第 5 章
企業の能力形成をいかに分析するか
－イベント分析を用いた縦断的研究－

藤田 麻衣

要約：

近年、企業にとって、「能力」が重要な資源のひとつであることが広く認識されるようになったにもかかわらず、現実に企業がどのようなプロセスを通じて能力を蓄積していくのかのか、実証的に分析した研究は数少ない。その背景として、これまで、中長期にわたる企業レベルの能力形成のプロセスを分析するための方法が工夫されてこなかったという点があげられる。本稿は、企業レベルの能力形成を分析するアプローチとして、イベント分析を用いた縦断的事例研究という方法を紹介する。筆者のベトナム二輪車産業におけるフィールド調査に基づく研究に基づき、このアプローチを用いることによって、この分野の多くの既存研究にみられるような特定の一時点を対象とした分析と比べ、格段に複雑かつ動態的な能力形成のプロセスを描き出すことが可能になることを論じる。

キーワード：企業　能力形成　学習イベント

Event-Based Longitudinal Research for Studying Trajectories of Firm-Level Capability Formation

Mai Fujita

Abstract:

"Capabilities" are now widely recognized as one of the key strategic resources for firms. Yet, we still know very little *empirically* about how firms go about accumulating their capabilities over time, primarily because of the methodological constraints associated with studying the dynamic and evolutionary process of capability formation. This paper reports on how the event-based retrospective case study methodology can be applied to analyzing the dynamics underlying firm-level learning processes and mechanisms. By drawing on the author's field-based research on the Vietnamese motorcycle industry, this paper shows how this methodological approach may present a picture of firm-level capability formation trajectories that are substantially more dynamic and complex compared to that presented by the existing research based on "snapshot" analyses covering short periods of time.

Keywords:

capability, firm, event-based analysis

1. Introduction

In today's globalized and competitive economy, one of the key strategic respirces for firms is "capabilities"—or resources needed to generate and manage innovations, including skills, knowledge and experience, and institutional structure and linkages (Bell [1984]; Lall [1992]; Bell and Pavitt [1995, 1997]). Firms need to continuously improve on their capabilities if they are to survive ever intense competition at home and abroad. This is no less true of developing country firms than of firms that are close to the technological frontier.

How do developing country firms go about accumulating their capabilities over time?

While a large number of studies have modeled capability formation paths as sequential stages for firms to follow, we know very little *empirically* about how capability formation in practice proceeds *over time*. The bulk of the existing research has ended up simply showing either the status of firms' capabilities at particular points in time of changes in short periods of time. This paper argues that one of the reasons why the existing research has failed to go beyond "snapshot analyses" has to do with methodological constraints—i.e., methodological difficulties and high costs associated with studying capability formation trajectories *over time*. In this light, this paper is concerned with the *methodological approach* to analyze the dynamic and evolutionary process of firm-level capability formation. As an attempt to develop a methodological approach for implementing "deliberately designed longitudinal research" that Bell [2006] proposed, this paper reports on how the event-based retrospective case study methodology can be applied to analyzing the dynamics underlying firm-level learning processes and mechanisms. To this end, this paper will draw on the field-based empirical research on capability formation trajectories of local component suppliers in the Vietnamese motorcycle industry conducted by the author.

The remainder of the paper is structured as follows. Section 2 reviews the literature on the dynamics of firm-level learning and identifies the research gaps. Section 3 presents the event-based longitudinal analysis as a methodology to analyze firm-level learning. Section 4 reports on the author's extended fieldwork-based research on the capability formation trajectories of local component suppliers in the Vietnamese motorcycle industry, as an effort to illustrate how the methodological approach proposed in Section 3 can be applied to empirical analysis of firm-level learning. Section 5 concludes the chapter by summarizing the main arguments and discussing the implications of the methodological framework.

2. What the Existing Literature Says about Capability Formation Trajectories over Time

Based on the evolutionary theory of technical change (Nelson and Winter [1982]), the technological capability (TC) approach considers that technological changes or innovations are not being generated simply by importing equipment embodying new technology but require specialised resources accumulated through deliberate investment and efforts (Lall

[1992]; Bell and Pavitt [1995]; Bell and Albu [1999]). These firm-specific, intangible resources are often referred to as technological capabilities. Numerous studies have elaborated different stages in the capability accumulation process and modeled them as sequential paths that firms are expected to follow. Despite the different terminologies used by different authors, the basic underlying concepts are remarkably similar (Bell [2006]). These sequences include steps along a common path, running from imitation (learning to use knowledge sourced from elsewhere) to innovation (learning to make changes to the existing knowledge).

