

Outsourcing: Some Strategic Aspects

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Abstract: A firm faces a choice between outsourcing a crucial input and producing it in-house within the vertical structure. This paper discusses strategic motives behind the outsourcing decision.

1. Introduction

Outsourcing is now practised by almost all firms and business organizations all over the world. Initially, the activity was limited to unimportant or non-core activities (say, for instance, janitorial or gardening activities), but nowadays almost every function, from product design to final production, distribution and marketing, to research and development, are being outsourced. Grossman and Helpman (2005) have rightly said, “We live in an age of outsourcing”.

What is outsourcing? Broadly speaking, outsourcing is a contracting by a company or firm with another company or organization to delegate some specified function to be ultimately purchased back as a service. Thus when a firm writes a contract with an independent firm or organization regarding performing some business function (say, purchasing of inputs), this is an act of outsourcing. The opposite of outsourcing is ‘insourcing’, that is, producing in-house, and this is accomplished via vertical integration. If the outsourcing function is relocated across borders, it is ‘offshoring’. The firm which provides the necessary services is called a service provider, vendor, subcontractor, supplier or an upstream firm, and the outsourcing firm is called a buyer, acquirer or a downstream firm.

The outsourcing activities got impetus and became popular with the advent of information technology (IT). As a consequence, business process outsourcing (BPO) has increased at a high rocketing speed. This encompasses a wide range of activities including banking, finance,

accounting, insurance, medical and various consultancy services, various data entry and computing services, etc. *Data Outsourcing India* has emerged to be the India's best IT enabled service provider company. It helps clients to improve their business growth with different kinds of IT services such as, data entry, online data entry, data computing from the web, data mining and cleansing, data conversion, catalogue processing, website design, graphics editing, logo design and similar other services.

During the last two decades the magnitude of outsourcing activities has been growing at a fast rate, not less than 30% per annum. For example, Nokia alone makes use of more than 300 domestic subcontractors and similar number of foreign subcontractors. In computer industry *Sun* purchases about 75% of components from other companies. The aircraft giant Boeing outsources products of over 34000 components from different manufacturers and then assembles these into its production of 747 passenger aircraft. The 1998 Annual Report of WTO estimate shows that only 37% of the production value of a representative American car is generated domestically in the US. A little search in the internet will reveal many more such information. Recently, R&D outsourcing is also growing fast.¹

Next question that naturally follows is: why is outsourcing? Typically a firm is confronted with the choice of in-house production versus outsourcing. It's a 'make or buy' decision --- a decision whether to integrate or separate. Traditional theories take care of the cost consideration only; hence the problem is explained in terms of transaction costs, specificity of factors and incomplete contracting. In the next section we discuss this very briefly. However, beyond this boundary, outsourcing often occurs and that is so because the firm gains by outsourcing strategically. So the purpose of the present paper is to focus on some strategic aspects of outsourcing. This is presented in section 3. Then a conclusion follows.

¹ Frost and Sullivan (2004) have analysed the prospect of growing R&D outsourcing market for information technology in India and policy regulation in the R&D domain in Asia. Marjit and Mukherjee (2008) discuss why international outsourcing and R&D by the outsourced firm may be either substitutes or complements. The paper also derives welfare implications for the consumers. Then Marjit, Xu and Yang (2009) have provided a theoretical model on the role of intellectual property in developing countries in offshore outsourcing of R&D.

2. Outsourcing: Least Cost Consideration

When a business organization goes for outsourcing instead of getting the work done in-house, this is either to make a strategic gain or to get the services from outside at a lower cost. In this section we focus on the cost consideration.

The firm may not be capable to produce those services most efficiently or at a least cost, or even if it is capable, it involves a large amount of fixed costs including training of the personnel and staff, whereas the service providers are already specialized in that service. If the firm wants to produce every item it needs, the size of the firm has to be too large to be effectively controlled and managed, whereas outsourcing can offer a greater budget flexibility and control. Outsourcing allows organizations pay for only the services they need. The firm can fully focus on its core sectors/activities. It also eases cash flow constraint and makes business more flexible to the changing demand and environment. Also by means of outsourcing the company can avoid some taxes and regulations, and the troubles and conflicts due to labour union.

