Research on the Investment Costs of IT Project

Chen Zurong, Feng Jingchun
Business school, HOHAI University, Nanjing, China

Abstract. The investment costs of IT project are the basis of IT project management. The meaning and composition of the investment costs of IT project were analyzed in this paper, which involving the engineering cost of IT project, the other costs of IT project, reserve cost and financing interest of the construction period. On this basis, the composition and content of static investment costs and dynamic investment costs of IT project were also studied in the paper.

1. The meaning and composition of the investment costs of IT project

The investment costs of IT project are the basis of objective control on cost, financial and economic analysis, the selection of plans, risk analysis and sensitivity analysis. Meanwhile, it also provide backing to the self-evaluation of financial obligation for the owner, marketing transactions, investment estimation, design estimates, design budget, contract price, claim price, changing price, settlement price and final price. IT project is of intensive assets and technology, the composition and content of which have their own particularities. The costs of brainwork, living labour, equipment and operation& maintenance take a large proportion of the investment costs of IT project. At present, there have some confusions of the composition and content of the investment costs, and it has not yet formed a sophisticated and standard framework, which is adverse to the conduct of functions of IT project management. Therefore, the composition and content of investment costs of IT project are systematically analyzed from the perspective of the owner in the paper.

1.1 The meaning of the investment costs of IT project

The investment costs of IT project refer to all the costs expensed after IT project initiation. From the owner’s point of view, the costs expensed early in the project preparation period are usually not included, such as the cost on requirement analysis, the cost for the owner to appoint consultants to draw up project definition (project proposal), the cost on feasibility study and investment estimates, because if it is failed in IT project initiation, the corresponding costs should be reckoned in sunk cost for the owner.

1.2 The composition of the investment costs of IT project

According to the nature of costs of IT project, the investment costs of IT project can be divided into the engineering cost of IT project, the other costs of IT project, reserve cost and financing interest of the construction period. In the owner’s opinion, the composition of the investment costs of IT project can be seen in Fig.1.

2. The composition and content of the engineering cost of IT project

2.1 The cost of construction and installation of IT project[1,2]
2.1.1 Direct cost of project

Direct cost of project means the money spent on IT project entities, including direct cost and field cost.

a) **direct cost.** Direct cost includes labour cost, materials cost and machinery cost. Labour cost refers to the various expenses on technical professionals directly engaged in IT project, including basic wage, auxiliary wage and surcharge. Materials cost refers to the amortization on materials for consumption, devices and turnover of construction and installation of IT project. The budget on materials covers all expenses on the delivery of materials from the original place to warehouse or the equation, and it generally involves the costs on materials, packaging, transportation, transportation insurance and procurement & storage. Machinery cost refers to the fees expended in the form of depreciation in the implementation period of IT project, and it includes two categories, one is the first category of cost, that is, the depreciation, the fees on repair, replacement of parts, entering into and retreating from the site, the other is the second category of cost, that is, the fees on fuel and staff, as well as tax on vehicle license.

Fig.1 The composition of the investment costs of IT project

b) **Field cost.** Field cost contains the money spent on production and management in building site, including the fees on temporary facilities and on-the-spot management. The fee on temporary facilities means the cost the contractor expend on temporary facilities of production and living for the installment of IT project and other fees for implementation, such as the cost on putting up, repairing and removing facilities, amortization and so on. The fee on on-the-spot management refers to the cost the contractor take on organization and management in implementation period of project, namely, the basic wages, subsidies, welfare, labor] protection of on-the-spot managers, office expense, travel expense, the depreciation of fixed asset, the fees charged for using tools and insurance.

2.1.2 Indirect cost

The management cost for the contractor refers to the fees of organizing activities for production and conduct. The following fees are included:
a) Basic wage, subsidies and standard welfare for managers.

b) Travel expenses, which cover the fees for managers to be on mission, remove work, eat meals, visit relatives and recruit labor, a one-time expense for retired workers, as well as the costs on oil, fuel, license, highway maintenance.

c) Office expenses, which mean the fees for the contractor spend on office supplies, printing, post, telecommunications, books, conferences, hydropower, coal-fired (gas) and so on.

d) The fees charged for using fixed assets, which refer to the expenses on fixed assets, like housing, equipment and that kind of things.

e) The fees charged for using tools and equipment, which mean the amortization and maintenance costs on tools, appliances, furniture, vehicle, inspection, testing, fire that do not belong to fixed assets.

f) Insurance premiums, which are the fees on property insurance, management of vehicles, etc.

g) The fees for staff education, which refer to the fees spent for workers to learn advanced technology and improve their literacy.

h) Labor protection fees, which refer to all the fees sent to employees by the contractor in accordance with State regulations, for example, the fee of labor protection appliances, repair fee, health fee, anti-heat & temperature-drop fee, as well as the fee on measures of technology safety and fuel for bathing water and drinking water.

i) Taxes, which mean the housing tax, the tax of using vehicle for management and stamp duty that the contractor must paid by law.

