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RESOURCE OPTIMIZATION FOR IT PROJECTS— A SUPPLY CHAIN APPROACH

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ABSTRACT

Software service organizations (SSOs) execute Information Technology (IT) projects and provide skilled human resources to client organizations. For a given IT project, a SSO may be required to provide their clients with IT professionals having a specific combination of software and/or hardware and/or managerial skills and with a specific level of expertise in each of those skills. However the actual number of people who meet all the required conditions for an IT project would be small. SSOs aim to achieve a balance between high growth and high utilization; the former requires keeping a pool of available resources to be deployed at growth opportunities. However if this pool becomes too large, utilization suffers, lowering profitability. Thus, the key to IT project execution lies in human resource optimization—putting together the optimal mix of human resources at the correct location at the correct time at the correct price. However, SSOs have not been very successful in this regard, with low utilization ratios being common in the industry. The objective of this study is to provide an optimal human resource management model that maximizes profitability by taking into account factors peculiar to SSOs.

KEYWORDS

Information Technology (IT) Projects, Resource Optimization, Supply Chain.

INTRODUCTION

Recent reports suggest that organizations plan to increase their Information Technology (IT) expenditures over the coming years (Causar 2004; Seroppian 2003). The total size of the IT market is estimated at around \$1.521 trillion with around \$556 billion belonging to the IT services sector (Adams & Silliman 2003). The annual growth rate of the IT services sector is estimated at around 5.6% and is projected to reach \$707.3 billion in 2007 (Pring 2003). Major players in this field include multinational organizations such as IBM Services, Bearing Point, Cap Gemini, Tata Consultancy, and Infosys. Research has focused

primarily on issues relating to the implementation of IT projects within organizations, with little or no research conducted on the issues faced by providers of such services. Based on two case studies and a series of interviews conducted with management at software service organizations (SSOs), we introduce the human resource management model in place at SSOs, identify its structural deficiencies, and propose a new model that would result in greater human resource utilization and profit maximization.

THE SSO RESOURCE MANAGEMENT MODEL

The core SSO business model consists of executing projects and, in some cases, providing skilled human resources to client organizations at internal development centers or at client locations across the globe. *The key to execution is putting together the correct mix of human resources at the correct location at the correct time.* Resources need to have a specific skill set that can include an expertise, experience, or certification in a particular language, operating system, software package or platform, and a specific expertise level in each of these skills. The interaction among the above variables can create a situation that the actual number of people who meet all the required conditions would be very small even if the overall resource pool was quite large.

SSOs are usually structured as delivery/business units that usually focus on a client, industry segment, or technology. In some cases, the individual units own the human resources and in others, the human resources are allocated to individual units from a central pool. In any case, at any point of time all the resources are attached to one of the individual units except for resources who are free and available for re-deployment. These would be attached to a central resource management unit (CRMU). The challenge for SSOs is to achieve the balance between high growth and high utilization of human resources. A high growth requires keeping a pool of resources to be deployed at growth opportunities. If this pool becomes too large, utilization suffers, lowering profitability. The bigger challenge is the inability to predict the type of resources that would be required for upcoming opportunities.

SSOs organizations have addressed this issue by having a pool of new human resources and lateral hires (experienced people), and by contracting. The usual model is to ensure that existing units release experienced resources for new opportunities by substituting them with new resources or new lateral hires. Existing experienced resources are preferred for new opportunities as the chance of failure is less, and it is assumed that ongoing business can take the risk of substitution as they will be able manage the risk. Also, the costs of substituted resources are less than the released resource. A CRMU manages this movement of resources. The operation of an SSO can be likened to a supply chain. In the automobile industry, manufacturers need to source thousands of different parts from multiple locations across the globe and bring them together at the assembly location in correct proportion without carrying excess inventory. Using this analogy, each IT project is the equivalent of a vehicle model; each human resource in the project is equivalent to a component, each project location is equal to an assembly plant, and each delivery location where resources are stationed is equivalent to a component supply location. We call this model the "People Supply Chain." Despite being widely used, it has certain structural deficiencies. Individual delivery/business unit managers do not have an incentive to release human resources as this runs contrary to their own individual profit/performance objectives. We first discuss deficiencies within the SSO Resource Management Model and then provide an internal market mechanism for the optimization of the "People Supply Chain."

Structural Deficiencies in the SSO Resource Management Model

In this model, an internal transfer cost is assigned to each resource, and each unit is billed this internal transfer price. Given this situation, a unit manager usually does not have an incentive to release an individual for a new requirement if the substitute does not come at significant lower cost. Thus, at an

organizational level, an opportunity for higher profit is lost. In situations where a standard transfer price is attached for all human resources, there is no incentive to differentiate between resources at the same price. Some of the resources that are technically superior can move up and do higher value-added work, however the unit manager continues using the resource in a lower value-added position if the manager does not have enough higher-level positions within the same unit. This can lead to a good resource getting demoralized and moving out of the organization, resulting in a loss to the SSO. Managers tend to hold on to good resources, as their success is dependent on it. These resources might be utilized sub-optimally with respect to their capability and potential. Other managers would like to obtain these resources and optimally utilize them. However, given the reluctance of managers to part with good resources, usually such underutilized resources are not shifted to a different project, resulting in a loss to the SSO.