Traditionally, this is discussed in terms of theories of transaction costs, incomplete contracts, asset specificity, property rights, etc., which define the boundaries or limitations of the firm.² This ultimately leads to the choice of production organization based on cost consideration. Important contributions have been made by Williamson (1985), Grossman and Hart (1986), Hart and Moore (1990), Bolton and Whinston (1993), Antras (1993), and Grossman and Helpman (1999), among others. Holmstrom and Roberts (1998) have provided a survey on the determinants of the boundaries of firms. Decentralised markets are presumed to perform more efficiently in allocating resources. Then why do the firms go to produce within the vertical structure of the organization? Williamson (1985) is the champion of the transaction cost based analysis.³ Grossman and Helpman (2002) have analysed why costs of producing under vertical structure can be very high because of incomplete contracting and large organization. However trade-off arises because outsourcing is also subject to various costs. For example, international outsourcing often involves significant costs in the process of selecting vendors and writing contracts, then the cost of transferring technologies, the cost of

² Coase (1937) provides a pioneering work in this field.

³ For a review of the Williamson (1985) work see Masten (1986).

training of the employees and management, so on and so forth (see, for instance, Grossman and Helpman (2002), and Glass and Saggi (2001)).

McLaren (2000) studies the impact of international opening up on the vertical integration decision. Given 'hold-up' problem under outsourcing, vertical integration may be the chosen option provided the cost of management and governance under integration is not too high. Then Antras and Helpman (2004) explain whether under outsourcing foreign or domestic suppliers are to be chosen. There is a trade off between selecting partners from the north and the south, because the south has a lower variable cost whereas the north has a lower fixed cost. A further insight has been provided by Grossman and Helpman (2005). Accordingly, the outsourcing decision also depends on the consideration of thickness or size of the domestic and foreign markets for input suppliers.

3. Outsourcing: Strategic Consideration

From the previous section analysis it follows that outsourcing is likely to be preferred over in-house production or vertical integration if the firms can buy inputs from outside at a bargain price. There are, however, evidences to prove that sometimes outsourcing occurs not because that in-house production is costlier, but for the simple reason that outsourcing generates some strategic advantages that ultimately benefit the firm. Firms may opt for outsourcing because it may give the firm competitive advantages over the rivals, it may act as entry deterrence, it may raise rivals' costs, or it can alter the market structure in its own favour. Below we discuss contributions of some selected papers in this context.

First consider the work by Shy and Stenbacka (2003). This paper shows how the competing firms may manipulate their design of production mode as a strategic instrument. In a Hotelling model of differentiated duopoly they have investigated how the degree of competition in the final goods market affects the incentive to outsource production of key components. Here firms have the option to produce in-house or outsource an input from a third firm or market. In-house production requires an irreversible investment $F > 0$ to produce the input in-house at a cost $c < P^S$ (outsourced price). Then it becomes the trade off between irreversible investment and the gain in marginal cost. Depending on the size of fixed

investment relative to the size of the consumer population, in equilibrium both firms may outsource, or only one firm may outsource or none may outsource. In particular, if F is small, none will outsource, and if F is large, both may outsource. Higher input price reduces competition in the final goods market, and it becomes profitable to outsource. When there is a (joint) monopoly input producer, the paper shows that outsourcing to the monopoly input producer is welfare improving relative to in-house production.

As in Shy and Stenbacka (2003), the Buehler and Haucap (2006) model also assumes that the firms making an irreversible investment can reduce their variable costs to produce in-house, otherwise they can outsource inputs at a higher price. But in Buehler and Haucap (2006) the firms take the outsourcing decision sequentially. Since the model assumes reduced form payoffs, it can deal with various forms of market competition including price competition. The paper analyses how one firm's outsourcing decision induces other firm's outsourcing decision. In particular, the paper discusses why it may be advantageous for a firm to give outsourcing order to a supplier to whom its rival has already gone. By giving outsourcing order it raises input prices (hence the downstream cost) and this can be mutually profitable in the downstream competition where it softens competition.

