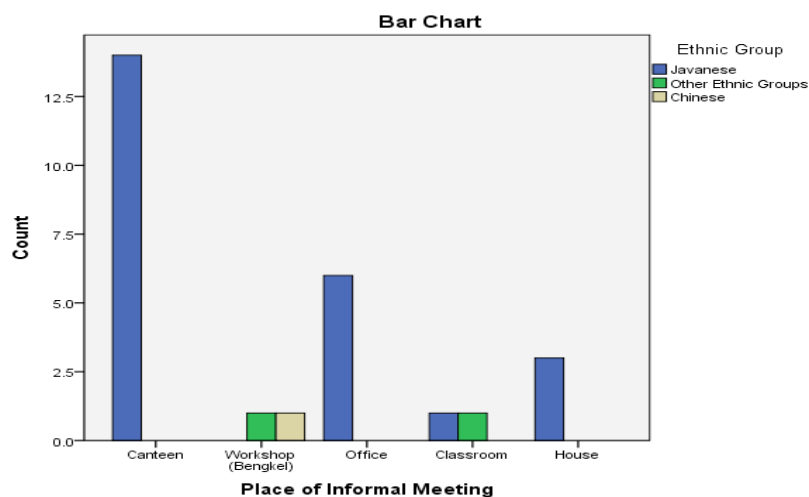
²¹² One could also compare with the work of a two-tier structure of molecular laboratory carried out by Karin Knorr-Cetina. Here the organisation of the work in the laboratory is organised by means of object-oriented work both on the laboratory level and the experimental activities (Knorr-Cetina 1999: 85).

²¹³ This is described in detail in chapter six.

informal meetings attended by the instructors and/or employees in the production directorate. It is informal as it is fluid in character; one who is not involved in the project of parts cannot participate. It is quite unpredictable in terms of time and space, an invitation for the meeting may be sent via Blackberry messenger (Interview, Cikarang, 12.01.2011). Moreover, the informality is also evident due to the location. This meeting is usually held outside of office space, particularly in the canteen (Observation, Cikarang, 26.01.2011). This is confirmed in the statistical survey. The canteen has the highest percentage (50%) as a location of informal meetings. Office comes second with 22.2%, whilst house as a meeting location is in third place with 11.1%.

Participants of the project meetings are mostly those within the production directorate. This type of meeting is tied to the process of production. There is information sharing on the new parts being produced, the materials, and the ways to produce the parts. In this meeting knowledge pertaining to the know-how of the production process and the drawing is also shared (Interview, Cikarang, 21.11.2010).

Javanese is the language spoken among the group at the project meeting in the canteen. This is shown by the following descriptive statistics. A cross-tabulation analysis of ethnicity and the exact significance (2-sided) of person chi square shows 0,003. The P value shown of 0,003 is less than $< 0,01$. This demonstrates the significance of relationship among the variable of ethnicity, namely Javanese with canteen as meeting place. This is shown in Figure 7.2.



(Source: Author's field data in 2010-2011)

Figure 7. 2 Informal Meeting Place & Ethnic Group

Thus knowledge sharing occurs within these project meetings located mostly in canteen among the Javanese ethnic groups and using Javanese language.

These project meetings are indeed restricted in membership. A respondent in the questionnaire characterised the canteen as *Judas* meeting room. I sometimes overheard this term among the instructors in the shop floor. The phrase pointing out the canteen would be: '*Lha kuwi ruang meeting Yudas*'²¹⁴ (Informal discussion, Cikarang, 10.01.2011). This betrayal denoted in the name of *Judas* meeting room shows how instructors and some employees expressed their feelings about how they are *excluded* in the project meeting. The membership is restricted and delineated by the informality tie.

The boundaries and informality of this group of individuals in project meetings resembles that of epistemic group, or communities of practice (Schiein 2009).²¹⁵ My findings of the communities of practice in this project meeting suggest that instead of sustained and cohesive individuals that infer stability, there is fluidity²¹⁶ (Evers 1980a). The restricted membership reaches outside the organisational boundaries to include engineering or quality control staffs of companies. The tie that binds this community of practice is their production function, the language spoken is Javanese, the protocol would be to tune in with the drawing of parts including changes thereof and informality is the norm. Consequently, the closer one is with the job order and production function, the more likely is the access to the community of practice.

To this point, this part (i.e. part d) has discussed how the academic facet in the polytechnic in fact functions more in its entrepreneurial facet. The previous paragraphs have demonstrated that first, knowledge is shared by way of face-to-face communication and managed via the visualisation and/or storytelling. This pattern is akin to those in the automotive industries. The project meetings are forums for knowledge sharing among actors in the polytechnic. Whilst the monthly meetings served more as hierarchical knowledge sharing, the project meetings are more informal. Secondly, there are challenges to specialisation of profession and the tacit knowledge codification. The dual role of instructors as both supervisors (of the parts production) and lecturers causes confusion. The instructors are also unwilling to make explicit the tacit knowledge obtained from the parts production. Thirdly, the trainings received by the knowledge workers have mostly been practice (vocational) oriented. The polytechnic as an organisation functions in its collective manner in a way that supplementation of income remains an exception rather than the norm.

²¹⁴ In English: "Yes that is the *Judas* meeting room." In the Catholic tradition, *Judas* betrays Jesus to the religious authorities.

²¹⁵ Schiein defines communities of practice as a sustained and cohesive group of individuals with a shared purpose, identity for members, a mutual environment using shared knowledge, language, interactions, beliefs and other elements. He then advanced his argument by contending that communities of practice extend beyond the organisational limits and progress into a kind of trans-organisational network (Schiein 2009).

²¹⁶ Evers describes the fluidity and loose structure as the main feature of Southeast Asian society. He added further this may be well bring further categorisation as such of that *aliran*, cliques or patronage system (Evers: 1980a). I extend this fluidity in the epistemic groups in that the memberships are fluid, yet despite the fluidity it is still possible to maintain restriction of members. This fluidity however is embedded also in the language that they used, namely Javanese.

e. Summary

In this chapter, by focusing on the knowledge workers in academia, I contend that the liberalisation and bureaucratisation of academia obstruct the scientific knowledge production and knowledge sharing of academia.

PU as an academia does not have control over its resources. The strategic group analysis of the process of establishing a defence study programme shows a strategic group formation of the military, the alumnae network of LEMHANAS, and the Foundation of PU. The idea of the study programme came from both the military and the foundation. The programme was designed to accommodate the interests of the top official of the military and the LEMHANAS alumnae network. The mechanism of how a decision on study programme reveals that it is made by a series of informal meetings, and that by way of the informal linkage the state (through the military) contributes to the creation of a bureaucratised space, a space whereby the rationale for the creation of a study programme is determined by Jakarta (the military located in Jakarta). The funding allocation and administrative positions are also not determined by PU but by the founders. They are controlling this by the patron-client linkage. PU in its informal shape is the ninth company under the auspices of the Jababeka Group. The founders through the Jababeka Group have been supporting PU in operational and funding assistance. In return, they have a final say on the usage of the income received by PU and the appointment of the administrative positions.

Knowledge production is restricted to teaching and distorted by the intense competition for the administrative posts. Although the majority of the knowledge workers in PU have a formal educational background in the level of master degrees and doctoral degrees, scientific knowledge production in the form of research and publication is not central in the everyday academic activity in PU. This is owing to the fact that there is a teaching overload for the lecturers, a lack of research funding, and competition for the *jabatan* (administrative posts). Such competition mobilises the bureaucratisation of PU as a university. Knowledge sharing is carried out as a theatrical exercise of a science-based organisation, whilst on the contrary it is an administrative practice. There is a different range of meetings in PU, from faculty meetings, Monday meetings to research meetings. Decision making for resource allocation is not made at these formal meetings. The statistical result pointed out that it is informal meetings that function as a forum for discussion between the lecturers. The formal meetings act as an exercise for projecting the reality of the university as an academic institution. The research meeting case study points out how the meeting functions not to discuss topics pertaining to research but to air their discontents. Despite the lack of effective function, there is an insistence to stick with the routine of research meetings. The collaboration with the Mattel Company is brokered by a gatekeeper in PU and enabled due to

the personal linkage. Knowledge exchange is possible on the basis of the collaboration of lecturers for problem solving on the shop floor of Mattel and teaching activity of Mattel Company employees. Due to the thick linkage between the gatekeeper and the patrons, the knowledge from the collaboration tends to be controlled within this linkage. Bureaucratisation poses the risk of PU as an academia to suffer the loss of its scientific character.

The ATMI Polytechnic leans on the market (i.e. industries) to support its operational costs. It is by producing parts by way of subcontracting activities (job order) that the ATMI Polytechnic Cikarang manages to survive. Unfortunately the parts production brings into being the dominant feature of the production facet of the organisation. Knowledge, specifically strategic tacit knowledge, is produced during the parts production processes. There is no impact on the scientific knowledge production from the tacit knowledge attained in this production process. Access to this strategic tacit knowledge is dependent upon one's own function and membership. The closer he or she is to the production function, the greater the chance to gain access to the knowledge in the assembling area (which is a restricted entrepreneurial space). Due to its production character, the polytechnic is more tapped with the industries located closely. The selection and priority tagged to parts production are governed by social relations. Again, the central character of the polytechnic's production is reified once the label 'top urgent' is accorded to the parts. The (unintended) output would be lack of briefing and lack of supervision for students carrying out the production system. This creates a situation where education is made dependent on the production system. Collaboration between academia-industry is characterised by an embedded social relations made possible on the ground of alma mater. This is the case with the ISE Company, polytechnic collaboration whereby the polytechnic produces moulds for the company. The tacit know-how is obtained from the techniques on the mould production and exchanged by way of face-to-face meetings.