When it comes to *showing empirically* how supplier learning evolves over time, very little of the existing research adequately addressed this agenda (Bell [2006]). A limited number of existing empirical studies, however, looked into capability formation trajectories of major corporations over an extended period (Bell [1984: 201; 2006: 26]; Meyers [1990]; Kim [1997, 1998]; Dutrenít [2000]; Figueiredo [2000, 2002]). According to these studies, development of firm-level capabilities in practice is a long-term, evolutionary process that does not necessarily progress linearly and steadily along a pre-determined path. Firm-level learning trajectories often entail discontinuities and qualitative transformations – jumps, truncations or even reversal of previous learning trajectories. Firms may face major leaps in the course of capability development. The progress attained in the past, however, may be reversed if, for instance, sufficient and consistent efforts are made by the firms to maintain the knowledge and skills they had acquired. Yet others may fail to make major progress beyond a certain point, resulting in "halted learning."

In spite of a limited number of illuminating studies mentioned above, the paucity of knowledge about the evolution of learning trajectories over time is still serious. And this is particularly the case for small-scale developing country suppliers that are at the lower end of technological trajectory. The existing empirical research in this field mainly focused on 'snapshot pictures' of supplier learning, assessed as the presence or absence of technological improvements (Ivarsson and Alvstam [2004, 2005]), learning attainment at certain points of time (Ariffin [2000]; Ariffin and Figueiredo [2004, 2006]; Figueiredo [2008b]; Gammeltoft [2004]) or the progress the firms had made over the short period immediately preceding the timing of observation (Mitsuhashi [2005]; Bazan and Navas-Alemán [2004]; Navas-Alemán [2006]; Jonker et al. [2006]).

Even these 'snapshot' analyses, however, provide some pointers suggesting the occurrence

of discontinuities in learning trajectories. Some researches explicitly focused on discontinuities caused by particular incidents such as external shocks or major policy shifts (Tewari [1999]; Figueiredo [2008a, 2008b]). A limited number of longitudinal works, which often analyzed a limited number of (often successful) firms over relatively long time periods, also suggest that firms experience particular timings of intensive learning as the major milestones in acquiring advanced capabilities. Chitravas' [2006] detailed analyses of learning mechanisms in nine Thai auto part suppliers provided evidence on how learning trajectories are often comprised of slower-learning and faster-learning phases,[1] some of which are initiated by different types of discontinuities such as start of new business relationships with foreign auto makers, launching of new products, or engaging in export activities.

Of particular importance in the present context is that, precisely because of such discontinuities, one could arrive at very different interpretations on firm-level learning in a particular industry depending on the particular points of time he/she conducted the analyses. Bell [2006], by referring to two sets of empirical studies on local shoe manufacturers in Sinos Valley, Brazil, argued that different interpretations could result from the changes in the context of local firm learning that have taken place between the different phases at which observations were made. This suggests that, in examining dynamic, fast-transforming industries, 'snapshot' observations may lead to conclusions that do not reflect the more dynamic and complex realities.

In practice, however, conducting longitudinal research is often not easy due to limited data availability and methodological constraints. As Bell [2006] notes, time-series data on capability formation and innovations are rarely available beyond statistics on patents and R&D expenditures, which are often not relevant for analyzing capability formation of firms in developing countries. Moreover, attempts at conducting longitudinal research on firm-level capability formation often suffer from high resource costs incurred as well as methodological constraints, i.e., the paucity of methods for systematically analyzing trajectories of firm-level technological changes over time.

In summary, the existing literature on firm-level capability formation has not examined empirically the evolutionary dynamics of learning trajectories of small-scale developing

[1] Chitravas [2006] refers to the former as 'start-up phase' and the latter as 'expansion phase' (and the 'adaptation phase,' for some suppliers). In some suppliers, the start-up phase extended over more than 20 years.

country suppliers that are at the lower end of technological trajectory. Longitudinal research is needed to address this research gap.