In a recent paper Chen (2011) constructs a model to show that by sourcing key intermediate goods to a potential entrant, an incumbent firm can credibly and observably commit to an intensive post-entry competition, thereby deterring the entry. The incumbent monopolist initially possesses both technologies of producing inputs and then converting inputs into final goods. There is an entrant which holds at present an inefficient technology to produce inputs ($c_e < c_m$). Moreover, if it likes, it can acquire the same final goods producing technology by investing a fixed amount, $K > 0$. They play the following game.

First, the incumbent negotiates with the entrant a sourcing contract, i.e., writes a contract to buy a certain amount of inputs from the entrant at the contracted price. Then, in the second stage, entrant decides whether to invest on final goods technology and enter the product market. Finally the active firms compete in quantities for the final good. The paper shows

that in a unique equilibrium there is a quantity to be outsourced by the incumbent to the entrant in which the entrant stays out. The outsourced quantity constitutes an entry deterring capacity. By producing within the established capacity, the incumbent is granted a Stackelberg leader's advantage signifying that it can behave aggressively if entry occurs. The entrant, if enters, is forced to act as Stackelberg follower. Then there exists a threshold quantity for the incumbent to order from the entrant which reduces the entrant's post-entry profit to the point of entry deterrence. This means such outsourcing facilitates tacit collusion. With entry deterred, the final good market is kept monopolized and the entry cost is avoided. Whenever the benefit of outsourcing is more than offsetting its cost, a joint surplus is generated and both the firms are better off through their sourcing transaction.

The paper by Arya, Mittendorf and Shappington (2008a) constructs a three-firm model with one wholesale input supplier (of an essential input), and two product market competitors, of which one firm, say firm 1, has capability to produce the input in-house. The paper shows that even though firm 1 can produce the input at a cost less than the input price charged by the whole sale input supplier, firm 1 will outsource for strategic advantages. The whole sale input supplier fixes an input price W_1 for firm 1 who decides whether it will outsource or produce in-house. Then the whole seller decides W_2 for firm 2. Finally, the firms 1 and 2 compete a la Cournot. Here strategic effect is that W_2 directly depends on W_1 if firm 1 buys a positive quantity, i.e., $W_2(W_1)$, with $W_2' > 0$. So firm 1 strategically opts for outsourcing that raises rival's cost.⁴ The discriminative treatment to firm 2 benefits firm 1 although firm 1 could produce at a lower price.

The idea that outsourcing may raise rival's cost for strategic gain is further extended by Kabiraj and Sinha (2011). In their model therefore outsourcing occurs even when in-house production is cheaper. They have also constructed a model of three firms. The novel thing of the work is that they have introduced technology transfer in the context of outsourcing. One of these three firms, say firm 0, has only input production technology. The other two firms, firm 1 and firm 2, compete in the final goods market, but firm 2 does not have input production technology; so it has to depend on input market for inputs. On the other hand, firm

⁴ On the literature of 'raising rivals' costs, see Salop and Scheffman (1983, 1987).

1 has both input and final goods production technologies; moreover, it has superior input production technology compared to that of the independent input producer. Firm 1 then has the option to decide whether it will compete with firm 0 to supply inputs to firm 2. It is shown that in the subgame perfect equilibrium firm 1 must compete in the input market and in fact grab the whole market share under price competition. And when it takes outsourcing decision, as a commitment device it sells out the patent right of its superior input production technology to firm 0 and in turn buys inputs from firm 0. Since firm 0 now becomes a monopoly in the input market, both downstream competitors buy inputs at monopoly price. Then outsourcing decision can be optimal if the outsourcing firm (firm 1) can over-compensate the loss of payoff in the final good market by the price it charges for selling its patent rights. The paper shows that firm 1 opts for outsourcing the key input if the gap between its input production technology and that of the independent input supplier is small. If the input production technological gap is large, firm 1 will do better by means of in-house production along with input market competition. The strategic advantage of outsourcing stems from softening of competition in the final goods market and the benefit in turn accrues to firm 1 through a payment for the patent sale to the independent input supplier. Thus Kabiraj-Sinha (2011) paper, in a sense, complements the works of Arya et al. (2008a) and Chen (2011).