The academic facet of the polytechnic functions in a more entrepreneurial way. The knowledge workers' training is applied and practice oriented. Sixty percent of the academic background of the knowledge workers (both instructors and lecturers) is diploma (a three-year diploma). The nature of the training is rather technical, workshop-based or short course type of training. The organisation in its day-to-day work orientation manages to keep its collectivity as the knowledge workers do not take up jobs in different places. It is a challenge to make explicit tacit knowledge and specialisation of profession. Tacit knowledge is hoarded and not made explicit due to the fact that there is no standard part in place, the lack of willingness of the instructors, and the minimum organisation incentive. Endeavours designed to overcome this, including the *Pekerti* training by DIKTI or the comparative study to the ATMI Polytechnic in Solo, have yet to yield the intended result. Specialisation of profession is challenging as the indicators for the performance assessment

of lecturers and instructors are on the same basis with other employees. There are no credits for lecturers when they produce scientific work. The job order work orientation has created bewilderment regarding the actual role of the instructor (whether he/she is an industry supervisor or a lecturer). In the polytechnic knowledge is shared by means of visualisation (of problems or parts) and storytelling. The intensive forums for knowledge sharing are the informal ones managed and tied to the production function. This project meeting is characterised as the *Judas* meeting, which may exclude a certain group of knowledge workers. Javanese is usually the language spoken among the members of the group. This group involved in the project meeting is similar to communities of practice; it is fluid in character and the tie binding is the function of production. The everyday academic facet in reality reinforces the work orientation of an industry.

Hence, on the one hand, liberalisation has realigned the means of knowledge production, sharing and exchange of the polytechnic to an entrepreneurial facet, resembling the work of industry. Bureaucratisation, on the other hand, also brings similar consequences in terms of PU's actual work orientation mimicking the government offices. Both processes consequently co-opt the scientific character of an academia in the Indonesian science system.

Chapter 8

Analytical Typology of Academia: Entrepreneurial Organisation & Bureaucratised Organisation

This chapter emanates as an exercise of the reflexive science²¹⁷ (Bourdieu and Wacquant 1992; Burawoy 1998), in the sense that it attempts to contribute to social science theory building in Indonesia. It builds further on the argument of liberalisation and bureaucratisation of academia made in chapter seven. I propose and argue for two analytically defined academia: entrepreneurial and the bureaucratised organisations.

One of the persistent questions of knowledge cluster relates to the realistic mix of organisations in a cluster to enable a strong knowledge base (Evers 2011). Studies of industrial clusters in Europe have probed various types of knowledge bases²¹⁸ (Asheim and Gertler 2006; Asheim, Boschma et al. 2011). A direct application of any of these theories to the empirical body of work would be premature in Indonesia, as it has a distinct trajectory of industrialisation.²¹⁹ There is a lack of horizontal linkage between academia and industries as shown in Indonesia. In addition, the industrial research and development (R&D) units are for the most part not located in the clusters in Java.

Most of the foreign industries in Indonesia were claimed to be ‘footloose’ and, thus, have minimum linkage with the local economy (Firman 2004). However, Gammeltoft’s work on industries in the electronic sector in Indonesia highlighted various typologies of firms²²⁰ (2003), and that it would be untenable to label industries, even foreign industries as, simply put,

²¹⁷ The fourth principle of reflexive science, as coined by Burawoy, is reconstruction. One should start with the favourite theory to find refutations within that theory that would inspire further understanding (1998:16). He pointed out possibilities of progressive reconstruction of theory (1998: 16). Bourdieu, taking social units in their relational feature calls for, *inter alia*, breaking with empiricist passivity, constructing a scientific object by taking up an active and systematic posture against ‘facts’ (Bourdieu and Wacquant 1992: 233). This requires one to tackle “a very concrete empirical case with the purpose of *building a model*...you must link the pertinent data in such a manner that they function as a self-propelling program of research capable of generating systematic questions liable to be given systematic answers, in short to yield a coherent system of relations which can be put to the rest *as such*” (Bourdieu and Wacquant 1992: 233).

²¹⁸ This includes synthetic, analytical, and symbolic types of knowledge bases (Asheim, Boschma et al. 2011). An analytical knowledge base points to the economic activities whereas scientific knowledge is built on formal models as well as the codification being vital. A synthetic knowledge base refers to economic activities in which the innovation occurs chiefly occurs through the implementation or the new mixture of existing knowledge. The symbolic knowledge pertains to the aesthetic fetures of products, to the creation of designs, including the economic usage of various formats of cultural artefacts/creative industries (Asheim, Boschma et al. 2011: 896-898).

²¹⁹ Chapter two of this thesis discussed the knowledge-based cluster and industrialisation in Indonesia.

²²⁰ In the study 67 companies were analysed by quantitative means and complemented with qualitative interviews and site visits to 27 electronics industries in 1998. He observed modes of capability development of the firms, and postulates six development modes. They are the ‘enclave firm’, ‘implanted firm’, ‘technology-importing firm’, ‘selectively-linked firm’, ‘delinked firm’, and ‘polylinked firm’ (Gammeltoft 2003: 755-756).

footloose. Whilst carrying out my fieldwork in Indonesia I found it suitable to use a specific typology of academia. The term academia used in this chapter encompasses universities, polytechnics and governmental R&D institutes. I use the concept of bureaucratised space and entrepreneurial space when looking at these two typologies of organisation. As mentioned beforehand, I assert that there are two typologies of academia: the bureaucratised academia and the entrepreneurial academia in the Indonesian science system. I argue that the first step in developing a (strong) knowledge base requires tapping into the existing knowledge flow in a cluster with an academia subsumed in the entrepreneurial space. Yet the peril of both types of organisation is the decrease of the scientific character of science-based organisation in Indonesia. This is my attempt to contribute to theory building of academia and industry collaboration in the Indonesian science system.

In this chapter I will review the work of organisation theorists. I revisit the work about professional organisation and entrepreneurial organisation and then look at the process of bureaucratisation as studied by the Southeast Asian sociologists. I base this typology on organisational ethnographic studies of academia in Indonesia.²²¹

a. From Professional-based to a Bureaucratisation Process in the Organisation

Organisations are social units established to strive for specific goals (Etzioni 1964). Due to the multi-goals they pursue, universities and polytechnics are tied with the *Tri Dharma* principle and are multipurpose organisations. This is distinct with an R&D organisational unit focusing on producing knowledge through research in a particular area. The degree of Mode 1 production of knowledge, however, is subject to empirical inquiry. This is also the case with the extent of knowledge flowing from a company being stored in the university/R&D institutes.

Looking from the standpoint of how knowledge is handled in organisations, Etzioni (1964; 1969; 1975) differentiates between professional and semi-professional organisations. On the one hand there is professional organisation, which is characterised by high numbers of professionals, the goals, and the authority relations between professionals and non-professionals (Etzioni 1964; Etzioni 1969). The authority of relations is structured to enable professionals to have a superior

²²¹ The focus of the two organisational ethnographic studies are ATMI Polytechnic and PU, located in Jababeka Industrial Cluster. To add further weight to the analysis, I have also carried out observation and interviews in the Governmental R&D units located in Cibinong Science Center, Bogor and in PUSPIPTEK Science Park, Tangerang, Indonesia. Caution is warranted. One would perhaps come up with a different analysis should he or she observe universities that are old, that have a long historical trajectory and relatively strong alumnae networks in Indonesia such as University of Indonesia/UI, or Bandung Technology Institute/ITB. ITB, for example, for the research on Added Value for Production Supply Chain through the Development of an Integrated Zone in Bekasi in 2010 cooperate with the their alumnae in ITSb (*Institut Teknologi Sains Bandung*/Bandung Technology Science Institute) located in Cikarang Pusat, Bekasi. For reference see: <http://www.itsb.ac.id/?Keunggulan ITSb:Kerjasama dengan ITB%2C Sinarmas dan Pemkab Bekasi> (accessed on 6th of May 2012). The cooperation was smooth to the extent that for data collection the ITB research team can mobilise the students in the ITSb (Observation, Cikarang, 25.10. 2010, 27.08.2010).

authority on top of the organisation's major goal-related activities. In full-fledged professional organisations, the administrators are in charge of secondary activities (Etzioni, 1964: 81) with regard to the fulfilment of the organisation's goals. Administrators may voice concerns; however, in the end it is the professionals who decide to what extent the administrative rationales may be taken into consideration (Etzioni, 1964: 81). It is important to note that most professionals in this type of organisation are reluctant to take up administrative posts. On the other hand, there are semi-professional organisations as outlined by Etzioni that have the following character (1969, 1964: 77-78): semi-professional authority whereby the training is shorter, pertaining to values other than that of life or privacy. In addition, the focus is more on the communication of knowledge than the creation of knowledge. Furthermore, in contrast to professional organisations, the professional work has less autonomy. Lastly, semi-professionals are more likely to have skills pertaining to administration. Some examples of semi-professional organisations are nursing services of hospitals or primary schools.

Etzioni's work on semi-professional and professional organisation contributes to the understanding of organisational work and knowledge in several ways. First is the direction of knowledge and authority in an organisation: in a professional organisation, professional knowledge is the authority; in the former it is tied more with administrative authority. Second is the distinct orientation of the professional individual in each organisation; in a professional organisation, the key professionals would be inclined to take up administrative posts. Third is in regard to compliance and organisational goals; in a professional organisation, the compliance is secured through normative compliance (Etzioni 1975).²²² Etzioni's work, however, is silent in terms of space dimension, epistemic groups formed by the profession themselves, especially in regard to the lack of professional associations in Indonesia, and 'class consciousness'²²³ (Gerke 2000).

When knowledge is capitalised and commodified actively by an organisation especially for organisational learning and survivability, the discussion regarding entrepreneurial organisation is a priority in discussing academia in Indonesia. Taking into account the liberalisation of higher education in Indonesia, integrating educational institutions with the market is the current trend.

²²² Etzioni proposes a classification of several organisational goals linked with the means of compliance (1975: 104-107, 112-118). They are, among others, organisations with culture goals. These organisations with culture goals establish conditions required for the creation and preservation of symbolic objects, including their application and the reinforcement of commitments to such objects. They would have a normative compliance structure (1975: 105). Research-oriented universities are classified as organisations that have culture goals as they give emphasis on the creation of culture and the preservation of the cultural heritage by transferring it from generation to generation (primarily through teaching) (1975:105). Professional organisation is also categorised in the organisation with culture goals as it specialises on the application of culture, chiefly science and art. To pursue their aims, the organisations with culture goals, according to Etzioni, hinge mainly on normative compliance instead of other means of control (1975:116).