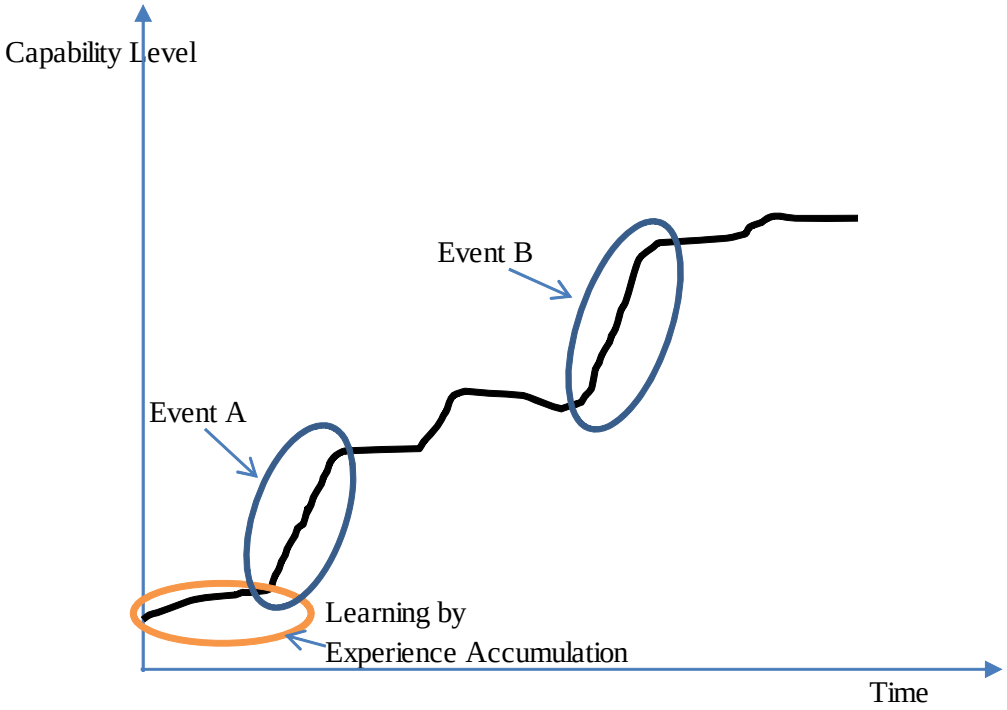
3. The Event-Based Approach

Capability formation is a long-term, cumulative process through which firms acquire new and progressively more advanced capabilities. Although capability itself is intangible, acquisition of new capability can be confirmed by a firm's demonstrated capacity to conduct activities that it had not been able to do previously or to conduct the existing activities in a substantially improved manner. The nature of activities conducted by firms therefore provides important clues as to the types and levels of capabilities that the firms possess, and *changes* in the nature of activities point to formation of new capabilities by the respective firms.

Given that firms in practice engage in a myriad of activities and many are also continuously experimenting through trials and errors in their day-to-day activities, the event-based approach has an advantage as a focusing devise in analyzing the evolutionary and multifaceted processes of firm-level capability formation. A 'learning event' is defined as an incident that signifies critical improvements in the way the activities are conducted. An event has a start date, when the firm launched a new initiative or target in its activities. An event may last just for a few months, or they might extend over several years. The goal or plan initially set at the start date may eventually have to be adjusted or changed. An event also has an end date, when the initiative is terminated—whether it is accomplished, abandoned unaccomplished, or taken over by a different initiative.

Capability formation trajectories can be depicted as a sequence of important learning events. **Figure 1** is an illustrative example of capability formation trajectory of a supplier in a given category of capability. The two major milestones (Events A and B), which took place in response to different customer requirements (i.e., in different value chains), functioned as a major driver for this supplier to progress from the operational to the adaptive level of capability.

Figure 1. Concept of Learning Events and Learning Trajectories



(Source) Prepared by the author.

The event-based approach also enables researchers to probe specifically into the detailed contents of the learning as well as the mechanisms through which firms are able to cross critical junctures in the long-term learning process. The event-based approach has been used for analysing innovation (Van de Ven and Poole [1995]) and project-based learning in service sector (Lema [2009]).