This is not vacuous that a firm outsources crucial inputs even when its in-house cost of input production is low. For example, Boeing had entered into outsourcing contracts with three industrial giants Mitsubishi Heavy Industries, Kawasaki Heavy Industries Ltd., and Fuji heavy Industries (called Japanese consortium).⁵ This happened when these companies showed interest in entering the market for commercial aircrafts. Consequently, a series of agreements occurred between Boeing and those firms regarding supply of some goods related to aircraft production, together with related R&D during the 2000s. News week International Edition (May 15-22, 2006) observed, Boeing's outsourcing cannot be justified based on cost-saving, since in the aircraft industry costs in Japan were no less. Another example is the contract between Boeing and Lockheed. The latter exited the commercial aircraft market after 1981 and thereafter never entered although it was capable to compete with Boeing. On the

⁵ See in Chen (2011)

other hand, Boeing signed a contract with Lockheed for purchasing certain parts of commercial aircraft.⁶

Two papers that talked about technology transfer and outsourcing are by Pack and Saggi (2011) and Peirce and Sen (2012), but their focus was completely different. The paper by Pack and Saggi (2001) considers transfer of DC technology to an LDC firm which produces the product but sells it to the DC firm which markets the product. However, some knowledge may be leaked out or spilled over to other LDC firms which may directly compete with the DC firm in its markets. If the DC and LDC firms are vertically integrated, how this affects diffusion and profitability are discussed. In this model, outsourcing is akin to licensing of an innovation to another producer that has a lower cost of production. The paper derives implications to diffusion and competition. On the other hand, Pierce and Sen (2011) have constructed a Hotelling duopoly with one firm possessing a superior intermediate good producing technology. The paper considers and compares two alternative regimes, viz., outsourcing (when the high cost firm outsource its order to the low cost firm) and technology transfer (from the low cost firm to the high cost firm). Outsourcing acts as a credible commitment on the part of high cost firm to maintain a specific market share (thus acting as Stackelberg leader). Since strategic interactions under technology transfer and outsourcing are different, it has different implications to the firms and consumers. Under outsourcing, consumers are benefited, but not is the case under technology transfer with royalty contracts. However, under both outsourcing and technology transfer each firm uses the cost efficient production process.

Chen, Dubey and Sen (2011) have constructed a model of N firms which are competing in the product market; however only a subset of firms has access to intermediate input technology, and the other firms either get inputs from the remaining insiders or from the outsiders. The paper portrays situations when intermediate goods can be sourced to firms on the outsiders even when there are no economies of scale or cost advantages for these firms. Insider firms when accepting outsourcing orders incurs the disadvantages in the ensuing

⁶ See the Wall Street Journal, May 10, 1989.

competition to sell the final product. Thus they have incentives to quote high provider prices to ward off future competitors, driving the latter to source outside.

Some papers have focused on scale economies. For example, Cachon and Harker (2002) have constructed a model with two competing firms when each firm's cost per unit is decreasing in demand. The paper shows that even if the supplier's technology is no better than the firms' technology and the supplier is required to establish dedicated capacity (so the supplier's scale can be no greater than either firm's scale), the firms strictly prefer to outsource. Then Chen (2005) has provided a model of dynamic scale economics through learning by doing. Given an upstream and downstream structure, a vertically integrated firm can reduce its upstream cost by supplying downstream competitors. However, the downstream competitors may strategically decide not to purchase from the integrated firm unless the price of the integrated firm is sufficiently lower compared to alternative sources of supply. The paper portrays situations when in equilibrium vertical disintegration occurs.

Many sourcing firms are observed to practise multiple outsourcing, that is, a firm simultaneously buying inputs from many sources. But the theoretical literature on it comprises only a few papers. In Pack and Saggi (2001), by means of multiple outsourcing a firm can reduce the effect of double marginalisation problem. Andrabi, Ghatak and Khwaja (2006) consider multi-sourcing as an outcome in the presence of uncertainty. It actually reduces the problem of supply bottlenecks. Mukherjee and Tsai (2013) consider a scenario when outsourcing embodies technology transfer from the input buyer to an input supplier because the latter can produce at a lower cost than the former. But there is a threat of imitation by the transferee, that is, if the transferee is capable to imitate the technology it can enter the technology seller's final goods market. Given this threat, by making outsourcing contracts with a number of input suppliers, the outsourcing firm can, in fact, eliminate the threat of entry.