²²³ Solvay Gerke examined the middle class Indonesians and lifestyling through consumption, pointing out, *inter alia*, that 'class consciousness' was manifested through consumption and was not determined by political action but by means of identification of classes or groups of people having a particular lifestyle (2000: 146).

The 'triple-helix' mode of innovation brings forth the conceptualisation of an entrepreneurial university. There is increasing linkage between the users of the knowledge, such as industries and/or government giving a university a role as an economic actor (Etzkowitz 2008; Etzkowitz and Zhou 2008). This entrepreneurial university acts as the motor of triple helix; it is not governed by the government or industry. Etzkowitz (2008: 41) further explicates the norms that drive the entrepreneurial university as consisting of:

“First, *capitalisation*. Knowledge is created and transmitted for use as well as for disciplinary advance; the capitalisation of knowledge becomes the basis for economic and social development and thus of an enhanced role for the university in society. Second, *interdependence*. The entrepreneurial university interacts closely with industry and government; it is not an ivory tower isolated from society. Third, *independence*. The entrepreneurial university is a relatively independent institution; it is not a dependent creature of another institutional sphere. Fourth, *hybridisation*. The resolution of the tensions between the principles of interdependence and independence is an impetus to the creation of hybrid organisational formats to realise both objectives simultaneously. Fifth, *reflexivity*. There is a continuing renovation both of the internal structure of the university as its relation to industry and government changes and of that of industry and government as their relationships with the university are revised.”

The increasing transformation of the internal structure of academia making it more entrepreneurial within the 'triple helix' is most likely due to structural coupling of different communication subsystems in the society. The more the academia is coupled and integrated with the industry or market as subsystems, the more likely it is that this will reflexively restructure the orientation of the university as an organisation. The social system is regarded as autopoietic (Luhmann 1995), therefore, able to self-organise. The location or space mediating the sphere between academia and industry is consequently reduced to the 'interrelation of social situations' (see Knorr-Cetina 1981).²²⁴ Meusburger (2000: 361) criticises the functional approach as only able to illustrate a limited part of the spatial pattern and stresses that the borders between the functional requirements and symbolic meanings are becoming increasingly vague. In addition, location is not an issue to be taken into account (Meusburger 2000). My analysis of academia-industry linkage shows that space does matter within an organisation reorienting towards being bureaucratized or more entrepreneurial. I also demonstrate that there is a social space mediating the linkage between industry and academia fostered by it being embedded due to alumnaeship, and work experience. The process of authorisation within the top management or key person in the company enables the incorporation of external knowledge in the form of advice from academia to the shop floor material modification process. This *raison-d'etre* would not come up if one were clinging solely to the functional approach in the 'triple helix' system.

There is, of course, criticism of the notion of an entrepreneurial academia. Giroux contended that

²²⁴ As suggested by Karin Knorr-Cetina, social system theory addresses the issue of interrelation between social events or linkage of the happenings of diverse micro-situations through the structural and functional interrelations between social situations (1981: 28).

higher education must not be reduced to its entrepreneurial function, although public and private organisations must still be able to make a profit (Giroux, 2001: 1-3). It is necessary to defend higher education to maintain it as an autonomous sphere and for the progression of a critical and dynamic citizenry (Giroux 2001). Whether making academia more entrepreneurial, giving it an economic logic and marrying it even more with the market would subject it to an 'elitist' knowledge, is subject to empirical research.

The discussion of bureaucratisation of science system in Indonesia began when Geertz carried out his work in the 1970s. He describes intellectual life in Indonesia as being spasmodic, practical, centralised and robustly influenced by the economists (Geertz 1974). He set out the difficult realities of Indonesia's social science policy (1974: 366), including among others, the intense bureaucratisation of scholarly life and Indonesian society. He showed the strong inclination for educational programmes to be oversized and given grand titles. However, in the end, they are managed by civil servants who are occupied with a number of other things (1974: 369). He also pointed out how the production of knowledge in social science has a doctrinal quality, a bookish character. The role of research, as a comprehensive understanding of what the actual social research is, would not likely be an output of the current method of education in Indonesia (1974: 369). Reflecting on this, then, it is possible to infer that 'Mode 1' of knowledge production by science centres, such as a university or R&D institute, would be disrupted due to intense bureaucratisation.

The term 'runaway bureaucratisation' was coined by Evers to describe the stark increase in terms of numbers of government employees in Thailand, Malaysia and Indonesia (1987). He observed the long-term process of bureaucratisation from the 1920s up to the 1980s and draws the distinction of three types of bureaucratisation (1987: 667). First, 'Parkinsonisation', namely the growth in the number of government personnel; second, 'Weberisation', which refers to the penetration of rational principles of organisation through government administration, and third is 'Orwellisation', referring to the growth of over-all bureaucratic control. The hypothesis is that major political upheaval is likely to be followed by rapid bureaucratisation (1987: 678). The study is aimed more towards government expansion, but the logic of bureaucratic capitalism where extra income may be attained through social network should be considered in the analysis of the bureaucratisation process in Indonesia, especially when one realises the irrational salary structure of the lecturers working in universities thereof.

Academia during the New Order regime may represent, to use Umar Kayam's term, '*jawatan pemerintaban*' (government office). It functions like a *kecamatan* (sub district) office that is being asked to obey the state's orders and also in post-authoritarian Indonesia, higher education

universities are still controlled by the state (Nugroho 2012). But does this mean bureaucratisation in the form of ‘Orwellisation’ is increasing for the academia? Are there other possibilities? By possibilities I mean other avenues of organisation that embrace the logic of the market. To understand this, I examine the entrepreneurial academia.

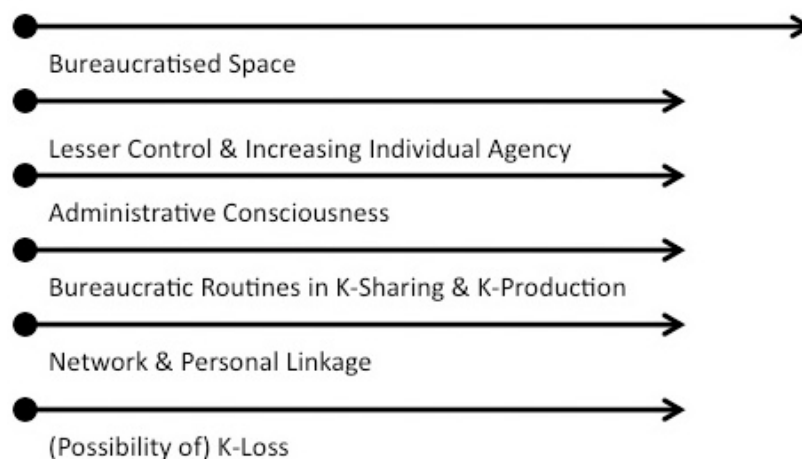
I argue for two analytical typologies, the bureaucratised organisation and the entrepreneurial organisation. An organisation may have both typologies, but when the working of the organisation dictates the goal, the specific typology surfaces. This is the case with the ATMI Polytechnic, which tends to be bureaucratised in its academic sections, but entrepreneurial in the production function to the extent that this consumes the entire logic of the working of the organisation. To set a basis for this, one might ask how I came up with the typology. I looked at organisations not from the issue predefined beforehand, but of the organisation’s layers. The layers are not the realities constructed, but more that of regularities knitted, sometimes strategically, by the actors and the structure. This is the beginning of the focus of analysis. It is possible to do this by looking at the dramaturgical character of the *formal and informal activities* of an organisation. To do this would help to make sense of why actors insist on coming to meetings and labelling them as knowledge sharing forums; however, most meetings end in disappointment, as it is not knowledge being shared but grievances. I then realise that this grievance is more than a signal of the lack of knowledge sharing, that the organisation maintains its repressive bureaucratic decorum as an academia through exercising the research group meeting. In line with Clifford Geertz’s (1981) description of the Balinese ‘theatre state’, the tendency to develop ‘theatre universities’, where ceremonies and bureaucratic formalities are meticulously enacted, can be clearly seen.²²⁵ This hides the lack of innovative thinking and the production of new knowledge as well as knowledge sharing.

The next area of analysis is the *spatial character* of the organisation. An organisation may be located in a geographically bounded area, but access to certain know-how or valuable information is closely intertwined with membership in the social space. Using Bourdieu’s theory here can help. He states that space is a field constituted by positions and relations among participants and characterised by the distributions of capital mobilised in the struggles (Bourdieu 1985; May 2007). Take, for example, the assembling area in the polytechnic, which is geographically an open space, but because the gateway to the know-how depends on the membership of the production process, this space is reproduced as an entrepreneurial space. The argument propounded is outlined in part b of this chapter.

²²⁵ Geertz describes the state ceremonials of classical Bali, referring to them as ‘metaphysical theatre’. He further explained this metaphysical theatre: “theatre designed to express a view of the ultimate nature of reality, and, at the same time, to shape the existing conditions of life to be consonant with that reality; that is the theatre to present an ontology, and, by presenting it, to make it happen- make it actual” (1981: 104).

b. Typology of Academia as a Bureaucratised Organisation

The bureaucratised organisation is the opposite of a professional organisation. The professionals do not substantially control resource allocation even when they constitute the greater proportion of the units of an organisation. The layers that compose the bureaucratised space of an organisation consist of lesser control and increasing individual agency, administrative consciousness, bureaucratic routines in knowledge sharing and production, usage of network and possibility of knowledge loss. These are depicted in Figure 8.1:



(Source: Authors' own construction based on fieldwork)

Figure 8. 1 Bureaucratised Organisation

This type of organisation is subsumed in a bureaucratised space. First, there is diminishing control of the organisation and increasing agency of individuals. By increasing agency, individuals would have two, three or even four posts. He or she would have different name cards. A normal day would be incredibly busy for these individuals, teaching in a university located in central Jakarta, then moving to another post located in Tangerang or even in Bandung. This type of work increases the 'transaction cost' and undermines the positive aspects of knowledge clustering. The tie that binds the membership organisation is not the collective norms, but the fact that it acts as a terrain of competition for individuals. The terrain of the organisation is marked by competition for administrative posts. These posts are not just posts as in a professional organisation described beforehand. These posts have a symbolic meaning, as a source of reward or recognition of achievement to the individual. Moreover, there is also an economic capital attached to this post, with the extra allowance from meetings per diem, the car facilities, and access to valuable information. This may well indicate a past relic of feudalism (Nugroho 2005) being transferred to the day-to-day business of running an academic organisation.