4. An Illustrative Example: An Analysis of Supplier Learning in the Vietnamese Motorcycle Industry

This section seeks to illustrate how the event-based approach can be applied to empirical fieldwork-based research on capability formation trajectories and mechanisms of developing country firms. Using the author's research on motorcycle component suppliers in Vietnam as an illustrative example, this section will show how the event-based methodology can be implemented in practice and can be a powerful tool in showing the dynamics and complexity of firm-level capability formation that would otherwise be difficult to highlight.

4.1 Background and Aim of the Research

This research sought to analyze capability formation processes and mechanisms of firms in a dynamically transforming industry. While the Vietnamese motorcycle industry started as a virtual monopoly of dominant Japanese lead firms, a major external shock— massive imports of cheap Chinese imported components—triggered the emergence of local Vietnamese companies assembling Chinese components. This was followed by rounds of competition and adaptation between Japanese motorcycle manufacturers and Vietnamese motorcycle assemblers organizing their value chains in very different ways. In all, development of the Vietnamese motorcycle industry can be divided into the following three stages in terms of the dynamic evolution of value chains:

- Stage I (from the middle to the end of the 1990s): the start-up phase, when only the Japanese lead firms were present;
- Stage II (2000-2004): the China shock years, when Vietnamese local assemblers entered and almost wiped the expensive Japanese models out of the market; and
- Stage III (2005-2008): the FDI-lead growth phase, when the Japanese motorcycle manufacturers recovered their market shares by adjusting their product strategies to respond to the challenges posed by Chinese imports.

Fast transformation of the industry in a relatively short period of time points to the importance of the dynamics of change. During the China shock years, firms responded to a severe external shock, bringing about significant adjustments in motorcycle assemblers' strategies in developing and managing relationships with suppliers. It needs to be emphasized, however, that the China shock years hardly offered a stable environment for firms' sustainable growth because the Vietnamese government also reacted to the shock by enacting numerous policy interventions that restricted both motorcycle production and sales in arbitrary manner. Only in Stage III, when the arbitrary policies were abandoned, fast industrial growth created an environment conducive to firm-level learning.

The limited stock of the existing research on the Vietnamese motorcycle industry, however, offered a fairly static and simplistic view on supplier learning. Virtually none of them explicitly examined the supplier learning trajectories over time (Nguyen Duc Tiep [2006, 2007]). The only exception has been Pham Truong Hoang [2007] which presented rich empirical materials on four case suppliers. Nevertheless, the analysis ended up with a fairly

static conclusion associating the types of capabilities acquired by the suppliers with the types of supply networks that the suppliers participated in. Despite the very detailed description on the learning processes and mechanisms, the research failed to provide insights on how the *transformation* of supply networks shaped supplier capability formation trajectories over time.

The present research was undertaken to shed light on the evolution of supplier capability formation trajectories and mechanisms in this dynamically transforming industry. Specifically, in the light of the remarkable dynamism of value chain transformation in this industry, this research sought to analyze how the value chain dynamics affected supplier capability formation trajectories and mechanisms, covering a period of a decade from the late 1990s to 2007-2008.

4.2 Research Questions and Conceptual Framework

Within the broad area of inquiry specified in the previous sub-section, this research addressed two empirical questions related to the dynamic evolution of supplier learning in the Vietnamese motorcycle industry. The first question is concerned with the 'how' of supplier learning trajectories.

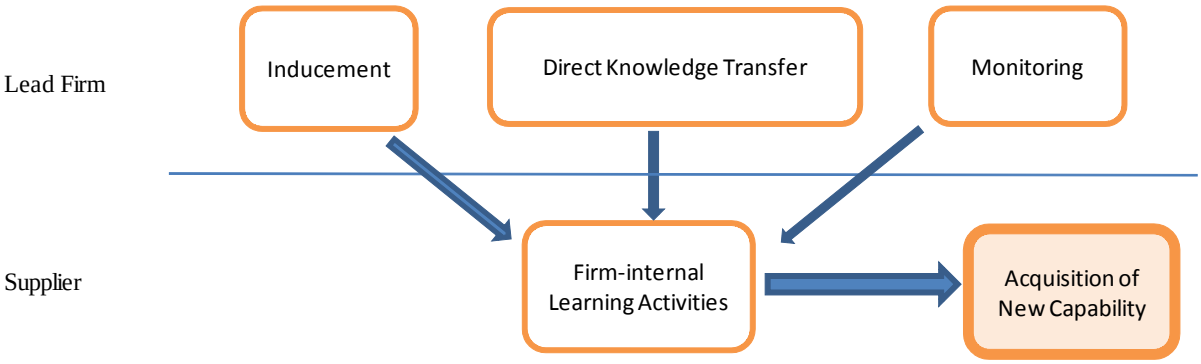
> Question 1: *How did the Vietnamese motorcycle component suppliers' capability building trajectories evolve over the decade since the late 1990s?*

