IT-Enabled Affiliations as Organizational Forms

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Abstract

We have found that information technology allows the creation of virtual enterprises - thereby enabling new forms of organization. This paper addresses the problem where expertise about customers and physical assets are separate. Traditional organizations couple these two aspects, often overlooking the contribution externalities make to incentives. We describe how IT-enabled affiliations can employ the externalities to improve incentives and become more profitable.

Introduction

This work describes the generalization of our existing stream of research on how information technology (IT) can enable new organizational forms. That stream was initiated by our work on franchise organizations in the commercial fueling industry (Nault and Dexter 1994), where we concentrated on local investment (e.g., local customer recruitment) by franchises. Because there are positive externalities between franchises that are not accounted for in traditional franchise organizations, underinvestment at the franchise level occurs (Katz 1989). In our model, IT-enabled transfers between franchises increases the level of franchise investment past the levels in traditional franchise organizations, partially accounting for the inter-franchise externalities. As a result, the franchisor becomes more profitable. We characterize the IT-enabled organization form as "ownership of customers" because those franchises that generate customers through their local investment efforts are rewarded through the transfers when those customers make purchases elsewhere in the franchise network.

We extended that model to include global investment (e.g., national promotion)

and found the results on local investment continue to be true, and underinvestment in global investment is also mitigated by IT (Nault 1996b). In addition, we provided conditions under which both the franchises and the franchisor are made better off through this use of IT (e.g., Pareto improvement) (Nault 1996a), and explored the implications of ownership of customers on the location of decision rights in an organization.

The present work focuses on generalizing the types of organizational forms to which our concepts of ownership of customers and inter-participant transfers can be applied. As our analyses suggest, the underinvestment problem that occurs in franchise organizations persists in many other hybrid organizational forms that lie between the extremes of hierarchy and market. In many of those forms, IT-based ownership of customers and transfers can be used to mitigate the underinvestment problem, improving the profitability of the organizational form. This analysis typifies the "move to the middle" hypothesis (Clemons et al. 1993).

The Traditional Organization

Traditional organizations couple two aspects we argue can be separated - the recruitment of customers and the provision of locations from which customers make purchases. The traditional organization proceeds to recruit customers solely on the basis of selling goods and services to them from its own locations. Therefore, incentives for customer recruitment are only derived from profits made locally. Ideally, an organization prefers to incent customer recruitment from purchases made at a wider set of locations, thereby increasing the incentive for recruitment. In the extreme, the organization wants to incent customer recruitment from profits made across the population of locations, thereby approaching the incentives that arise in a fully integrated operation. That is, these incentives result in levels of investment that are first-best.

Unfortunately, the expertise and specific information required to get the most out of investments in customer recruitment reside with individuals that are not necessarily principals of the organization. Although the principals may be able to estimate the returns to investment in customer recruitment, they cannot write a contract that details how these investments should be implemented. The solution for the traditional organization has been to couple customer recruitment and provision of location in order to partially resolve the investment incentive problem.

However, with the emergence of modern computing and communications

technologies, it is now possible to create "virtual enterprises" by decoupling aspects that were previously kept together. IT enables new organizational forms through IT's ability to monitor transactions, thereby providing a basis for the substitution of incentives for hierarchical control mechanisms (Milgrom and Roberts 1992)

IT-Enabled Affiliations

The structure we outline here decouples owners of customers from owners of locations. The former we refer to as "owners" and these are agents that have expertise or specific information that can be used in recruiting a segment of customers. The key to our structure, as we described above, is that principals cannot contract for the use of expertise or specific information held by these owners. Owners of locations, that we call "outlets", own assets related to a geographical location. Owners recruit customers to join the network, and outlets sell goods and services to final customers.

In the commercial fueling industry, trucking firms prefer to purchase fuel across locations from a single provider rather than a series of completely independent fuelers. In that industry, several networks of owners of outlets have evolved. Thus, a truck stop providing fuel to network customers is an outlet, whereas an agent that recruits a trucking firm to use the network of fueling stations is an owner. The network provider tracks purchases by customers at outlets, provides billing information to the owners so that they can invoice their customers, and manages the funds transfers between owners and outlets. Individual owners decide how much investment (or effort) to put into recruiting trucking firms for the network. Individual fuel outlets decide whether to become a network location. On each purchase in the network the network provider sets a royalty from the owner to the provider and a transfer between the owner and the outlet.