Second, the organisation and the units that make up the organisation are more administrative conscious. They are tied up with managing the university, teaching, which is related more to updating syllabus or presentation materials, attending meetings, and other theatrical decorum. The attainment of credits for the promotion of functional rank is fulfilled for administrative purposes. Consequently, this has contributed to a lack of awareness of the geographical location of the organisation. Although this organisation is located in the heart of industrial cluster, it faces difficulties in moving to visit companies due to the burdensome procedures of using facilities in the academia. The formal structure of this type of organisation exhibits the layers of hierarchy. The informal feature of the organisation, which is often tied with the history of the development of the organisation, exhibits a distinct logic from the formal one. This, in turn, renders the organisation having less control. It is likely that the members of the organisation will expand not in competence, but in numbers.

Thirdly, the allocation of resources for research and capacity building is harnessed through a network. This network is forged from alumnaeship, past work experience either in the earlier projects, government, and other universities or in membership of political parties. There is a formation of groups with different linkages. In some cases, they exhibit a strategic group confiscating resources for a certain project, such as the establishment of a new study programme or the creation of a new research project using the alumnaeship linkage in an area that is far from the current geographical location of the organisation. Networking is usually seen as a necessary condition for knowledge sharing and the production of new knowledge, i.e. innovation (Evers, Nordin et al. 2010; Menkhoff, Evers et al. 2011). The case of Indonesia illustrates that the distribution of resources for research may well be predisposed to be based on connections rather than a merit-based selection.

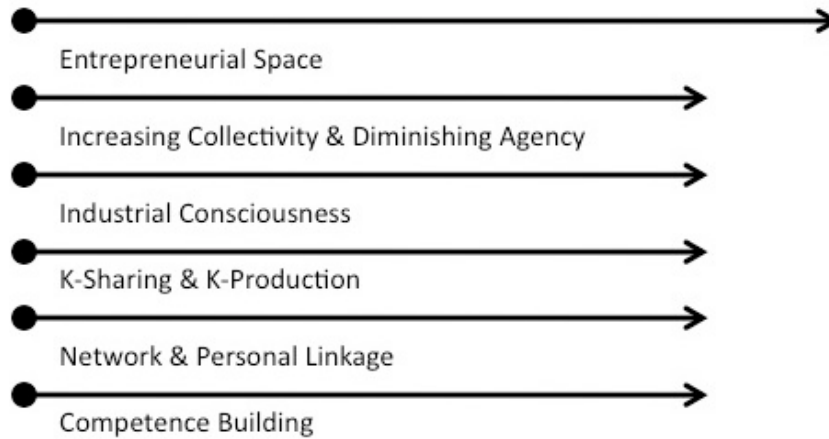
Fourthly, meetings and discussion forums may function as a forum for bureaucratic knowledge sharing, making up the key routines of the organisation. Energies and resources are being spent on meetings to maintain the formal appearance of an academic space whilst in fact the content of the meetings exhibits tension and stress relating to work. Knowledge is produced more in terms of the technical transfer of materials and information to the graduates through teaching. The teaching materials are produced not through research, but by updating the modules, and reading, mostly on an individual basis. If there is good communication between the professionals in the study programme, there is knowledge sharing on the syllabus teaching. Research is not a priority due to the lack of individual motivation, the uncertainty of the funding and the lack of the academia's control over its own resources.

Fifthly, knowledge loss (Evers and Wall 2006) is an issue. As knowledge is being produced in a bureaucratic routine manner to fulfil the functioning of work in the organisation, any knowledge attained in the previous training of the individuals is likely to be lost. This is also the case when an individual is 'poached' or 'hijacked' by other academia to work full time with the offer of an administrative post and/or better pay. In some cases, the pay is so generous that it exceeds the formal salary of a Minister in Indonesia. Cooperation with industries is indeed possible for the subject matter of attaining applied knowledge of the lecturers or for teaching. Yet this is likely to be possible with individual brokerage. The knowledge obtained nonetheless is likely to evaporate. The internalisation of learning within industries does not bring learning to the organisation as a whole. It remains strategically distributed within the brokerage linkage. Due to the 'thick' personal linkage, bureaucratic routines and increasing individual agency, the knowledge attained from collaboration is likely to be lost.

The above layers reproduce and push the bureaucratised space in the academia. A visible observation of this is in the library, whereby the majority of visitors are students reading magazines and sometimes books. The lecturers are either in their rooms, or busy with their hectic schedules. The bureaucratised organisation actively capitalises on knowledge (i.e. the knowledge workers and the students) as an instrumental end: the operational cost of the entire structure of the organisation relies on income based on tuition fees charged to the students or based on the state budget, the lecturers are, despite having the relatively formal higher education background, powerless regarding the resource allocation of the organisation. The peril of this type of organisation is the de-professionalisation and the decrease of the scientific character of academia.

c. Typology of Academia as an Entrepreneurial Organisation

There is also a pull for academia to be more entrepreneurial. This is true particularly in the case of lack of funding for research and the minimum support provided by the state to cover the operational costs. These types of academia provide services to industries, or perform industrial tasks such as taking orders for manufacturing parts. Figure 8.2 describes this type of academia.



(Source: Authors' own construction based on fieldwork)

Figure 8. 2 Entrepreneurial Organisation

This type of organisation is subsumed in an entrepreneurial space. Firstly, there is increasing collectivity of the organisation and diminishing agency of individuals. The organisation has agency over patent applications. The workers also actively market the patents to customers. They will not burden the state budget with the patent's maintenance fees. Books and training modules may be published without the name of the authors. Workers only have one name card and if asked whether they have other name cards they would say no. They would normally work in an office within office hours. This office usually runs a morning shift and a night shift depending on the workload of orders filed by customers. The relative transparency of the decision-making process and the shared norms enable the functioning of the organisation to also foster collectivity. Trust may be exhibited by cooperation between individuals in the epistemic group formed for the improvement of the production process or to process the orders being made. This element of trust is crucial for the sharing of information such as drawing, minutes of meetings describing the flow of the production of the parts as well as requests made by the customer. Knowledge sharing would take place but is likely to be tied with the process of discharging services.

Also, this type of organisation is more industrially conscious and has a great awareness of the organisation's geographical location. This type of organisation would actively approach industries to market their services or their products. They have out-of-town visit projects to reach companies located in industrial estates in Bekasi, or Karawang. This organisation is not administration conscious and the knowledge workers do not pursue administrative posts. The organisation would hold membership in industrial-based associations, such as Indonesian Mould and Dies Association, and active in the implementation of lean production and standardisation norms (such as ISO). These are central themes in this organisation, making it function more like an industry at times.

Additionally, the organisation actively produces knowledge in line with the customers' needs and, sometimes, organisational needs. Organisational needs are usually managed via manpower training. The formation of an epistemic group will be closely integrated with the problem solving need of the customers, thus in some cases the membership of the epistemic group is structured loosely in terms of membership of the meeting that could cut the engineering staff of a company, or a material science. Minutes of meetings and the drawings discussed in this meeting are treated with secrecy. Access to these documents or artefacts of knowledge would only be possible if the individual is a member of the organisation and involved in the process of production.

This organisation also relies on a network based on alumnaeship and past work experience, either via previous work in other companies or sometimes via religious-based networks such as the Jesuit association. There is also brokerage on an individual level. Collaboration with industries is embedded in social relations harnessed on the basis of the aforesaid network; however, the results of the collaboration are returned at an organisational level. These networks tend to be embedded in social relations. The knowledge attained from this interaction can in turn shape and reshape the internal contours of an organisation by integrating the learning system as codified in various ISO certifications in the working of the organisation. At an individual level, learning is kept on the tacit basis.

This type of organisation is likely to expand its competence based on industrial needs. For example, in engineering this ranges from drawing and moulding to plastic injection. Competence at an individual level would typically not be certified following the certification norm developed by the state. The imprint of the competence is evident when there is teaching activity with the students or integrating the drawing-based request of customers with the production or the material testing process. The production of knowledge is closely integrated with the entrepreneurial instinct it develops. For example, typically this academia will not randomly pick a research project and propose a budget for this activity to the state through the DIPA (*Daftar Isian Pelaksanaan Anggaran Negara* /State Budget List of Items for Activity) without making sure it targets a certain segment of customers to market the output of the project. Consequently, the type of research would be applied research and not basic research.

The aforesaid layers increase the reproduction of entrepreneurial space in the organisation, increasing its ability to interact with industries. Tacit knowledge and the knowledge workers are capitalised on for generating income and the organisation's learning. Learning for the organisation is sometimes unintended, as shown by the confusion of the role of the instructor in the ATMI

Polytechnic, as to whether he is a supervisor on the industry shop floor or as a lecturer. The peril of this type of organisation is the decline of the academia's scientific character.

I have so far elucidated two types of academic organisations in Indonesia based on my ethnographic fieldwork. Revisiting the question posed at the beginning of the chapter, what is the realistic mix of organisation so as to enable a strong base of knowledge in the cluster? The answer is far from simple. This requires more than a simplistic policy such as establishing a business incubator in an academia located in the cluster. Unfortunately, this is the current policy of RISTEK in the Jababeka Industrial Cluster, Indonesia. One should look instead at the type of academia in the cluster; an entrepreneurial academia is more likely to tap into the existing knowledge flow in the cluster; whilst bureaucratised academia would be adamant with regard to the knowledge flow in the cluster.

