Cost Analysis of the Super Department Reform in Universities---Based on the Cost-Utility Model

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Abstract. Super department reform can improve organizational operational efficiency. It is the direction of modern organizations. However, it should pay attention to the cost of the super department reform. This paper analyses the existing cost problems in the reform of the super department. Using cost theory to analyses the relationship between revenue and cost of the reform in universities. The cost mainly contain four aspects. They are establishment cost, operation cost, benefit friction cost and coordination communication cost. It is possible to make better improvements when we should clearly understand the cost problems in the reform.

1. Introduction
China's higher education has made great progress in teaching, scientific research and social services. Universities have achieved remarkable achievements in education quality, discipline construction, academic, scientific research and social benefits. However, compared with western developed countries, China's higher education management system still has many problems, such as complicated institutions, overlapping functions, limit autonomy in running schools, confusion of academic and administrative powers. Super department reform can solve the problems partly. It can optimize and integrate the institutions of various departments. The reform should handle the similar functions by a single department. It can minimize the waste of resources caused by functional overlap and management confusion in different departments.

However, different universities have different occasions. So it is necessary to take cost theory into the functional department reform.

2. Empirical analysis
The super department reform is a kind of non-professional and complete entrustment. Schools entrust different tasks to secondary units. The secondary utility function of each department in university includes different cost. We assume

The utility function of each department in university includes cost, and the absolute cost coefficient is $\eta$. We hypothesis that there are two different tasks (Task 1 and Task 2). Assuming that department A has to work hard to accomplish task 1 and task 2, the cost of effort is as follows:

$$C(e_1,e_2) = \frac{1}{2}ce_1^2 + \frac{1}{2}ce_2^2 + \delta ce_1 e_2$$

(1)
In the contract theory, it generally use $\delta$ to express the degree of technical independence of two tasks. It is usually assumed that ($\delta \geq 0$), when $\delta = 0$, it means that two tasks are technically completely independent. When $\delta > 0$ means that increasing efforts on one task will increase the marginal cost of efforts on another task. In this paper, we assume $-1 < \delta < 0$, because the increasing efforts on one task will generally reduce the marginal cost of efforts on another task. But the reduction is limited for interrelated tasks. $\delta = 0$ indicates that the degree of correlation between two tasks is zero. We define the absolute value is the degree of correlation between two tasks. After the efforts of each department, the benefits can measure as follows:

$$X = e_1 + e_2 + \varepsilon$$  \hspace{1cm} (2)

In the formula $\varepsilon$ is a random variable conforms to the normal distribution. Its means value is 0, its variance is $k \sigma^2$. K is a constant greater than 0. $0 < k < 2$ means that there is less cost to entrust two tasks to the same department than to entrust two tasks to different departments. $k = 2$ means that entrusting two tasks to the same department has the same cost as entrusting two tasks to different departments. $k > 2$ means entrusting two tasks to the same department rather than entrusting two tasks to different departments cost more. We call K is the cost consolidation factor. It can express the department cost as follows:

$$w = ax + r$$  \hspace{1cm} (3)

$a$ is the excitation intensity, $r$ is a fixed payment. According to the above settings, we can get the equivalence of department revenue as follows:

$$CE = ae_1 + ae_2 + r - \frac{\eta}{2} a^2 (k \sigma)^2 - \frac{1}{2} e_1^2 - \frac{1}{2} ce_2^2 - \delta ce_1e_2$$  \hspace{1cm} (4)

Through the formula, we can get the overall goal of the school is to maximize its expected utility and minimize the cost of inter-departmental coordination. But it is not easy to achieve because the constraints of the conditions in various departments will increase the cost of functional department reform.

3. Cost analysis

The cost-generating mechanism in the process of super department reform will further guide theoretical exploration of super department reform. The specific cost can divided into establishment cost, operation cost, benefit friction cost, coordination communication cost.

3.1. Establishment cost

The establishment cost consists of two parts. One is the cost of reform plan design. The plan design of the major department reform carry out in stages according to the social and economic development. We need a reform design plan to lead the whole reform process. The other is clearance cost of old system. In fact, the whole process of establishing the new system is the abandonment and removal of the old system. Such as the specificity of material assets. Because of the division in labor, the department and agencies have a large amount of information and abundant resources in a certain field. They reform separate the interests of different department. However, department with advantage resources are usually reluctant to share resources with disadvantaged department.

At the same time, duplicate work also increases the waste of resources. The specificity of material assets are also important. Because of the division of labor, these department and agencies have a large amount of information and abundant resources in a certain field. And they have irreplaceable authority in this field. They work separately from the interests of the department. The integrated department will face such a difficult problem. Department with advantageous resources are usually reluctant to share
resources with disadvantaged department. It is inevitable that some mistakes or even major mistakes will occur in the implementation path of the reform strategy. Even if the mistakes are very small. The sunk costs will be very high under the macro environment of the whole reform. In addition, in the process of reform, the increasing risk of change and the increasing factors of instability have increased the random cost of reform.