In another paper Mukherjee and Tsai (2010) have shown that an international outsourcing can be employed as an entry deterring strategy. Such an outsourcing is also welfare reducing for the outsourcing country. The paper focuses on the cost asymmetry between the incumbent

and the entrant in respect of outsourcing. Since the entrant requires, in addition, to incur an entry cost, the incumbent can prevent the entrant from entering.

Bandhopadhyay, Marjit and Yang (2013) have drawn attention to an important aspect of outsourcing, viz., the impact of barriers to international outsourcing on domestic employment in an oligopoly framework. International outsourcing implies, in a sense, transfer of job creation from home to foreign country. It has also adverse implication for home tax revenue. In US, offshore outsourcing has been so vast in size that it has been a big political (debatable) issue in the last consecutive US presidential elections. Some study founds that about 71% of American voters believe that outsourcing jobs overseas hurt the economy and about 62% believe that US government should impose some legislative action against companies that transfer domestic jobs overseas, possibly in the form of increased taxes on companies that outsource. US policy makers have, in fact, proposed to reform tax codes to reduce incentives for US companies to outsource jobs.⁷ Bandyopadhyay et al. seem to be sceptical about the desired effect of the policy. Their paper shows that market share losses of domestic firms due to outsourcing barriers may indeed end up hurting domestic employment. While outsourcing tax makes domestic labour cheaper, its employment effect is ambiguous due to strategic considerations and interdependent nature of international policies. They claim that their results are robust to both Bertrand and Cournot modes of competition.⁸

Then a number of papers on outsourcing are prepared in the context of trade liberalization.⁹ Consider the papers by Chen, Ishikawa and Yu (2004) and Ornelas and Turner (2008). Chen et al. (2004) focuses on strategic outsourcing in a period of trade liberalization in intermediate product market and draws attention to the observation that an outsourcing firm sometimes purchases key intermediate inputs from its efficient rival in the final goods market. In such a situation the usual cost-saving motive is accompanied by a strategic motive. Then trade liberalization in intermediate goods may lead to higher prices for both

⁷ See the White House press release dated 9/8/2010 (www.whitehouse.gov).

⁸ In a differentiated duopoly model, Arya, Mittendorf and Shappington (2008b) derives implications of outsourcing from low cost competing firm under price competition and Cournot competition. It is shown that Singh-Vives (1984) results undergo a drastic change. For instance, Bertrand competition can produce higher prices, higher industry profits, lower consumer surplus and lower total surplus than Cournot competition. When the supplier of an input is also a retail rival, the vertically integrated production may set a higher input price under Bertrand competition than under Cournot competition.

⁹ We have already discussed the contributions of McLaren (2000), Antras and Helpman (2004) and Grossman and Helpman (2005).

intermediate and final goods. On the other hand, Ornelas and Turner (2008) draw attention to the effect of trade costs on outsourcing, investment and integration decision as well as on trade flows. The paper shows that as tariffs fall under liberalization, not only it has positive price and investment effect on trade flows, but also it induces vertical integration to occur between domestic buyers and foreign suppliers and hence incentives to invest go up further.

4. Conclusion

This paper discusses the choice between outsourcing and producing inputs under vertical structure. Theories based on transaction costs, asset specificity, and incomplete contracting mainly focus on the boundaries of the firm. Within this orbit therefore outsourcing occurs because producing inputs in-house is costlier. The present paper draws attention to strategic factors. So outsourcing can happen even when the outsourcing firm has no apparent cost advantage. We discuss how by the decision of strategic outsourcing a firm can affect the cost and entry decision of its rivals, thereby can alter product market competition in its favour. This paper however provides just an overview rather than a thorough survey on the subject.

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