The second question asks the 'why' question on supplier learning trajectories, i.e., why the learning trajectories evolved in the ways they did.

> Question 2: *How did the key learning events take place? What actor constellations and what knowledge flows conduced to those events?*

While the first research question could be explored with the event-based approach outlined in Section 3, the second question called for a framework for analyzing the sources of supplier learning (**Figure 2**). In this framework, two primary actors shape the supplier learning: suppliers themselves and buyers or "lead firms" —in the terminology of the global value chain approach. While supplier learning is ultimately determined by deliberate investments in specialized, change-generating activities by the suppliers as the very agents of learning, this research placed particular emphasis on the roles of lead firms which intervene in the supplier learning process by inducing supplier performance improvement, transferring knowledge directly to suppliers, and/or monitoring supplier performance.

Figure 2. A Model of Supplier Learning: The Roles of Key Actors



(Source) Prepared by the author.

The above framework is consistent with an implicit assumption underlying the overall research aim discussed in Section 4.1 that the way lead firms organize their value chains has major influence over (although it is not the only factor that determines) supplier learning. In other words, to the extent that lead firms influence supplier learning, supplier learning is expected to be broadly similar across suppliers catering to the same lead firm. However, even among suppliers catering to the same lead firm, learning trajectories and performance are expected to vary by supplier-internal learning activities.

4.3 Research Design and Methodology

Since this research addressed “how” and “why” questions on a decade-long dynamics of change, this research adopted the retrospective case study method (de Vaus [2001: 227-8]; Glick et al. [1995: 135]; Tuma and Hannan [1984]). This involved illuminating the process of change by reconstructing history and mapping the sequence of key events. Also, analyzing the sources of key events in a sequence enabled the author to outline the changes in actor constellations that underlie the overall process of change.

There were two distinct units of analysis: the learning event and the supplier. A learning event is an embedded sub-unit of a supplier. Especially at the initial stages of the analysis, event-level analysis turned out to be useful in specifying the types and levels of capabilities that the suppliers acquired at particular points in time, as well as the sources of learning mobilized by the suppliers in this process. In the later stages of analysis, event-level data were aggregated to supplier-level so as to examine: (1) how the nature of capabilities acquired by the supplier changed over time for the purpose of analyzing

supplier learning trajectories), and (2) how the sources of knowledge mobilized by the suppliers changed over time, in an attempt to shed light on changes in the learning mechanisms.

This research adopted a multiple rather than single case design because the above analytical framework assumed learning trajectories to be heterogeneous even among suppliers supplying components to the same types of lead firms, not to mention among suppliers to different lead firms. The research was designed so as to cover a sufficiently large number of cases to shed light on the heterogeneity of learning paths across suppliers participating in different value chains as well as those participating in the same types of value chains.

Data were collected via extensive fieldwork involving in-depth interviews with suppliers. Wherever possible, suppliers were interviewed at least twice. The first interview was usually with the top management of the firms, and aimed to identify up to three major learning events experienced by the suppliers since the mid-1990s. The second interview was usually with the manager(s) who directly took charge of new product introduction or production activities, and focused on collecting detailed data learning events consisting of thick description of the process of events as well as the roles of various actors involved in the events.

While the reliability of retrospective data collection is often called into question due to the problems of recall accuracy, the advantage of the above approach is that it aides the memory of the interviewee to relate important events with each other. While the author tried to use multiple sources of data and apply analytical triangulation wherever possible, it was confirmed that one could obtain fairly accurate data on sequence of events over a period of a decade via in-depth retrospective interviews.

