

The Operating Cost in a Tele-working Organization

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ABSTRACT

In this paper, we develop a model of the operating cost in a teleworking organization and describe the components and the changes of the operating costs. Then we give the application of the model for the decision-making in an organization willing to adopt teleworking.

Keywords: Teleworking; Operating costs; Net present value (NPV) criterion

1. INTRODUCTION

Telework, considered as an innovative work organization form, has emerged thirty years ago. However, at present telework has been adopted by more and more companies as a tool to cut costs, attract and retain top personnel in fields with short labor supplies[1]. Until 2003, 19.8 million persons usually did work at home as part of their primary job according to the Bureau of Labor Statistics of the U.S. Department of Labor report[2]. In Britain, official government statistics show telework has doubled in the six years since its measurement was incorporated into the Labour Force Survey. Whilst growth in some years has hit as much as 20 per cent, for 2003 it has been a more average of around 12 per cent. The total has grown from 1.01 million in 1997 to 2.113 million people or just over 7.5% of the workforce.[3]. In China, the government and companies' appeal to telework is also becoming stronger and stronger.

However, the cost is one of the key factors when an organization decides whether to adopt teleworking. The past study about the cost of telework is integrated with the cost components less and uncompletely. For instance, just as the author (On Cost In Teleworking) pointed out, the model didn't consider learning costs explicitly. Moreover, the existing studies about costs in a teleworking organization mostly are passive studies.

In this paper, our major interest is to understand the components and changes in costs when an organization changes from traditional form to teleworking form. The objective is to provide a decision support tool about the operating costs in a teleworking organization.

2. TYPES OF TELEWORK

Telework is defined simply as employees who work anywhere except the main office and make use of the electronic connections, for example telephone lines, cellular, wireless circuits, internet access. Telework has developed various kinds of types in different countries and locations until now, including mobile working, home-based teleworking, satellite offices, and

neighborhood work centers [1].

And it is culture to mainly influence on various kinds of types of works producing. In America, the freedom and independence is regarded as the most important factors in American literature so home-based teleworking are satisfied with the general American life. But, in Europe quantity of the staffs who spend their working time at home are less than in America.

3. ORGANAZATION OPERATING

If a company intends to adopt telework for the improvement of productivity, efficiency and flexibility or any else, the first one what need to do is to ascertain the new culture and than implementation completely. During the implementation, some objectors become the producer of obstacles for reformation but they will follow the majority's opinions and join the party by more and more staffs supporting the reformation. So to select a suitable pilot project is vital for an organization that has the will to adopt teleworking.

A good pilot project should have 5 elements including people, business, time, scope, and thing as the following:

- People (staffs): enthusiastic participants (volunteers) but few
- Expected reaction: criticizing the business moderately
- Business: constructing the new reasonable standard.
- Time: a period of less than one year
- Scope: suitable work scope
- Thing: a nominal cost

When the majority in the organization accepts the new company's operation that leads to the new company culture, it is time to decide which parts of works are suitable for teleworking. The following traits should provide the possible criterions for selecting the suitable department to perform the teleworking .

- Activities requiring concentration intensely and creative thought

- Individual or small-scope review and analysis
- Work that requires low levels of physical collaboration
- High telephone and computer use

However we can think over the problem from another aspect. In every organization, a variety of tasks have to be carried out by employees. In a given situation the employees of the company have a number of tasks. Each

of these tasks can be described by a number of variables or dimensions[5]. Examples of such dimensions are listed in Table 1 (On Cost In Teleworking, p56).

In fact, we can try to identify these characteristics of a task to decide whether it is suitable for teleworking. A task having the left characteristics is more suitable than the others in the table 1.

Table 1. Examples of task dimension

Degree of routinization	High	<.....>	Low
Degree of structuredness	High	<.....>	Low
Degree of active action necessary	Low	<.....>	High
Complexity	Low	<.....>	High
Need for internal communication	Small	<.....>	Large
Need for external communication	Small	<.....>	Large
Demand for competence	Small	<.....>	Large
Coordination need	Small	<.....>	Large
Time demands	Small	<.....>	Large
Environment	Stable	<.....>	Dynamic
Demand on accessibility	Low	<.....>	High

4. THE MODEL OF OPERATING COST

In an organization, some of the company's costs vary with output, while others remain unchanged as long as the company is producing any output at all. Moreover, when the variable costs increases continually until it almost equals to the fixed costs, the leader in the company begins to think over another model to decrease the variable costs or change it into the fixed costs such as building up the new location or buying new equipments. With different parts of the cost, we apply the different analysis methodology. We therefore divide total cost (TC) –the total economic cost of production—into two components:

Fixed cost (FC): A cost that does not vary with the

level of output.

