

Inter-firms collaboration of joint venture in IC foundry business

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Abstract

In order to increase their capacity and competitiveness in the global market, more and more companies tend to enter strategic alliances with each other in the past decade. This paper describes a collaborative method for IC foundries industry to help managers and decision makers better cope with the dynamic relationship and related issues that can occur during joint ventures between two or more enterprises. The collaborative view analyzes different types of joint venture and modes of cooperation in the IC foundry industry that enhance efficiency and increase the possibility of success. Competitive and collaborative relation issues of stakeholder management in IC foundry business chain will also be discussed in this research. This paper's aim is to use the IC foundry as a case to explore the key of success from the new joint ventures game.

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1. Introduction

Joint ventures have been regarded as an important strategy for industries. They are typically defined as an alliance between two or more parties in researching, development, production, sell, distribution or sales of a product or service for profit (Kukalis and Jungemann, 1995). These occurrences between companies which are competing with each other in the international markets have become increasingly interesting to both researchers and participants (Richter and Vettel, 1995). Many of the scholars and researchers are still working on the topics related to and involved when enterprises engage in joint venture issues for adding to its variable value.

The literature on this subject may be sorted into five categories: strategic issues, relation management issues, enterprises modeling issues, performance measurement issues, and knowledge management issues (Table 1).

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Recent researches have more interests in relation management issues. But, very few of researchers discuss the new collaborative relationship and the new forms of joint venture issues for high-tech industry. We use the IC foundry as an example to explore more key information about their new joint venture game for managers to refer.

The integrated circuit (IC) production process is becoming more and more challenging as it increases in complexity and wafer size continues to grow (Pfitzner et al., 1999). IC foundries are one of the most important systems for the next generation (Kuo and Huang, 2000). An IC foundry business is the enterprise that manufactures IC for IC design house or other semiconductor manufacturers. The correlated complexity of business processes, which include design, manufacturing, engineering, and logistics management seen in the IC foundry area, has increased tremendously over the past decade.

IC foundry companies have several goals in mind when they created its global product programs: access to advanced technologies and processes, supply chain information management services, product planning support, production and delivery consistency, production volume control, quality control, responsiveness as well as stability in customer/manufacturer relations. To increase their

Table 1
Literature review of joint venture research

| Strategy | Relation management | Enterprises modeling | Performance measurement | Knowledge management |
|---|--|---|---|--|
| Kukalis and Jungemann (1995), Mills and Chen (1995), Naylor and Lewis (1997), Vanhonacker (1997), Maccoby (1997), Chen and Chen (2002), Rigby and Zook (2002), Amesse et al. (2004), de Man and Duysters (2005), Yasuda (2005), Hoecht and Trott (2006) | Shaughnessy (1995), Littler and Leverick (1995), Martinsons and Tseng (1995), Beamish and Inkpen (1995), Gifford Jr. (1998), Norwood and Mansfield (1999), Fey and Beamish (2000), Hobbs and Andersen (2001), Steier (2001), Meyerson (2001), Ghosn (2002), Buckley et al. (2002), Walker and Johnnes (2003), Bayona et al. (2006) | Mesak and Mayyasi (1995), Richter and Vettel (1995), Nakamura et al. (1996), Williams et al. (1998), Wang et al. (2004) | Luo (1996), Park and Kim (1997), Pearce II and Hatfield (2002), Beamish and Berdrow (2003), Swierczek and Dhakal (2004), Mohr and Puck (2005) | Abecker et al. (1998), Kidd (2000), Jolly (2002), Wong et al. (2002), Tidd and Izumimoto (2002), Walker and Johannes (2003), Li et al. (2003), Gerwin and Ferris (2004), Revilla et al. (2005) |

competition in the semiconductor market and gain more profit, IC foundry companies have initiated strategic joint venture projects with related IC companies for years.

Some of the successful joint ventures create remarkable profit, while others fail, causing tremendous losses and even impact their business reputation. The main problems for top managers will be selecting the right partner from related IC companies and resolving the issues during the collaborative processes. Another important issue for decision makers will be gauging their competitive position after a joint venture that will be of mutual benefit to themselves and their partners.

IC foundry business represents the original equipment manufacturer (OEM) of IC industry. The related high-technology industries such as liquid crystal displays (LCD), organic light emitting display (OLED), as well as other high-tech manufacturing industries may have similar collaborative relations with their OEM partners. In current high-technology industry, companies have to deal with the issues of concurrent competition and collaboration with one another to provide better service for their customers. This paper provides an overview to show the different forms of strategic joint ventures for gaining better benefit for their profit goals. Our research tries to assist the managers to figure out a more completed picture for selecting the right partner from the right collaborative and competitive position.

This paper examines collaboration between IC industries in the hopes of aiding managers and participants in the decision making process when faced with the contingencies involved in joint ventures. We analyze the strategic relationship between each player in the IC industry and discuss the different collaborative aspects of the joint venture process to clarify these relationships and with the expectation of possibility of success. The IC foundry industry is reviewed as an example for other related high-tech industries in dealing with similar situations. We will also analyze the role of stakeholder management issues involved in the IC foundry business. The remainder of this paper is as follows: Section 2 discusses joint ventures of IC

foundry business, Section 3 discusses collaboration in IC operation, Section 4 discusses collaboration in joint venture processing, and Section 5 discusses stakeholder management in IC foundry collaboration. Some directions for future work will be discussed in the section of conclusion.

2. Joint ventures of IC foundry business

2.1. IC foundry business

Fig. 1 shows that IC devices are mostly produced by integrated device manufacturer (IDM) and application specific integrated circuit (ASIC) in the initial phase of the IC business (Tseng, 2002). The IDM and ASIC companies include functions of system/IC design, wafer manufacturing, assembly and testing. After the emergence of IC design companies (Fabless company), IC foundries started to play a very important role in the business. Foundries manufacture ICs for design companies or other IDM and ASIC companies and have currently expanded their technical support for intellectual property (IP) design companies by integrating design service and wafer manufacturing.

An IC foundry fab is characterized by complex production routes, high product mixes with short life cycles (Kuo and Huang, 2000). The correlated collaboration of business process is one of the important keys of success due to the increasingly complicated issues of production and logistics processes in IC foundry business. A new joint venture always causes major change of business processing of an IC foundry ; the negotiation problems incurred by these changes exhaust a significant amount of time and resource and cause delays in the progress of expansion.

2.2. Joint ventures occurring in IC foundry industry

To increase their competition in the international market, more and more IC foundry enterprises have been engaging in joint ventures in the areas of technological

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