Careful interpretation and coding of these materials collected via extended fieldwork were conducted to create a database of learning events. In the initial stages of analysis, the database was utilised extensively to search for similarities and differences in learning attainment and its sources across suppliers. Since the fact that the suppliers are *not sampled randomly* meant that the ratios (of events or suppliers) cannot be used to support arguments, the author followed the replication logic (Yin [2003]) to look for similarities across suppliers classified by value chain participation and to identify reasons for any

exceptions. As the author proceeded to the supplier-level analysis, initial attempts were made to analyse learning trajectories as a sequence of learning events that took place in a particular supplier utilising the database. In the following stage, attempts were made to look more carefully and thoroughly at a small number of particularly successful or illuminating cases.

4.4 Main Findings

As a result of extensive fieldwork-based data collection and analysis, the research was able to present much richer insights on the dynamics of supplier capability formation than what was available in the existing research.

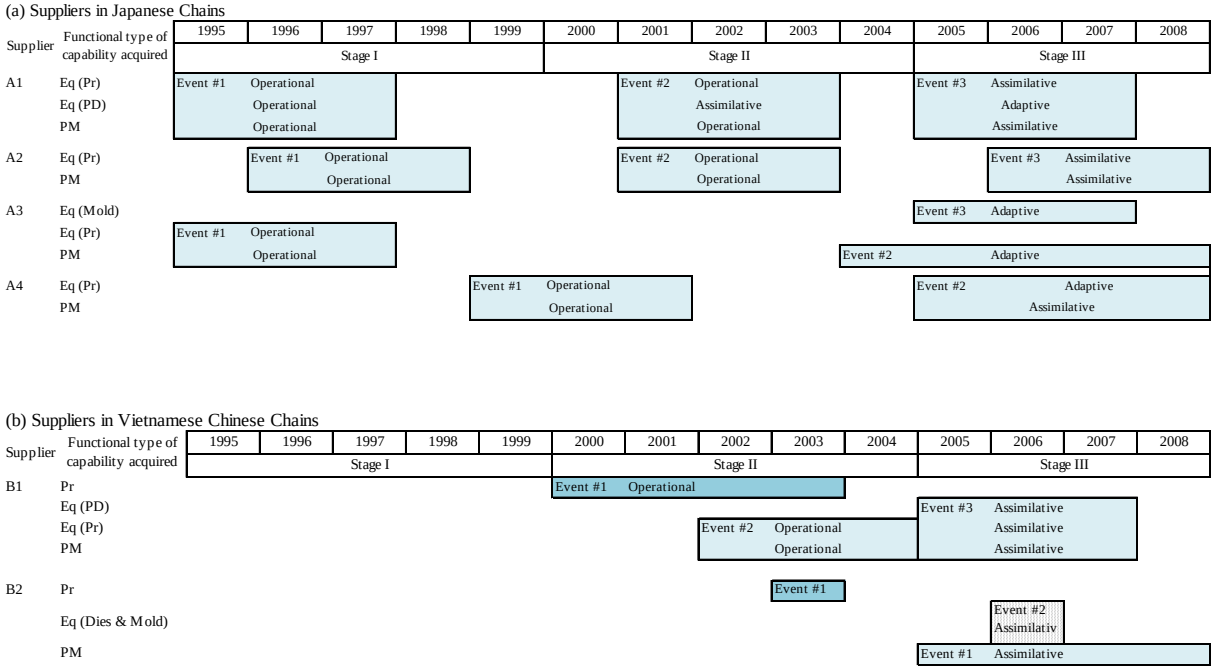
As regards the first research question on supplier learning trajectories, the author could elaborate on supplier learning trajectories as sequence of major milestones, which enables tracking key learning events of a particular supplier over time. **Figure 3** provides an example of how supplier learning trajectories can be shown as sequences of learning events. The figure shows the sequence of learning events for four suppliers that participated in Japanese value chains and two suppliers that participated in Vietnamese-Chinese value chains, covering information on the timing of the events as well as the types and levels of capabilities acquired.

On the basis of the decade-long learning trajectories for the case suppliers, this research was able to demonstrate that supplier learning was an evolutionary process involving major leaps, slow progress, and/or even halted learning at different points in time, far from being a steady and continuous process that progresses incrementally along a pre-determined path. The following were the main research findings.