Indeed, the spasmodic characteristics of intellectuals are exhibited in a bureaucratised organisation. Ben Anderson (2010) pointed out that there is a decline in public intellectuals in Southeast Asian countries such as Malaysia and Indonesia. Professors are badly paid, so much so that they end up embarking on useless state funded research projects, moonlighting and being columnists in newspapers (Anderson 2010). This may be the case, but I simply beg to differ with Anderson in regards to the reason why survival of public intellectuals is difficult in Indonesia. It is not (yet) because of the professionalisation of universities and the usage of technical jargon by individuals in the same discipline (Anderson 2010). Before referring to professionalisation of an organisation, one should ask how academia as a social unit in Indonesia endures amid ever expanding bureaucratisation and liberalisation at the 'micro level'. Then after the 'survival question' is answered, which I have attempted to pursue in this chapter, one could discuss Mode 1 knowledge production.

d. Summary

The discussion in this chapter began by posing a question regarding the mixture of organisations that would support the knowledge base of the industrial cluster. The theoretical part of the discussion reflects on a professional and semi-professional organisation. A professional organisation features high numbers of professionals, and the authority relations, where professionals own superior authority on the basis of their knowledge. There is also the reluctance of professionals to take up administrative positions. A semi-professional would have shorter training as they focus more on skills pertaining to administration, thus they have less control. I also revisit the concept of an entrepreneurial organisation in the 'triple helix' concept. The increasing linkage with other 'helixes' reflexively restructures the orientation of the organisation, making it an economic actor.

The issue of bureaucratisation was also a theme discussed by Southeast Asian sociologists. These ranged from the process of bureaucratisation as described by Geertz as the establishment of grandiose educational programmes that later tend to be reductive and handled by several busy civil servants, and a distorted Mode 1 knowledge production in social science research. The Orwellisation, Parkinsonisation, and Weberisation are other types of bureaucratisation epitomising the expansion of government officials in Southeast Asian countries as proposed by Evers. Based on these works I reflect on the bureaucratisation process in an organisation.

The focus of an organisational conception's analysis as proposed here is based on the formal and informal feature, as well as the spatial character of the organisation. The bureaucratized and entrepreneurial organisation is not either/or, it is not a continuum. This type arises when the actual work of the organisation determines the goal. The bureaucratized organisation is characterised by less control and increasing agency, administrative consciousness as mirrored in the pursuit of administrative posts. Knowledge sharing and knowledge production tend to be reduced to bureaucratic routines, network and linkage in this organisation do exist and sometimes facilitate the link with industries. However, this linkage, including the knowledge flowing within, would be subservient to certain groups; knowledge loss is also an issue in this organisation. These rubrics or layers pushed the expansion of a bureaucratic space in the organisation. Contrary to this, there is also an entrepreneurial organisation that is characterised by increasing collectivity and diminishing (individual) agency in its function, more industrially conscious and apt to learn. The organisation has a strong orientation in producing knowledge and competence building closely attached to the market needs. The knowledge sharing in the organisation also reflects this re-alignment to the market. Network and personal linkage are vital components, but these in turn, including the knowledge attained, will link back to the working of the organisation. Subsequently, these layers produce the entrepreneurial space in the organisation.

Thus the issue of organisations such as academia-industries that would bolster the knowledge base of the cluster would need to aim at the concept of the organisation as a social unit, and look at the actual work. Between the types mentioned, the entrepreneurial organisation would be more likely to tune in to the existing knowledge flow in the industrial cluster level in Indonesia.

Chapter 9

The Collaboration between Academia-Industry-Government in the Indonesian Science System: Converging or Diverging?

I embark on this research journey mainly by asking: *how is knowledge produced, shared, and governed between academia, industry and government in Indonesia?* I take knowledge as tacit knowledge and the everyday knowledge production activity of the knowledge workers, and by doing this I manage to delve into the aforesaid inquiry in the context of the Indonesian science system. The term of industries (in the academia-industry-government collaboration) will be restricted to the manufacturing industry, particularly the automotive supplier companies. The main objectives of the thesis are threefold. First, it intends to examine how science policy is carried out by steering knowledge in the institutional, social and regional framework in Indonesia. Second, it aims to show the existing rubrics of linkage enabling knowledge flow in the industrial cluster level as well as to inquire on the importance of location of the cluster. Third, it seeks to provide an understanding of how academia produce and share knowledge, and the process of knowledge exchange with industries. I seek to gauge the issue of knowledge governance in Indonesia using a multilevel approach: it starts from the macro level to inquire about science policy in Indonesia and the progression of regional autonomy in the Bekasi District, then it shifts to the meso level of the Industrial Cluster in Jababeka and scales down to an organisational level of academia.

a. Converging or Diverging?

Is there convergence or divergence in the inter-linkage of the academia-industry-government in the context of science system in Indonesia? I argue that the linkage is diverging instead of converging, leading to the constrained capacity of the science system in Indonesia to localise the (global, tacit) knowledge from the supply chain linkage. This is due to the process of liberalisation and bureaucratisation, which hampers scientific knowledge production and sharing in the academia. On the one hand, the academia is pulled by the control that the state and Jakarta have. On the other hand, the leading companies in the supply chain network control the tacit knowledge flow in the industrial cluster.

I started the introduction by stating the concept of academia-industry-government is prevailing as part of the discourse on the policymakers level in Indonesia. Knowledge as capital circulates and distributed unevenly. It is not simply an issue of *macet*, but also a matter of deflecting pull, which disables the linkage of academia-industry-government in the Indonesian science system. The research is focused on the Jababeka Industrial Cluster in Bekasi District. The location is justified due to the absence of empirical research inquiring into the issue of knowledge flow in this area, the diversity of companies located in the cluster, the need to distance myself from a research site with which I am acquainted, and the fact that the cluster has been referred to as the potential ‘triple helix’ (i.e. of academia-industry-government collaboration) site.

The examination of the state of the Indonesian science system is investigated in chapter two. In this respect I focus on the recent debates pertaining to science policy, knowledge-based cluster development and industrialisation, knowledge flow between academia-industry-government – all of which need to be discussed to look at the knowledge governance issue in Indonesia. In addition, several key terms are defined and the analytical framework is outlined in this chapter. I showed how science policy analysis in Indonesia is lacking in terms of inquiry beyond the policymaking and policy implementation. Science policy is thus defined as ‘norms and policy practices that drive and perpetuate the order of the science system.’ The analysis of science policy looks at the normative facet (of the written norms), social facet (of social structure/interaction between actors in collaborating and/or competing) and regional facet (of the progression of decentralisation). The knowledge-based industrial cluster and industrialisation state of the art review explicates the reasons why industries cluster, namely because of geographical proximity, location, and the importance of spatial proximity for the transfer of tacit knowledge. For the purpose of this research, industrial cluster is defined as ‘industrial agglomeration in a (bounded) geographical space’. As the growth of industrial clusters are pushed by the flow of foreign capital (FDI) in Indonesia (Dahrul and Raybould 2011), the formation of these clusters is likely to be a mixture of industrial agglomeration, in which the industrial plots, services and estate area are managed by private companies. These are exhibited in the industrial clusters located in Bekasi District. The scholarly work on industrial clusters in Indonesia has been enriched by the contributions of disciplines such as economic geography, urban planning, econometrics, and rural cluster study. These studies, as I have pointed out, however do not thoroughly capture the link with the overall macro policy level as well as horizontal linkage (of both academia-industry collaboration and the inter-firm linkage). Indeed, this is the gap evident within the existing industrial cluster studies in Indonesia. I utilise the concept of knowledge cluster to examine the industrial R&D capacity of the cluster as well as the existing linkages of knowledge flow on the industrial cluster level. The thesis takes insight from the ‘triple helix’ theory, which postulates that,

inter alia, academia can play a key role in innovation within the knowledge-based society (Etzkowitz and Leydesdorff 2000). The theory gains support from Luhmann's social system theory (1995). It is a biologically informed theorem (see among others: Leydesdorff 2004). The second approach in looking at the role of academia-industry is the Mode 1 and Mode 2 forms of knowledge production. Mode 1 is the traditional disciplinary knowledge production, whilst Mode 2 is the knowledge being produced goes outside of the disciplinary boundary essentially disintegrate the demarcation lines academia and industry (Gibbons, Limoges et al. 1994). The scholarly analysis of academia-industry horizontal linkage in the knowledge cluster in Indonesia has not been carried out comprehensively. The majority of the work has been focused on the university, instead of vocational education's role in the linkage. Despite gaining insight from the 'triple helix' theory, I disengage from this theory by gauging the two levels of analysis: the first is how academia produces knowledge and how the existing social structure (in the organisation) steers such production and sharing, and second, how academia responds to the notion of changing space and scale. The key terms used in the thesis are then defined. They cover the academia-industry, knowledge, knowledge sharing, knowledge exchange, horizontal vertical linkage (of knowledge flow), and core-periphery. The analytical framework is built using the extended case study method (Burawoy 1998). I observe units as social units and situate my study among the agency-structure continuum in sociology. In an attempt to be consistent in the multilevel analysis, I look at actors, institutions, patterns, space, knowledge and territory. The analytical framework cemented the basis for me to undergo the analysis.

The first pull that leads to the divergence of linkage is the centralisation of the science system by the state. The science policy analysis shows even after the *reformasi* period in 1998 that the science system in Indonesia is largely centralised. To inquire further as to how and why such centralisation by the state persists, I concentrate on 1) how the state is manifested in the normative facet as reflected in the normative policy analysis, and 2) the manifestation of policy as practices in the social facet as demonstrated in competition and collaboration. The examination yields to the reality that the state maintains its grip on the scientific knowledge production of academia, and the policy harnessing the academia-industry collaboration is fragmented due to the hype of liberalisation in the industrial sector as well as the higher education sector. In addition, there are existing and active partnerships the state has in building alliances with other countries, in this case Japan. These shape the normative facet of science policy. The social facet of science policy (policy being defined as practices) portrays the way resources in the science system are deflected: the structure, namely the preference for *Widjojonomics* (i.e. of cheap labour and natural resources) and small projects of research prevailed, the spatial disparity of knowledge-producing organisations, which are mainly located in Java Island, and the control Jakarta has through the patronage linkage and the bureaucratisation process.