PROPOSED MARKET-DRIVEN HUMAN RESOURCE MANAGEMENT MODEL

We propose a model which would create an internal market for human resources within the SSO. The function of the market would be to create a liquid market for resources. The unit managers would be participants in this market and would procure and supply human resources at prices at which their unit profits would be maximized. As in any market, if individual market participants maximize their profits, the organizational profits would also be maximized. Following are the features of the proposed model:

- Unit managers are assessed at their gross contributions and their contribution ratio. The contribution is defined as revenues minus the transfer pricing of their resources. The contribution ratio is actual contribution divided by actual revenue. To ensure a level playing field, all managers should have the same target contribution ratio irrespective of the profitability of their segments
- All resources will have a transfer price attached to them. The nominal transfer price for a resource will be the cost to the company divided by the available number of working days. Every time there is a change in the cost to company of the resource, the nominal price would be updated
- The CRMU is assumed to be market maker, all revenues from nominal transfer pricing for the resources would be to the revenue account of CRMU, and similarly nominal price of all resources not allocated to any unit after being ready for allocation would be debited to the account of the CRMU. All employee costs would also be debited to the CRMU. Thus the CRMU would have an ever increasing debit account which will reflect the slack (non-utilization) within the organization
- Resources will be classified into three categories for purposes of the market:
 - Free Resources (FR) (available with CRMU)
 - Project Resources (available with managers), this will be classified into 2 categories
 - Free Project Resources (FPR)
 - Non-Free Project Resources (NPR)
- When a resource is allocated to a project, it cannot be shifted for certain period of time, for example 3–6 months. Thus a resource would be classified non-free during this period; post this period they would be changed into the free category
 - Contractors—These are subcontracted resources available from outside and are usually much more costly than internal resources. They are usually of three types:
 - Contractors working in Projects, Non-Free (NCR)
 - Contractors working in Projects, Free (FCR)
 - Contractors available in Market (MCR)
- The same rules that apply for non-free project resources apply to non-free contractors
- All new resources and lateral hires will come into the FR category
- At the start of the market, each of the resources will be classified as per their current status and the cost against them would be their nominal cost
- The function of the market would be to facilitate a free movement of the resources within the organization using the transfer price of a resource

- When there is a requirement for a additional resource a manager has the following options:
 - Search whether there are any FR fitting the exact requirement available in the market
 - Search whether there are any resources in the FPR and FCR
 - Obtain a lateral resource from the outside market
 - Search whether there are resources in the MCR category

Given the project requirements, the manager might choose the options that suit him best, however this would also result in optimal human resource utilization and profit maximization for the SSO. Of the many possible scenarios, we discuss two.

Scenario 1

In the case that the manager identifies a resource in the internal market that is in the free category, he can decide to bid for the resource. The bid would be a daily dollar value and duration (for the assignment). In the case of free resources in the pool, the bid can be equal to nominal transfer price. In the case of the project free resources and contractors, the bid would need to be higher than the transfer price being paid by the current unit. Assume that in any bid only one bidder apart from the existing manager would be involved. The existing unit has the option of accepting the higher bid and releasing the resource or matching the bid. This process can go on until there is a highest bid not matched. The bidding winner could be the resource's existing unit manager or another manager who wanted the resource. If it is the same unit manager, then the transfer cost for the resource now gets set to the winning bid price for the duration which was specified in the bid. The new market price for the resource gets set as the new transfer price which would be the price to beat if someone needed to bid for this resource.

Scenario 2

In the case that the existing manager feels that the cost of a resource has gone too high, he can let the other manager outbid. In this case the resource is earmarked for release at the highest bid price. However the manager can have the option to release the resource fully or still keep ownership of the resource. The ownership option is valid only if the duration of the new assignment is less than a year. In this case, the resource returns to the unit after the assignment. In the case the manager decides not keep ownership of the resource, the resource will revert to the common pool after the assignment. In either case, the manager of the unit which releases the resource makes a profit on the transaction which equals to highest bid price minus existing transfer price multiplied by the duration of the new assignment. In addition, the winning manager needs to pay the existing transfer price for a period of, say, two weeks so that the existing manager can substitute the resource that is moving.

Benefits of the Proposed Model

Human resources who are not in demand or who have performance issues will be allocated to the common pool and there will not be adequate demand for them; this will highlight skill mismatches and allow the organization to take corrective actions. Valuable resources will be bid up by interested managers so that wherever they are, they can be identified by the high transfer price that they carry in relation to their nominal transfer price. Resources capable of taking up work that has a higher value added than what they are currently doing would be bid by interested managers and would be gainfully deployed; this would ensure that their career aspirations are also satisfied and attrition would not happen. Resources that are not perceived valuable will remain in the pool as managers will not be interested in bidding at the minimum rate which would be the nominal transfer rate; the SSO can take corrective action which would be appropriate. In this case, all managers will try to optimize their profits by choosing the appropriate mode of sourcing and appropriate resources at the cost that their business can support. Thus managers

who operate at lower price realizations will be forced to continuously reduce their resource cost by releasing their resources if their cost goes up and replacing them with cheaper resources.

CONCLUDING REMARKS

The proposed model addresses some of the resource management issues that face SSOs. It facilitates the transfer of resources in a manner which maximizes organizational profit objectives while also allowing individual managers to maximize their individual contributions. This also has an added advantage of allowing organization to increase revenue and profit potential by tapping into segments which would not be normally profitable in the current model.

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