3.2. Operation cost
After the establishment of the system framework of large department, how to realize the effective operation of super department and reduce the operation cost is also important. The operation cost of the super department reform mainly includes two aspects. One is maintenance costs. After the establishment of the new system, it often requires a certain amount of resources and costs to maintain it. There are no laws and regulations to regulate the functions and powers of the department, but simply merge the functions. The power conflict and the prevarication will occur. If only simple compulsory reform can promote institutional change in the shortest time and fastest speed, but it also has limitations. Such as ignoring the feelings and interests of different reform participants and executives. The key point of steadily pushing forward the reform of super department lies in the degree of interdepartmental fit after merger because it is an important factor affecting the cost of super department operation. The cost of supervision also exists in the super department reform. The new system based on the merger of functions means the centralization of power. Therefore, the parallelism of supervisory mechanism is very important. so it must have rewards and punishments for supervision.

This requires punishment, which consumes a certain amount of human, financial, and material resources to collect information, inspect the implementation, and accountability for violations.

3.3. Benefit friction cost
Every reform participant is a stakeholder. Everyone is constantly measuring the impact of reform programs and measures on their own interests. The reform of super department system will inevitably involve the reduction and distribution of personnel. Sometimes the risk cost caused by the centralization of department power. The establishment of super department strengthens the central consciousness of some powerful department. There are still many department restricting each other in the original system. The promulgation of a resolution often requires bargaining and consultation among different department. The decentralization of power and the division of interests objectively counterbalance the power expansion impulse of each department. The reform merges the department with similar but the functions strength is concentrated in most areas.

In fact, internal supervision is formalize and external supervision is fictitious. The further expansion of administrative power and the relative weakness of supervision mechanism make the motivation of departmental interest obviously. The reform has expanded the scope of business managed by a department, expanded its powers at the same time. It brake the balance between the original departments. All department are trying to change their strategies in the reform to expand the benefits, so the existence of game cost is inevitable.

3.4. Coordination and communication cost
In order to eliminate the information asymmetry, it must pay the cost of coordination and communication. Extending to the reform of super department, the opportunistic behavior among the participants in the reform directly or indirectly leads to information asymmetry. The reform is charged with achieving different goals and tasks. In the process of reform, we should not only maintain the smooth transition of reform, but also deepen reform and speed up the transformation of departmental functions. We should pay more attention to the efficiency factor.

The construction of coordination mechanism among department is a problem. No matter how much power the integrated Department has, it is impossible to have sufficient resources to deal with all the problems independently. Department must exchange information, share resources and negotiate
compromises to overcome the "dilemma of collective action" caused by sector protectionism. In order to solve cooperative issues, we should reach consensus goals and take effective collective action.

The organizations are bureaucratic structures in colleges. The corresponding hierarchical settings are relate with the control range. However, too wide range of management will inevitably aggravate the difficulty of management supervision and communication coordination. It make the organization fall into the quagmire of chaos.

![Invalid Reform Circle](image)

Figure 1. Invalid Reform Circle

If the traditional management mode is not innovated, the operation and performance of department will not substantially improved. If there is no effective change in the concept of governance and the way of management, the majority system can only trigger a "physical reaction" rather than a "chemical change". Super institutional reform will fall into a strange circle of "simplification -expansion - re-simplification-re -expansion".

4. Conclusion
This paper analyses the necessity of the reform of super department reform by cost theory. We get the conclusion that the overall goal of the school is to maximize its expected utility and minimize the cost of inter-departmental coordination by formula derivation. Super department reform is not an easy task. Reform may not necessarily improve departmental efficiency at the beginning. It may occur some cost problems such as the establishment cost, operation cost, benefit friction cost and coordination communication cost when we promoting the reform. We need to pay attention to these cost issues in order to promote the success of the reform.

References
[1] Christensen Tom, Painter Martin. A Case Study of China's Administrative Reform the Importation of the Super Department. American review of public administration, Volume 40 (2), March 2010, Page 170-188.
[2] Christensen, Tom. Japanese University Reform-Hybridity in Governance and Management. Higher Education Policy, volume 24, March 2011 (1), Page 127-142.
[3] Jung, Chulmin; Yoo, JaeBong. The UK University Reform: focused on Ideas of a University. Philosophy of Education, volume 48, 2012, Page 339-364.
[4] Kim, Yong. A Study on the Currents and Implications of the Japanese University Admissions Reform. Korean Journal of Comparative Education, volume 28 (3), 2018, Page 185-216
[5] Potts, Anthony. Selling university reform: the University of Melbourne and the press. Studies in Higher Education, volume 37 (2), 2012, Page 157-169.