The regional autonomy progression reifies the first pull of the centralisation process from the *pemerintah pusat* (or central government). I focus on the Bekasi District, which hosts the majority of industrial clusters located near the capital of Jakarta. *Pemekaran* (or the splitting of administrative unit) enables the utilisation of the geographical space for the competition of resources among the bureaucratic elites. The question is aimed in the direction as the prevailing capacity of the District Government of Bekasi in steering the knowledge base of the cluster. I examine the progression of the West Java special economic zone planning, the bureaucratisation process of the district government, and the knowledge production exercised by way of personal linkage. These contribute to the centralisation process, disrupting the efforts to build a strong knowledge base in the Indonesian science system.

The second pull straining the linkage is the control of supply chain linkage in the tacit knowledge (for the production process) and the influence of such linkage in terms of attaching the importance of location to the cluster. For the former, the location is the prime magnet of the Industrial Cluster of Jababeka. As the cluster functions more to facilitate the supply chain, it lacks the capacity to emerge as a knowledge cluster. The output is not new products developed within the cluster, but more tacit experiential knowledge. By focusing on the issue of location, I observe first the way the cluster is physically developed and the tension in the social relations of the actors. The main concern of the Jababeka Group is in discharging services and marketing the industrial plots. The planning of the cluster, which includes the industrial cluster, the residential city and the city, is carried out by the Jababeka Group. The companies under the auspices of the Jababeka Group provide services ranging from electricity and wastewater management to organising social events such as weekly tenant's meetings. The Cikarang Dry Port facilitating the shipment of goods to the Tanjung Priok Port started to function in 2010. Tension is also apparent. There is a rapid change of land title functions from agricultural paddy fields to factory areas. There is also some tension between the Jababeka Group and the District Government of Bekasi, signalling the possibility of conflict related to land titles. Relations between ethnic groups are also not easy, with tension between the Madurese and the local natives Bekasi. The segregation of residential areas is also apparent. These earmark the privatised spaces and tension in the location of the cluster, as the cluster by large is planned by the Jababeka Group. The second one is the importance attached to the location due to the spatial proximity with customers, facilities and the collocation with similar industries. I situate this in the context of supply chain network. First of all, as the cluster is formed as an industrial agglomeration, it is not organised thematically nor it is pushed by the 35 thematic cluster policy of the Government Regulation No. 28 year 2008 on National Industrial Policy in Indonesia. Second, The Jababeka Industrial Cluster physical

progression is reflected in the divide of core, which is the Jababeka Phase I, and the periphery, which is the Jababeka Phase II. The periphery is connected with the core in terms of the production of goods and parts as well as providing services. There are also areas of 'nested clusters' in the spatial peripheries of the cluster. Furthermore, due to the fact the cluster suffers from a lack of Industrial R&D and formed to facilitate the supply chain, the output of the cluster is not new product development but rather tacit experiential knowledge. For the latter, I argue that the control of the tacit knowledge is exercised by the leading firms in the supply chain. Such control depicts how tacit knowledge is governed in the vertical linkage. This tacit knowledge pertaining to lean manufacturing and production process is controlled within the Japanese *keiretsu* of vertical linkage between automakers and the automotive suppliers. The linkage is vertical due to the character of the *keiretsu* linkage, the thick (cultural) Japanese lean management practices and trust. This linkage of knowledge flow harnesses the cultural space between the customer and the suppliers, whereby the process of knowledge is not dictated by geographical proximity. The embedded horizontal linkage of knowledge flow exists within the 'nested cluster'. In this area small and medium-sized companies are cooperating for the daily problem solving activities. The embedded linkage is built based on alumnaeship or past work experience. It is within this nested cluster that the companies reap the gain of clustering, due to the spatial proximity enabling the exchange of tacit knowledge. The horizontal linkage between industry and academia is restricted and limited. This is due to uncertainty, lack of technical experience, lack of experience of the experts from academia and the lack of a need to engage in the cooperation, as most of the knowledge is imported from the principal companies. In cases where cooperation with academia does occur, it mostly takes place in regards to pure material engineering, testing of parts or internships. This cooperation forms a social space of interaction whereby it is fostered by alumnaeship and expertise. Authorisation and support from the top level company also enables the incorporation of expert advice (i.e. tacit knowledge) to the production process in the shop floor. Building a strong knowledge cluster in this 'industrial agglomeration' pulled by the supply chain thus requires nurturing the horizontal linkage between industry-academia, and between companies in this inter-firm linkage.

The third one is academia being pulled by the process of bureaucratisation and liberalisation. This pull hampers scientific knowledge production and sharing within academia. Bureaucratisation is the process whereby the actual work of the academia mimics the work of government bureaucracy with the competition of *jabatan* and the every-day administrative routines. I focus on organisational ethnographic work of academia located in the Industrial Cluster of Jababeka to pursue this line of argument. The first organisational inquiry is President University (PU). The story unfolds by the empirical inquiry of PU as an organisation 1) that is deprived of control over resources in its

organisation, and 2) where knowledge production and formal knowledge sharing forums are exercised to maintain the academic decorum. To substantiate the argument that PU is deprived of control, I carried out a strategic group analysis of the effort to establish a defence strategy undergraduate programme. The analysis illuminates that there is cooperation between different linkages of military, Foundation of PU and LEMHANAS (National Defence Institute) alumnae to attain a source of knowledge in the form of graduates. The rationale for the establishment of the study programme came from the centre, i.e. Jakarta, instead of taking into consideration the characteristics of industry located near PU. This fosters the bureaucratised space in the organisation, where a state maintains control through the informal linkage. PU's everyday shape is as the ninth company of the Jababeka Group Company. The patrons acting under the guise of the company are making sure that it has control over the resources (in this case it is funding and administrative positions in PU). PU has a strong knowledge asset in the form of knowledge workers with relatively high educational backgrounds, but the majority of them do not engage in research-based and publication activities. The everyday knowledge production is restricted to teaching and disrupted by the competition of *Jabatan*. Informal meetings are functioning more as a forum of knowledge sharing. The formal meetings, including research meetings, are held as an administrative-bureaucratic practice. They are held to maintain the academic decorum, to represent in a certain degree of reality that the university is an academic organisation. The collaboration with industry, in this case Mattel Company, for project of improvement (*kaiizen*) in manufacturing process and night classes was made possible also due to knowledge gatekeeper role. The gatekeeper role is focal due to the 1) four administrative posts being held, which have symbolic capital, and 2) the conversion of this capital into social capital through good relations with the patrons in Jababeka Group and with the key level management in PU. The knowledge from Mattel, however, is retained in the tacit manner and practiced only in its teaching routines. The process of bureaucratisation is restraining PU in terms of scientific knowledge production and knowledge sharing. The competition of *jabatan* as well as the protruding control of Jakarta into the day-to-day business of running an academia push the bureaucratised space whereby the university is insular in terms of the collaboration with the surrounding industries.

The second organisational investigation is the ATMI Polytechnic Cikarang, which is further integrated into the market. This is the liberalisation pull. The reality projected in the ATMI Polytechnic is the opposite of what was intended. Instead of a production-based education system, it is an education on the basis of production system. The dilemma is that the entire rubric of the knowledge production process is tied with its work orientation of parts manufacturing. The tacit knowledge is thus produced by the knowledge workers, particularly the instructors from this parts manufacturing. The closer the knowledge worker is to the production function in terms of work, the more likely he or she will be

able to access the knowledge from the assembling area. This assembling area is an entrepreneurial space where discussions pertaining to the parts being produced take place between the industry staff and instructors or the employees of the production units. The order of the parts manufacturing is governed by the factor of alumnaeship, *pedagogy ignasiens*²²⁶ and good relations (*hubungan baik*). Yet once the production facet takes over the entire rubrics of the organisation, the education facet becomes secondary. The collaboration with ISE Company is enabled due to the factor of alumnaeship. The physical distance between ISE Company, which is located in Tangerang, Banten, and the ATMI Polytechnic in Cikarang, Bekasi seems to be dwarfed by the thick embedded social relations driven by alumnaeship and good relations. Most of the knowledge attained is for problem solving, and parts manufacturing process. The knowledge is then stored in tacit format, staying with the individuals who have been involved in the production process. The polytechnic survives as an entrepreneurial organisation, instead of an academic organisation. Its collective feature is inherent in the daily work of the organisation. There is no way to supplement income that would divert the individuals from their hectic work schedule. This collectivity is built on the basis of alumnaeship, ethnicity and language (Javanese), shared commonalities of work and area of living. Career mobility in the organisation is difficult due to the wide skills demanded from the job order character, lack of research and development activities. The tacit knowledge codification (i.e. making it explicit in the teaching syllabus) and specialisation of profession are arduous. Instructors prefer to hoard their knowledge in a tacit format and identify themselves as part of the production directorate rather than the education directorate. Knowledge sharing through project meetings is the main facet of the organisation. The process of knowledge sharing is through face-to-face contacts and exercised, just like in industry, by way of storytelling and visualisation. The survival of the organisation thus hinges on its entrepreneurial-industrial character.

I assert that this third pull produces two types of academia: the entrepreneurial and bureaucratised academia. I argue that the possibility of tapping into the knowledge base of a cluster is within the entrepreneurial organisations. As a researcher, I am now at odds with the question of what is distinct with academia as a knowledge-producing organisation. If it is not heading towards professional organisation, thanks to bureaucratisation, and if it is integrating even further towards the market, making it more entrepreneurial, to what extent can knowledge produced by academia in Indonesia contribute to the knowledge base at the industrial cluster level? Thus this research has contributed to more ignorance; by throwing light on an unknown, more ignorance is yielded. To come up with this model, I detach myself from the system theory-inspired 'triple helix' model of entrepreneurial

²²⁶ This essentially means that the learning of the students is prioritised when it comes to parts production (see chapter seven for further discussion).

organisation and the professional organisation model. I observe organisations from the layers that are not constructed realities but the daily regularities that are moulded by the actors and the structure. It is the actual work of the organisation that determines the orientation. The analysis is built on two notions: the dramaturgical character of the informal and formal activities of the organisation and the spatial character of the organisation. The bureaucratised organisation is the antithesis of professional organisation. It is marked by lesser organisational control and increasing individual agency, and it administrative-conscious in terms of daily work. Knowledge production and knowledge sharing are reduced to bureaucratic routines and disturbed by the pursuance of the administrative posts. The bureaucratised organisation is susceptible to knowledge loss, due the fact that the individuals often hold numerous jobs. The tacit knowledge pertaining to the production process attained from the collaboration with industries is likely to be distributed within the thick linkage of actors and groups working in the organisation. The bureaucratised space of the organisation makes it adamant about interaction and collaboration with the industry located in close geographical proximity. Conversely, there is increasing control and collective agency of the entrepreneurial organisation. The organisation has a strong orientation in producing knowledge and competence upgrading closely aligned with the market's needs. It is industry-conscious in its day-to-day work. The organisation responds to the notion space by creating an entrepreneurial space activated through out of town visits, for example, or the linkage of alumnaeship. It is more responsive to the surrounding industries located nearby in terms of collaboration. The expanding process of bureaucratisation and liberalisation may lead to the decreasing feature of science in academia in Indonesia.