Variable cost (VC): A cost that varies as output varies.

Then FC can be divided assets costs, management costs and information costs. VC is composed of marketing costs, traveling costs, training costs, production costs, and other costs. The costs considered are shown in Fig 1.

4.1 Fixed costs

When an organization changes from one form to another with a given work, the fixed cost will vary. To begin with the discussion, we subdivide the fixed cost into three types of costs:

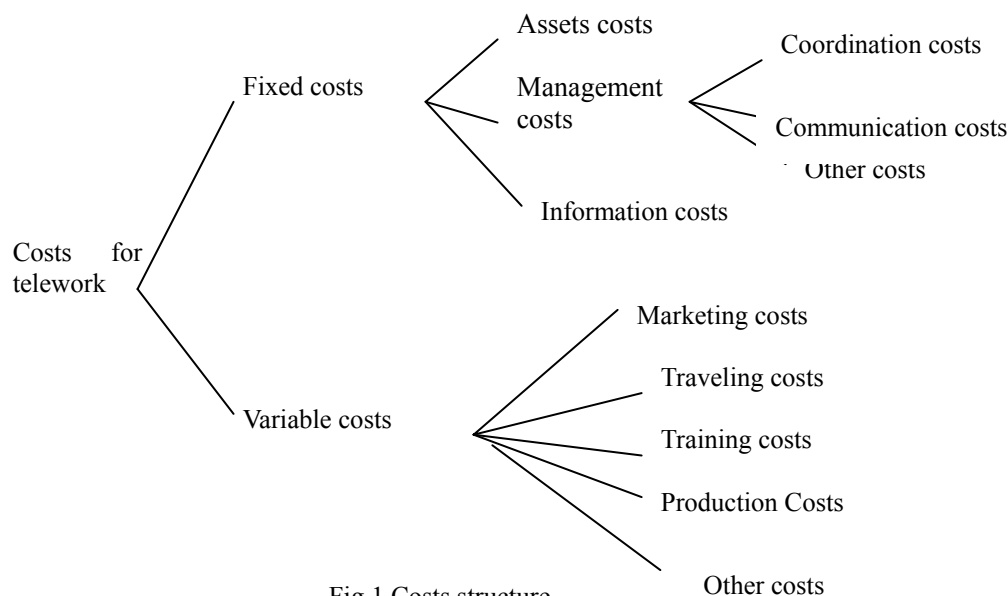


Fig 1 Costs structure

- 1, assets costs
- 2, management costs.
3. information costs

4.1.1 Assets costs

We refer to assets as the combination of working equipments and space.

Teleworker must establish “electronic connectivity” to the main office. Electronic information is typically conveyed in the form of voice, page, FAX, email or collaboration software application data. It can travel over a telephone line, cellular phone circuit, cable connection, or satellite link. Once the implementation mechanism for secure electronic connectivity is established, appropriate software packages should be procured to help mitigate the problems arising from reduced face-to-face communications. Applications could include uniform messaging (i.e., email, voice mail, and FAX all delivered to and sent from a web-accessible email address), voice-over-IP (i.e., internet telephony), teleconferencing, video conferencing, threaded discussion list management, workflow management, virtual whiteboards for concurrent document review and update, and document management (publish, check-in, check-out, version control). Organizations usually choose to standardize two mechanisms, in order to keep their information secure and their Information systems burden manageable:

1. The teleworker’s computing system capability and software application suite
2. The nature of the electronic connection, including telecommunications equipment

Once standards have been established, companies must select the degree to which they will underwrite the teleworker’s equipment and software. Some put the burden fully on the teleworker, some underwrite the required pieces, and some supply the teleworker with a pre-loaded, “approved” workstation. Factors that go into this decision include: data interoperability, teleworking budget, security, maintenance costs, and use as a recruiting/retention discriminator. To protect sensitive company information, teleworkers are frequently connected to their company’s intranet via a Virtual Private Network or a direct modem connection. Equipment expenses include (to the extent underwritten by the company):

- Computing equipment and software
- Office equipment (telephone, answering machine, cell phone, pager, copier, scanner, FAX)
- Office furniture (desk, chairs, file cabinets, bookcases, lights)
- Telecommunications (telephone, cellular phone, and cable connections; Internet access; Virtual Private Network)

The assets costs will go up as a result of buying new equipment. On the other hand, the working space cost will tend to be lower. When one of the departments of a

company move from an urban district to a rural one, the space cost will go down because of the lower price of the location and the local government’s grant.

