



The emergence of the outsourcing market and product technological performance

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ABSTRACT

This study is a novel empirical endeavor to analyze the impact of market demand and product technological performance on the growth of industry's outsourcing activities. Using the laptop computer industry as an example, this study examines the connection between the growth of outsourcing activities and product technological performance as well as market demand. The results suggest that, in addition to the relative efficiency assumed from transaction cost economies, the products' technological performance and market demand might also influence the growth of industry's outsourcing activities.

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1. Introduction

Jacobides [1] points out that the emergence of new intermediate markets that divide a previously integrated production process is relatively 'invisible' during the course of industry evolution. Many specialized firms surfaced from the once integrated production processes such as "fab-less" chip design companies in the semiconductor industry, specialized automotive part producers in the automotive industry, and specialized drug-testing firms in the biotech sector [1]. The emergence of these specialized firms breaks down the previously integrated production process such as was the case in the personal computer (PC) industry. Production process in the PC industry was once integrated in house, but now it is highly disintegrated with many firms specialized in a particular segment ranging from component production, PC assembly to distribution. The gradual transformation from integrated to disintegrated structure occurs when underlying products, services, and core technology remain the same [1]. For example, Taiwan Semiconductor Manufacturing Company (TSMC)

specialized in IC foundry. Fab-less chip design companies outsourced their production to TSMC. The gradual emergence of TSMC has disintegrated the conventional production process. This type of "invisible" transformation from integration to disintegration has a significant impact on the overall development of many industries such as automotive and semiconductor [1].

Williamson [2] suggests that the availability of an efficient market facilitates transactions and guides organizational governance mode selections. The emergence of TSMC provides a new intermediate market between IC production and IC design. The efficiency of TSMC allows fab-less chip design companies to abandon or bypass production. The transaction between TSMC and fab-less chip design companies reinforces each other's core capabilities. The transaction between TSMC and fab-less design companies forms a new intermediate market or outsourcing market between IC production and IC design. When such an intermediate market is available, the more efficient the market, the more active the outsourcing activities are. Market efficiency is relative to that of internal transactions. When such transaction between TSMC and fab-less design companies become more efficient, it is more likely that the firms will start to abandon internal production gradually. In addition to relative efficiency, firms often

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have to adjust their strategy based on the dynamics of their competitive environment [3]. Technological change constitutes a significant part of this competitive environment [4]. Firms adopt different organizational configurations in response to the gradual evolution of the technology life cycle [5,6]. The characteristics of each technology life cycle, such as demand [7,8], speed [4,9], product architecture [10], product complexity [11], and novelty [12] all influence a firm's integration [13] and outsourcing decisions. Novak and Stern [11] reveal that only a small body of research examines the impact of product performance on a firm's disintegration decision. The connection between industry's outsourcing activities and technology performance lacks empirical support [11]. The objective of this research is fill in this empirical gap by examining the gradual impact of laptop computer's technological improvement on the development of industry's outsourcing activities.

1.1. *Outsource decision*

Business strategy is often complex and must be appropriately examined from different angles [14]. Conventional discussion on outsourcing pays little attention to the variables affecting the growth of the outsourcing activities or the supply side of outsourcing services. Researchers have been interested in why firms choose to 'buy' instead of 'make' [15]. The buy side, the firm that contracts out, is often the point of attention rather than the supply side, where the firm provides the outsourcing service. From the buy side, the decision to outsource often involves a risk-and-benefit analysis [16]. The major outsourcing risk is the firm's loss of control over critical skills and suppliers. The benefits of outsourcing are more numerous and have received extensive attention [15–21], such as specialization, cost savings, time to market, and flexibility [22]. Although many scholars have examined the characteristics of outsourcing from various perspectives, relatively little empirical work has been conducted on connection between product technological improvement and outsourcing activities or the outsourcing supply side.

Resource-based view (RBV) and transactional cost economies (TCE) together provide the basis for the analysis of outsourcing. The decision to outsource implies a disintegration of firm activities [23]. At its basic element, outsourcing transfers a business process originally performed in-house to an external party [15,24]. The outsourcing market refers to the intermediate market that divided the business process between buyers and suppliers of a particular business task. The extent of disintegration can span various business processes, from producing a product component to the entire manufacturing process. Such outsourcing executed across a national boundary constitutes international outsourcing, or the relocation of business processes to a foreign subcontractor [24]. In addition, outsourcing can be divided into component and manufacturing forms: Component outsourcing entails subcontracting the manufacture of product components to a third party, whereas manufacturing outsourcing implies subcontracting the entire manufacturing process. Offshoring, on the other hand, refers to the disaggregation of the firm's value chain to a foreign location [25], which makes it a location strategy.

It has become increasingly common for firms to slice up their value chain activities through outsourcing to maintain their agility and keep up with the ever-changing competitive

landscape [26]. The decision to outsource depends upon the level of transaction cost involved in performing an activity internally versus sourcing it through an outside market. Accordingly, outsourcing is viewed as a natural continuance of Coase's and Williamson's work on contracting and transaction cost economics [15]. Following the idea of Coase [27], Williamson [28] suggests that the purpose of the firm is to economize transaction costs. The difference in transaction costs is the main deciding factor of the governance mode, but not the only one [29]. Williamson [29] summarizes the main aspects of TCE as follows: "align transactions, which differ in their attributes, with governance structures, which differ in their costs and competencies, in a discriminating way" [29]. TCE examines the connection between a governance mode and the costs associated with transactions [2]. Governance modes may take autonomous (market), cooperative (hierarchy), or hybrid forms [2], and by aligning these modes with the attributes of transactions, firms can improve their transaction efficiency [30]. The most common transaction attributes include asset specificity, uncertainty, and frequency [29]. In particular, asset specificity—the ease with which an asset can be redeployed to other uses without compromising product value—is key to analyzing the governance of contractual relations [29]. Market procurement offers a strong advantage when asset specificity is low, but high asset specificity favors internalization. The availability of an efficient market also facilitates transactions and guides institutional mode choices [2]. Williamson [14] further suggests that "a transaction occurs when a good or service is transferred between technologically separable stages" (Williamson, 1999: 1089). The non-separable activities will be conducted in-house. The independent nature of a modular system allows easier separation of production processes, which facilitates a firm's disintegration choice. The modular system gave rise to a group of specialized component providers in the automotive and semiconductor industries. Under a modular system, outsourcing became a common practice in these industries as companies contracted out parts of the value chain to specialized component providers [9]. Many scholars have revealed the impact of modularity on a firm's integration decision [6,10,23,31]. Embedded modularity significantly changes the relations among companies [22]. Modularity, consisting of units designed independently but still functioning as an integrated whole, alters industry structure and makes the best use of participating firms' abilities [22]. Modularity provides easier separation of activities.

On the other hand, TCE has been criticized for its narrow or single-minded focus on opportunism and bounded rationality while neglecting the role of value creation in governance decision [32]. Unlike TCE, though, outsourcing allows firms to concentrate on value-creating activities. The specialization that emerged in the modular system relates closely to the RBV, which states that firms should keep their core activities in-house and outsource noncore activities [16]. The RBV conceives of business organizations as unique bundles of heterogeneous resources, capabilities, and competencies [33], which implies that firm-specific resources are immobile, untradeable, and bound to the firm [34]. However, some resources are non-firm-specific, so others can imitate or replicate them. Thus, in the RBV, firms need to concentrate on their immobile core competencies and strategically outsource any noncore activities for which the firm has no critical strategic

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