These three pulls: the centralisation by the state as reified in the science policy, the supply chain linkage affecting the cluster's importance of location and the control of tacit knowledge, and the liberalisation and bureaucratisation of academia are leading to the divergence of academia-industry-government collaboration. *The science system is thus rendered powerless:* the more the science system (including the industrial system) is liberalised, the more likely academia will be integrated into the market and the tacit knowledge will be controlled by the leading key firms in the supply chain. The more the science system is controlled (by the state), the more the academia will be predisposed into bureaucratisation. The more resources in the form of research funding are poured into the science system, the more predisposed these resources will be to being cut into tiny projects, squeezed, deflected yet centralised in Java Island, Indonesia. This divergence is making the science system in Indonesia too paralysed to utilise knowledge from the global supply chain for the development of the science system.

b. Implications for Scholarship & Future Area of Research

The implication of this research is the need to revisit the concept of professional organisation in studying academia in the Indonesian science system. Instead of creating the expectation that academia produces knowledge in the Mode-1 sense, one should look into the actual day-to-day knowledge producing activities of knowledge workers. Indeed, publications and patents can be used as yardsticks to measure the intensive knowledge-producing activity of the knowledge workers. However, social structures enabling collaboration and competition in the academia cannot be answered by this concept of professional organisation or the aforementioned yardstick. Future research areas could be the investigation of other typologies of academia in the Indonesian science system.

Furthermore, this empirical investigation has yielded the results that the tacit knowledge for the production process is controlled in the supply chain linkage, and the existing flow of tacit knowledge in the inter-firm linkage located in the nested areas of the cluster. Thus studies showing that the inter-firm linkage is lacking²²⁷ (Sato 2000; Supratikno 2001) in the industrial clusters in Indonesia should be revisited empirically in the field. Future investigations into the potential of industrial clusters in Indonesia should instead aim to look at these industries, which are usually small and medium-sized industries located in spatial proximity to one another, and their capacity for generating knowledge and exchanging knowledge related to their production. The next issue is to what extent does this tacit knowledge in the ‘nested clusters’ enable the company’s capacity for upgrading process in the supply chain linkage or alternatively for them to be able to innovate in parts or product development with its own OEM (original equipment manufacturer). This requires further investigation in the future.

Next, as a scholar who had studied law beforehand, I found that the study of state and policymaking in science has yielded an intriguing result. The state is not neutral; it actively seeks collaborations with other parties, such as JICA, to pursue the economic liberalisation agenda. The term ‘state’ also should not be locked into a singular notion. One needs to break it down into groups and actors, such as bureaucratic elites, and the process whereby the resources of the science system could be channelled in this (informal) linkage of the state. Science policy studies should take into account these contextual notions beyond the normative dimension of merely emphasising the implementation of policies. The perverse centralisation then posed the question, where to next for post-authoritarian²²⁸ Indonesia? The term ‘post-authoritarian’, which I initially wanted to use as a title of the thesis, is now turning into

²²⁷ Sato’s (2000) inference, based on the study of cluster in rural cluster, is that there is a lack of inter-firm specialisation in the process of production, and no cooperation in technological development. Also, with the work of Supratikno (2001) whereby he showed that there is a lack of cooperation among producers in the cluster.

²²⁸ Post-authoritarian is the term I use to refer to the period after Soeharto’s demise.

an oxymoron, as centralisation in the science system is still perverse and the bureaucratic elites seem to control the resources accrued by the decentralisation process. Then what is the overall benefit of decentralisation for the science system in Indonesia? These are topics of interest for future research endeavours.

c. Recommendations based on Research Findings

Based on the research findings of this thesis, several recommendations are proposed. First, it is imperative to decentralise the science system in Indonesia. This can be carried out by involving existing professional associations²²⁹ and the private sector (i.e. private companies) in the research proposal selection as well as thematic research agenda. Second, a quota should be in place to allow a ‘special and differential treatment’ for universities and R&D institutes outside of Java Island to apply and attain research grants. Third, regulatory reform pertaining to industrial policy is crucial, especially in regard to attaching more coherence between industrial-based policy with the standardisation norms used in the engineering process. Fourth, a moratorium of the *pemekaran* (splitting of administrative regions) is important, as this will enable the central government to allocate budget from the special or general allocation grant to development-related posts in the APBN. This moratorium can only be possible if it is pushed from Jakarta, as it still yields a considerable influence over the regions (*daerah*). Fifth, the design of applied research should subscribe to different indicators that are linked directly with the industrial needs. This design should be developed with organisations that are entrepreneurial in character, including polytechnics and R&D institutes. Sixth, a reasonable level of salary for lecturers and researchers for academia is required. This should be supported by the central government, as the regional government is normally relatively curtailed in the education-related budget posts. The measure would ease the active supplementation of income and perhaps the competition for *jabatan* that exist within bureaucratised organisations.

As a concluding remark, the Industrial Cluster of Jababeka in Indonesia is located among two powerful axes. This first axis is the core in Jakarta, controlling its grip through the patronage linkage, the bureaucratisation process, and funding for the academia. Yet as the local production process in the cluster is likely to be a part of the global production system, another axis has to be taken into account, namely the leading companies controlling the supply chain linkage (as part of global production system). These two axes control the flow of knowledge as capital in Indonesia.

²²⁹ There are several professional associations that relatively active in Indonesia. This includes the Indonesian Planner Association (*Ikatan Perencana Indonesia*), the Indonesian Doctor Association (*Ikatan Dokter Indonesia*).

Appendix I

Research Method

This is a participatory, ethnographic and multilevel research, starting with large areas scaling down to smaller areas and population. It takes a participatory stance and derives the process of analysis and engagement in the field from the extended method (Burawoy 1998). It is expected that this method will be able to grasp the interaction between actors and structure in the cluster and gain a view of the bottom up process.

Participatory approaches can be defined as flexible, process oriented methodologies which combine a set of interactive techniques (see Mitlin and Thompson 1995). This method is also applicable to urban areas such as Jakarta Metropolitan Region.

The extended method, as propounded by Burawoy, applies a reflexive science mode of ethnography. According to Burawoy, reflexive science ‘extract the general from the unique, move from the ‘micro’ to the ‘macro’ and connect the present to the past in anticipation of the future, all by building on pre-existing theory’ (Burawoy, 1998:5). The implications of using an extended method in the overall rubrics of analysis in the research is *firstly*, one will encounter a dialogue form of discussion between the researcher and the respondents; *secondly*, critical thinking, I often asked myself whether the rendition or analysis of data is accurate, whether the questions I have asked suffice and are sufficient as a follow up. I also ask myself if the theory makes sense to frame the analysis, or conversely whether one can rely solely from (western) social theory. The latter most resembles the situation I have in the field especially in respect to social system theory underpinning the ‘triple helix’ theory. *Thirdly*, I acknowledge that my entrance to the field is also influenced by who I am. I am a female Indonesian, who speaks fluent Indonesian language and mildly *ngoko* Javanese language. The fact that I was working in the Indonesian Institute of Sciences (LIPI) may have contributed to the availability of some slots for interviews with experts. Of course this is with the exception of availability of experts in DIKTI. However, the fact that I did my fieldwork later on in the Industrial Cluster of Jababeka helped me maintain a certain distance with the field, which I needed for critical thinking.

The multilevel approaches are operationalised as ‘macro’, ‘meso’ and ‘micro.’ At a macro level, the focus will be on the Jakarta Metropolitan Region. I interviewed experts and policymakers in the capital city of Jakarta, Tangerang as part of a preliminary study of the PUSPIPTEK Science Park,

Bekasi District Government Officials and West Java Provincial Government in Bandung. These areas make up the 'macro' sites. A general preliminary hypothesis based on the expert interviews and observations is garnered in the macro level. In the 'meso' site, the focus is on one industrial cluster namely the Jababeka Industrial Cluster. Being trained to think as a sociologist, I firmly believe that to ground an analysis on a 'meso' or 'macro' level, micro level observations offer an important contribution of the 'meso' or 'macro' level analysis. Thus, in the 'micro' site, the ethnographic research was carried out in three organisations, the ATMI Polytechnic in Cikarang, President University and a Japanese transplant company. Drawing insights from micro level observations by following the researchers in their laboratory as in Knorr-Cettina's work (1999) and Latour's work (1987), I followed the day-to-day work of instructors in ATMI Polytechnic, lecturers and administrative staff in the President University and the TPS agents in the company.

Here I will explain the range of methods I used for data collection including the extent of the data. The research itself used a combination of quantitative and qualitative approaches. Triangulation of both enables the analysis of data. Triangulation is a 'combination of methodologies in the study of the same phenomenon' (Denzin 1978; Jick 1979). The range of methods used allows multiple viewpoints for greater accuracy (Jick 1979).