Another problem we cannot ignore is the leaving unused of the assets. In the teleworking form, the leaving unused of the assets is inevitable sometimes. For example, when an employee chooses the home-based teleworking—three days working at home and the other days working at the main office, the leaving unused of the assets is serious. When we take opportunity cost into account, the assets cost will rise dramatically.

So, the assets cost can be expressed as

$$\text{Assets costs} = \text{Equipment costs} + \text{space costs} + \text{opportunity costs}$$

4.1.2 Management costs

Telework, in any form, has ramifications beyond simply changing the way or place in which an individual employee performs work: It can extend to remote managing and virtual teams. Remote managing occurs when managers are physically separated from their members who work away from the main traditional office and communicate with them by information technology. Virtual teams consist of team members who are geographically dispersed and who come together by way of teleworking technology. Each team member may be located in a traditional office setting, but the offices are not proximate to one another. Additionally, virtual team members may telework, such as a teleworker who is a member of a multiple-site team.

Thus, telework may have additional challenges that emerge when consideration extends beyond the isolated telework—both up (to managers) and across (to teammates) the traditional organization. These challenges mainly resulted from the following several inherent obstacles:

- Only certain kinds of work are appropriate to perform at a distance
- Teleworker socialization needs are difficult to satisfy
- Non-telecommuting co-workers may resent the teleworker
- Electronic communication fails to substitute for face to face contact perfectly
- Meetings become harder to schedule
- Emergency actions involving the telecommuter become harder to take
- Teleworkers may lose focus on the task at hand
- Managers have difficulty managing by results only

These challenges of management may be showed as:

- Performance monitoring
- Performance measurement
- Mentoring
- Synergy
- Managerial control

- Organization culture

To overcome these challenges, managers have to devote more works than before. The management costs will rise following these works increasing. For example, the internal coordination costs will increase because the managers have to travel between the central office and the teleworking sites. When the managers give up these traveling and coordinate by information equipment, the costs will change in pattern but not in amount.

4.1.2.1 Communication costs

Communication form of telework is much more different from traditional form and also can makes us describe obviously the advantage and challenge in managing teleworking model so we discuss it more in this subsection. We give our attention to three parts of costs: the costs of social communication within the organization, the costs of searching for information for decision and the costs of handling remaining ambiguity. To improve the communication affection and get enough information for each teleworker, the organization has to use many IT equipments and devote much time into these activities.

On one hand, the e-flow of the information brings the communication a higher speed. On the other hand, due to the lack of the effective communications in the teleworking organization, feelings of isolation and an inability to complete work tasks fully become the main disadvantages of teleworking for the employee. All these factors will be the main obstacle to establish the organization cultures in a teleworking organization. Additionally, the employees may have difficulty in completing work assignments as they have less access to the necessary equipment (i.e., photocopier or fax machine). So the opportunity costs of the communication and will be much higher than before.

4.1.2.2 Coordination costs

The coordination costs include the costs of commanding—giving and taking orders for instructions or control—and the costs of project leadership. The cost of coordination largely depends on the way the relationship between the company and the dispersed unit is regulated and this, in turn, goes back to the types of tasks that have to be performed by the unit. Generally, this part of cost will be arising in a teleworking organization. For example, the internal coordination costs will increase mostly because the project leader has to travel between the rural and urban offices to give ‘face-to-face’ instructions.

The reason why we put the communication and coordination costs into the fixed costs instead of variable costs is that communication costs in teleworking vary little, almost stable during the period. In the traditional working form, it is easy to communication costs vary

with output. If the teleworking is adopted, the e-flow and IT equipment will make costs more stable compared with the traditional working.

4.1.3 Information costs

Information costs is shown on the marginal costs in the traditional model and it is covered into other costs such as the office’s rent. When teleworking is adopted, the information costs emerge clearly and the costs may decrease more and more by using IT equipments. Another reason of the decreasing of this part is that the distance between consumers and markets gets closer and closer in teleworking model. Here we give the definition of the information costs in telework that is produced when information is collected, transferred and switched by IT equipments for operating.

In addition, we must point out that the management and information costs have some superposition inevitably. For example, we cannot classify the cost when a manager exchanges information with a teleworker for daily work. However, when we refer to the information costs, we pay more attention on a teleworker rather than the manager.

4.2 Variable costs

Compared with the fixed costs, we mainly discuss the variable costs from the aspect of an individual employee. In other words, we mainly examine the average costs of every teleworker.

4.2.1 Marketing costs

About marketing costs, we must distinguish two kinds of conditions. First, if the marketing task is the project leaders’ job, such as in some consultant companies, the marketing costs with the client will keep stable due to the project leaders remain at the old location.