- For suppliers that started motorcycle component production in Japanese chains, it was generally found that capability acquisition progressed steadily but slowly up to Stage II. Learning trajectories diverged remarkably in Stage III. Several high-performing suppliers experienced major leaps towards acquisition of basic innovative capabilities, whereas low performers found that their learning stalled.
- For suppliers that started motorcycle component production in Vietnamese-Chinese chains, learning trajectories were found to be mostly similar in that learning focused on acquisition of fairly routine capabilities up to Stage II. Again, it was in Stage III that a growing divergence in learning performance across suppliers started to be

observed. With the exception of one supplier, which acquired the basic innovative capabilities, most suppliers saw their learning stalled or even stopped by then.

Figure 3. Learning Trajectories of Selected Component Suppliers



(Notes)
(1) Functional types of capabilities acquired are abbreviated as follows:
Pr: Product development capability; Eq (PD): Process design component of equipment-related capability; Eq (Pr): Processing precision component of equipment-related capability; Eq (Dies & Mold): Die and mold design/manufacturing component of equipment-related capability: PM: Production management capability.
(2) Up to three most important learning events are shown for each supplier. For each functional type of capabilities, there are four different levels of capabilities in the ascending order: operational, assimilative, adaptive and innovative.
(3) The learning events are colored as follows:
Events that took place in Japanese chain.
Events that took place in Vietnamese-Chinese chain.
Events that took place in other value chains.
(Source) The author's field research.

The above summary indicates that the biggest leaps in capability levels experienced by case suppliers was concentrated in Stage III of industrial development, regardless of the types of the motorcycle value chains that the suppliers participated in. It was only in Stage III that high performers, regardless of the types of value chains, started to acquire basic innovative capabilities, and that the study started to observe increasing divergence in learning attainment across suppliers.

The second research question required looking into the sources of learning, paying particular attention to the roles of lead firms and suppliers. By engaging in an aggregated analysis of learning events and in-depth examination of critical events, this research

arrived at important findings which can be summarized as follows.

- In the Japanese value chains, the Japanese learning model developed in their original form by Stage II. Under this model, supplier learning was shaped powerfully by active lead firm interventions in the forms of learning inducement, direct knowledge transfers and monitoring. By Stage III, however, this original model had been partially transformed. Under the adjusted model, lead firms' involvement in supplier learning in the form of direct knowledge transfer diminished, while supplier learning came to depend increasingly on independent and innovative initiatives on the part of the suppliers.
- In the value chains led by Vietnamese assemblers often in cooperation with Chinese firms, the Vietnamese-Chinese learning model emerged by Stage II. Under this model, learning resulted largely from suppliers' own initiatives to mobilize internal sources of knowledge, with very limited interventions by lead firms. Again, this learning model was partially transformed by Stage III. While learning continued to be largely a result of the suppliers' independent learning initiatives, supplier-initiated two-way knowledge flows with its customers came to shape the supplier learning process.

In short, the above findings corresponding to the two research questions provide a picture of local suppliers' capability formation trajectories that are substantially more dynamic and complex compared to that presented by the existing research. This study's empirical research demonstrated that learning models not only differed across value chains—the insights commonly offered by the existing "snapshot" research—but also went through partial yet important adjustments over time as lead firms and suppliers adapted to competitive challenges and changes in the surrounding environment. It was these important adjustments in learning models that account for remarkable progresses in capability formation experienced by a limited number of high-performing suppliers during Stage III discussed above.

5. Conclusions

Firm-capability formation is a dynamic, evolutionary process that extends over a long period, with major leaps, slower or halted progress or even reversal of past achievements. The time dimension needs to be taken in to account precisely because of the evolutionary nature of capability formation (Bell [2006]). This paper sought to make a methodological

contribution to this field of research by reporting on the much-sought-after methodological approach that can be applied to longitudinal analysis on the dynamics of firm-level learning over time.

In this paper, the event-based approach was shown to be a useful focusing devise in analyzing multifaceted and dynamic processes of firm-level capability formation. The author's extensive fieldwork-based research on the Vietnamese motorcycle industry not only showed how this approach can be applied to empirical investigation of firm-level learning, the findings of the research also clearly demonstrated how an event-based longitudinal analysis of supplier learning over an extended period may shed new light on a number of focal issues surrounding the learning of latecomer firms.

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