We study this structure by modelling its efficiency in three parts. Sequentially, the network sets the level of incentives (royalty and transfer). Then outlets decide whether to adopt, that is, become a node on the network. Finally, owners decide their level of investment in recruiting customers. We approach the solution in reverse order. First, we examine the owner's investment problem conditional on the coverage, where coverage is defined by the number of outlets that adopt. Second we determine which outlets adopt, taking into account the owners' investment levels. Third, we study the network provider's optimization problem choosing levels of the royalty and the transfer.

We identify outlets by potential traffic volume through the outlet and owners by potential volume generated by customers they recruit. Demand at a given outlet from a

given customer depends on the potential of that outlet, the potential of the customer, the investment made by the owners in recruiting the customer, and coverage.

The Owner's Investment Problem

A given owner's profit function is the premium per unit of demand, less the royalty and transfer, multiplied by the demand from a given customer at a given outlet, summed over all adopting outlets, less the cost of investment. Each owner optimizes its profits by choosing its level of investment resulting in a set of conditions, one for each owner, that describe a Nash equilibrium in investment. This equilibrium determines the level of investment for each owner as a function of the premium, the royalty and the transfer.

The equilibrium levels of investment are increasing in the premium, and are decreasing in the royalty and the transfer. This is intuitive - the higher the premium the higher the marginal return from investment in customer recruitment, and vice versa for the royalty and transfer.

The Outlet's Adoption Problem

If a given outlet joins the network it receives a transfer per unit on all purchases made by all the owners' customers at that location. It also faces an adoption cost that may be made up of lump-sum and variable components. Should the outlet not adopt, then it is unlikely that it would receive any purchases from owned customers as these customers derive control and convenience from exclusively using the network (Nault and Dexter 1995). Thus, an outlet adopts if its revenues from owned-customer transfers are greater than its costs of adoption. If demands are increasing in outlet potential, then larger outlets adopt and smaller ones do not.

The larger the per unit premium, the greater the coverage because owners invest more in customer recruitment, leading to increased demand at each outlet. The larger the royalty, the lesser the coverage for the opposite reason. Changes in the transfer have indeterminate effects: an increase in the transfer lowers investment in customer recruitment but directly increases the unit revenue at the outlet.

The Network Provider's Problem

The network provider's profits come from the royalty on all demands. The network

provider must decide on both the level of the royalty and transfer to maximize profits because the transfer affects profit through the incentive for owner investment. The negative effect on owner investment from increases in the royalty exceed those from increases in the transfer because the transfer has an additional positive effect on owner demand through increased coverage.

Nonetheless, because network provider profits are a direct result of the royalty, it is not possible in general to determine whether the absolute value of the royalty or transfer should be larger. Specific results require additional information concerning the parametric forms which would apply to a particular case.

Extensions and Conclusions

The organization form we described above is isomorphic to a credit card model, and thus our structure and analysis applies there also. Our version of that model has three types of participants: a credit card company (e.g., VISA), banks that offer the credit card (e.g., Chemical Bank) and stores that accept the card for payment. Using the terminology we developed above, the credit card company is the network provider, banks are owners, and stores are outlets. Thus, banks decide how much to invest in recruiting customers to use their card (i.e., local investment). Each bank has some local knowledge of its customer base that it can use in recruitment efforts. That reflects, for example, the credit worthiness of its customers. Next, stores decide whether to be sponsored, that is, to accept the use of credit cards for purchases. Finally, the credit card company has to decide how much to give stores and how much to give banks in order to incent the stores to take the card (adopt the network) and incent the banks to recruit customers.

Our work has shown that the IT-enabled mitigation of the underinvestment problem in franchise operations can also be applied to cases where expertise and information about customers, and physical assets related to location are separate. The basic form of our model is generic - it is generalizable to many other situations. We briefly described its extension to the credit card environment above, and we believe it is applicable to electronic commerce over the internet.

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