However, if the organization has the specific department to market with the client, the marketing costs may decrease especially when the purpose of organization’s executing teleworking is to reduce the distance between the company and the customers. In these cases, it is possible to locate part of the company close to an important supplier or customer, which could lower cost. Under these conditions, the satisfaction degree of the client will rise and the opportunity costs of marketing also go down.

4.2.2 Travelling costs

The most obviously benefit for the teleworker from teleworking is the reduction of the traveling costs.

Studies show that Teleworking Programs can contribute to 60% fewer driver miles, and traffic congestion is reduced as the number of employees physically traveling

to their places of employment decreases. It is estimated that each driver could save two hundred gallons of gasoline and four quarts of oil each year by utilizing alternative work places.^[7]

On the other hand, this travel-time reduction may result in over two hundred hours saved annually—time which can then be spent on family, hobbies, and other activities.^[7] So we can get that if an employee choose telework, his/her opportunity costs of the traveling will be much lower than before.

4.2.3 Training costs

In an organization, it is critical that both supervisors and employees feel they can share their concerns, and that they are capable of communicating their concerns cogently. However there are many difficulties in how to act as a qualified teleworker and how to manage teleworking when a traditional organization changes to telework. So it's necessary for managers and employees to improve their ability to make use of the electronic media for communicating effectively by training.

Supervisors of teleworkers provide important leadership, coordination, and team-building functions for their project teams. An introductory training session for telemanagers is recommended to:

- Learning the best practices of teleworker management
- Reviewing organizational telework policies and guidelines
- Understanding the needs of the teleworker
- Surface any concerns they may have about teleworking arrangements

Better-informed people make better-informed decisions. Introductory training for teleworkers helps inform them of:

- Organizational telework policies and guidelines
- Their communication responsibilities
- Best practices of telecommuting
- The challenges of to be a teleworker

Thus, for a teleworking organization, at the beginning of operating there must be a huge budget for the training costs. But when the managers and employees in the organization have been similar with teleworking, the training cost will be lower than before because these trainings can go on the teleworking web.

4.2.4 Production costs

The impacts of teleworking in the production costs including the following aspects:

Most readily apparent is an increase in employee productivity. While such results may be based partially on subjective assessments, many companies report productivity increases ranging from ten to forty percent.

Similar increases have been reported in positions such as data entry clerks, where gains may be objectively measured.^[8] While some may believe these gains result from employees working longer hours, a better explanation may be that teleworking (i.e., home) creates an environment more conducive to work. The teleworker is not subject to constant interruptions for quick questions or chats during the workday. Thus, the actual time spent working outside the formal workplace can produce a higher quality and quantity of work output. In addition to an increase in productivity, a decrease in absenteeism can be anticipated. Many absences occur due to an employee not being able to come to work for reasons including minor illnesses, emergencies, or personal appointments. When employees are able to perform some of their work as teleworker, absenteeism decreases, thereby minimizing the total costs.

The option of teleworking creates incentives for employees to remain with the company and thereby increases the retention rate and decreases recruiting costs. At the same time, teleworking allows the company to increase its base of potential employees, since the geographic location of available candidates greatly expands.

All what we have discussed as the above are explicit affections for a teleworking organization. However there are other advantages of teleworking existing as externalities for the company. Therefore, We should not be surprised when the government give a teleworking organization the grants. And the grants also affect the costs in teleworking just as what we point out in the next part.

4.3 Application of the model in decision

How should a company decide whether a task is suitable for teleworking with a given work? Suppose there is a task T for a company. If we will complete the task with teleworking, we need n employees and t unit times. The fixed costs are C_f , and the average costs of variable

costs for every employee is C_v per one unit time. The government grants are denoted as G , and the expected profits of the task are π . R is the opportunity cost of capital. In other words, the correct value for R is the return rate that the company could earn on traditional condition.

Then we can use the net present value (NPV) criterion to make decision:

$$NPV = \frac{\pi}{(1+R)} - C_v * n * t - an(C_f - G) * t$$

where $an(C_f - G)$ is the annual cost associated with fixed cost minus the government grants.

The company should adopt teleworking only if that net

benefit is positive—i.e., only if $NPV > 0$.

5. CONCLUSION

In this paper, we divide the operating costs in teleworking into several parts. Then according to the different characteristics of every part, we adopt different method to analyze it and build the model. And we design a mathematical model to support making decision according to this model when an organization plans to adopt teleworking in it. However there are still many problems we cannot give an effective method to solve. For instance, when we come to the opportunity costs of capital, no one can give an accurate value about R . Under this condition we must ask for help with our experts. But, we are not certain with to which extent the estimated value is reliable when facing a new thing. All these suspending problems are interesting and challenges for us. Following with the development of teleworking in China, our society will pay more attention on this field.

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