In total, the duration of fieldwork is 10 months, from the 1st of May 2010 to 25th of February 2011. Throughout this time, I managed to carry out in-depth interviews with 147 respondents. Of these interviews, only 1 interview was conducted by my research assistant. The interview duration ranges from one hour to two hours. The interviews themselves can be classified into three types. Firstly are expert interviews. I interviewed experts namely individuals who hold years of experience in his or her field. Also included are the policymakers who hold structural positions or higher echelons. I relied on their years of experience and as much as possible I asked them to reflect on their experience. Some of the output of the expert meetings thus is storytelling, where the experts foretell his/her narratives of experiences. The questions for the expert interviews were prepared beforehand, yet they remained open-ended so that follow-up questions in response to answers equipped the discussion. Secondly are semi-structured interviews conducted with respondents working in companies, and in the higher education organisations. Semi-structured interviews are suitable for the exploration of perceptions and opinions of respondents with regard to complex issues, in addition, further follow up questions to clarify answers and information are possible in this method (Bariball and While 1994) The questions function as a guide for the discussion. Thirdly are unstructured interviews. Unstructured interviews were carried out as I delved into further inquiry of the type of capacity building provided by the automakers to their suppliers. It does not make sense to ask the same question from one

automaker to another, as the company philosophy is different from one to another. For example, the Honda company principle is: “Maintaining a global viewpoint, we are dedicated to supplying products of the highest quality, yet at a reasonable price for worldwide customer satisfaction” (Honda 2012). What implication does this have for capacity building provided to the suppliers in Indonesia? The implication is that capacity building is tied with the procurement/purchasing division. This is distinct with the Toyota approach. Thus, the questions asked to the automakers and some of their suppliers cannot be structured in a uniform manner. In addition, several of the questions are based on the findings of the semi-structured interviews and expert interviews. A generic question would be untenable as the findings sometimes point to different directions. The unstructured interview enables further exploration based on the distinct automakers philosophy, and field research preliminary findings/instant hypothesis. I maintained the anonymity of the individuals and in some cases the organisations of the respondents.

Distribution of Interviews

No	Type of Organisation & Companies	Number of Organisations	Number of Individuals
1	Ministries & Governmental R&D Institutes	11	25
2	Bekasi & West Java Local Government	2	10
3	Companies/Industries ²³⁰	49	82
4	President University	1	11
5	ATMI Polytechnic	1	13
6	Other University	1	1
7	Other Relevant Private Sector	2	5
	Total	67	147

I also benefitted from observation. Two types of observation were utilised, which are documented in the field notes. The non-participant observations were carried out intermittently during interview sessions and during various meetings and seminars. In total, there were 27 meetings/seminars that I have attended. I maintained myself as an outsider yet observing the field. I observed the meetings, who talks to whom, and how does one react to a certain proposition brought by another participant. However, it was the numerous informal conversations with individuals during coffee-breaks, or during lunch which were significant data sources. Participant observation was carried out in a more systematic manner in three organisations, a Japanese transplant company for a week, President University for three months (18th of August 2010-15th of November 2010), ATMI Polytechnic for three months (16th of November 2010-17th of February 2011). The internships allowed me access to the day-to-day interactions of the organisations. The fact that I live in the residential area in the

²³⁰ I, however, do not use all of the data for the analysis of chapter six. I used 73 interviews, from 44 automotive supplier companies and 3 automakers.

Jababeka Industrial Cluster enabled me to interact with my key informants. Several of my key informants live in an area close to me. I gained insights from his/her view as an insider of the system. During this ethnographic work, I breached the norm of positive science. I was involved in some of the work in the organisations. For example, I assisted in the breakfasting (*buka puasa*) event organisation. Thus, I was intervening (Burawoy 1998) in social situations and interactions. I was also involved in the daily routines of the organisations. Travelling to the office at 7.30 in the morning and staying as an intern up to 5 in the evening enabled me to build ties of friendship with my respondents. Sharing the same office space with the administrative staff also exposed me to the same emotions such as disappointment aired when they were reprimanded for not carrying out tasks beyond their 'job description.' These situational experiences brought me to breach the second norm of non-standardisation of the field/questions (Burawoy 1998). I documented all the numerous informal conversations in the canteen, or in the halls in a small notebook. This habit has yielded a nickname for me in the field, as a *tukang kredit* (or moneylender). A moneylender in the *kampung*/rural area setting would write down the liability of the person owing a sum of money and the symbolic ownership of capital that the person might have. I write down the daily discussions in my small notebook and afterwards I transfer them to my field notes.

01.02
 Tanggal ~~02.02~~ Tahun 2011

Hari _____

divisi ini.

- fungsi dan toleransi : standar tetap, pengujian juga tahu.

obs: menta sering menyebut 4/ mengabaikan skala, toleransi dari banang itu pakai feeling

→ observasi di assembling (banyak karyawan yg kumpul disana).

ngobrol: Tahap ⑤ positioning, radius wire cut, k → ini disimpan di kepala.

Dalam cebukan 3 mold yg di gunakan.

Kembali ngobrol dgn mas [redacted]

- Proses pembelajaran, pembaruan jika ada gambar baru atau teknik baru
 - └ baik teknik proses
 - └ teknik assembling

ini semua disimpan di kepala

- Kompetensi penguasaan milling tdk pernah dikor, tidak di training oleh ATMI.
- Saya sebagai karyawan, disini lebih seperti industri.

Ngobrol dengan mas [redacted]

- Sulit 4/ menuliskan secara tertulis pembelajaran
 - ① baru karena tidak biasa

obs

ini fakta/bukti bahwa pengetahuan disimpan

Source: Author's own field note²³¹

²³¹ As evident in the field note, I use the term 'ngobrol' or informal discussion with my respondents in the field. I discern 'ngobrol' with my participant observation which I often abbreviate with 'obs' or simply put as *observasi* in Indonesian language. Most of my field notes are in Indonesian language. I mask the names of the respondents to maintain anonymity.

Based on the observation and the interviews, I use interpretive sociology (*verstehende soziologie*) to construct explanatory case studies. Case studies, as a research strategy, attempt to observe the following: a) recent phenomenon in its real-life context, particularly whereas b) the boundaries among phenomenon and context are not distinctly obvious. I utilise an explanatory case study (Yin 1981: 61) by explaining a rendition of accurate facts and at the same time tie it with a certain issue.

I held two focus group discussions with my respondents. They were organised to discuss network mapping of influential actors in the organisations, namely of ATMI Polytechnic and President University. In each of the group discussions my field research assistant and I used magnets as a medium to show the influence rate of actors. I tried my best to ensure representation to ensure a fruitful discussion. As it happened the discussion was fruitful, what was difficult was asking some people who disagreed to agree on how many magnets were accorded to a certain actor. The group discussion is also a worthy source of information in terms of a guided discussion on a particular issue such as funding or learning from companies.

This study also utilised archival work and written documents. I analysed regulations, existing normative laws pertaining to industrial policy, local finance (*keuangan daerah*) and science policy in 2010-2012. I also examined the planning documents of the Ministry of Industry, RISTEK, BAPPENAS, Ministry of Manpower, Bekasi District Government, as well as West Java Provincial Government. The minutes of meetings documenting the progress of bonded zone plan provided by the Bekasi District Government and West Java Province also provided valuable facts. The Jababeka Company and President University provided the data on company size, business sector and company origins. I combined these with the GPS Coordinates for the cluster analysis.

There is also a range of quantitative based data to help in explaining social interaction and in generating general statistical inferences. The inferences garnered from the statistical tools helped me in making sense some of the operational sub research questions or to test the instant hypothesis such as the pattern of knowledge sharing in a bureaucratised organisation. The identity or race of the researcher is an important factor in these types of survey research. The social setting, various local vernaculars or terminology used are also an advantage for the revision and testing of the questionnaire. Survey research should not be treated as a detached 'clinical' exercise. One could reflect on the study carried out by Caplan and Meyer (1967) where they tried to investigate the causes of the Detroit Riots in the U.S (Younge 2011).²³² For the purposes of data collection they drafted

²³² The study was, according to Younge, revelatory. It shows that the predisposition of the riot was not due to correlation with economic status, educational background, or with the immigrants coming from the south. The main concerns of

questionnaires after the fieldwork and specifically trained 30 black interviewers to go to the field. Each day the interviewer would send the results (Younge 2011). Thus, identity and understanding local terms/insights from fieldwork are beneficial for drafting the questionnaires and obtaining more feasible results.

The range of primary quantitative data collected is as follows:

- 33 questionnaires from a total of 47 lecturers and instructors in ATMI Polytechnic.
- 46 questionnaires from a total of 60 lecturers in President University.
- 53 questionnaires from a total of 200 supplier companies at the second tier of the automotive supply chain. I based the data on 8 first tier companies.

There are also other secondary statistical data which was of use. This data was collected from the Ministry of Industry, BPS, BKPM, and the Ministry of Finance websites as well as reports. This data typically covers the import-export data, state government revenues, spending in budget for education, the number of universities in Indonesia as well as district government spending. I also analysed the budget allocation for research in the *Insentif* RISTEK research grant 2008-2010.

A field research permit was attained from the Bekasi District Government to undertake fieldwork in the Bekasi area including in the Jababeka Industrial Cluster. Ethical consideration was also a vital part of this research. I took into account the issue of confidentiality and gained informed consent from respondents. Before recording the interview, I always asked the participant whether he or she agreed to have the interview and if so, whether the interviews may be recorded. The participants usually gave spoken agreement or a gesture such as a nod of the head. The data collected was kept in confidentiality and utilised solely for the purpose of research. All of the respondents are referred to anonymously. In some cases I also do not mention the place of the interview or observation. I simply refer to the month and year. The names of the supplier companies are also referred to by initials in this research. I asked for approval to use secondary data and pictures from the suppliers companies. In one instance, I was asked to return the data, as the company policy did not allow research based on this data. Of course, I returned the data to them and stated that I would obliterate any copies pertaining to the data given by them. Carrying out research in these companies is challenging and can require quite a degree of intellectual and fieldwork stamina. I was assisted by my field research assistant who was also persistent and luckily she did not easily take 'no' for an answer either.

resentment were police brutality, congested living conditions, poor quality of residential areas as well as insufficient jobs (Younge 2011).

In summary, these methods of quantitative and qualitative research facilitate the multilevel, participatory and ethnographic analysis conducted to answer the main research question of this research.

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