2.2 The acquisition cost of equipment

The acquisition cost of equipment includes the expenses on domestic equipment, imported equipment and production furniture.

2.3 The acquisition cost of hardware and existing software

The acquisition cost of hardware is consisted of two parts: First, the cost of purchasing computers and software to be used in software development; Second, the cost of system software to be used in the development (operating systems, databases, middleware, etc.).

2.4 The cost of software development

2.4.1 Direct cost

a) Labor cost. It means the various expenses on technical professionals directly engaged in software development. It covers basic wage which means the wages sent to the developer for his position and skill, supplementary wages which refer to the money paid to the staff in other forms instead of basic wages, involving the various perks which according to State regulations are of the same nature with wages, the standard price subsidies, the subsidies of coal, gas, transportations and housing, as well as wage surcharge which involving welfare fund extracted by State regulations, union funds, endowment insurance, medical insurance, industrial injury insurance, unemployment insurance funds and housing accumulation fund.

b) Materials cost. It is defined as the expenses on various materials consumed in software development.

c) Machinery cost. It refers to the fees expended in the form of depreciation in software development.

2.4.2 Indirect cost. Indirect cost refers to the management fees of the contractor and they are the same with those of construction and installation costs, including basic wage, subsidies and standard welfare for managers, travel expenses, office expenses, the fees charged for using fixed assets, the fees charged for using tools and appliances, insurance, expenses on staff education, labour protection fee, taxes and so on.
2.4.3 **Profit.** Profit refers to the gain that should be included in the fees on software development and the benefits to be expected from the software.

2.4.4 **Taxes.** Taxes are the sales tax and extra charges of education funds levied on the income of developers by the government.

3. **The composition and content of the other costs of IT project**

3.1 **The cost of IT project management**[^1][^2]

3.1.1 **Organization cost of the owner.** Organization cost of the owner refers to the expenses that the newly formed unit has to spend on office and living facilities, vehicle and other correlative costs for running the work.

3.1.2 **Ordinary expenditure of the owner.** Ordinary expenditure of the owner includes ordinary expenditures on both staff and IT project management.

- **Ordinary expenditure on staff of the owner.** It refers to the recurrent expenditure of the owner from the date of being approval until the completion of the project management. And it usually contains basic wage of staff, auxiliary wage, the wage surcharges, labor protection expenses, education expenses, office expenses, travel expenses, conference fees, vehicles fees, the cost of technical library, depreciation of fixed assets, sporadic acquisition cost of fixed assets, amortization of low-value consumption goods, the cost on tools and appliances, repairs fee, utilities fee, heating expense.

- **Ordinary expenditure on IT project management.** It refers to the various costs of the owner from planning to completion, including the fees for financing, the board meeting, conferences and travel of inspecting the project during the construction period; the fees for consultation on technical, economic, legal and other issues involved in IT project; tenure tax, property tax, the fee on contract notarization, audit fees, business fees for tender; the fee on project acceptance, as well as design review of the project and security identification presided over by the competent authorities.

3.2 **The cost of design**

The cost of design is the money spent on research, requirement analysis, design of IT project and other relevant charges.

3.3 **The cost of supervision**

The cost of project supervision is the fees paid to IT project engineer for the supervision, the amount of which depends on many important factors, such as the characteristics of IT project supervision, the cycle of project construction, geographical distribution, supervision object, the methods of supervision, and the difficulties. The following approaches are generally adopted.

- **In accordance with the percentage of the cost of IT project construction (or the contract price).** It means the cost of supervision is calculated by taking a synthetically consideration of the size of IT project, types (software development, hardware integration, networking, information system integration and workshop engineering), stage, content, complexity, supervision cost and other factors.

- **In accordance with the service fee of the engineer who participate in IT project.** For instance, it is often paid according to the workload of every month for each person in IT project of small-scale or the project that the owner have the special requirements for.

- **Negotiated by the owner and engineer.** It means how to pay to the engineer lied on the results discussed by the both side.

3.4 **The cost of research**

The cost of research refers to the necessary expenses on scientific research to resolve technical issues during the construction of IT project,
3.5 The cost of testing
Testing phase is an essential part after the completion of IT project development. Due to the constantly reducing errors, the cost of testing is changing as time goes by, more at the beginning but less at end.

3.6 The cost of intellectual property
The intellectual property of software belongs to the person who expends labour in the development. If you have intellectual property rights, you will be free to dispose of the software, such as using, copying, selling, etc. Otherwise, the software can only be used within the scope of the authority’s power while copying and selling are not admitted.

As to commodity software, Software Company produces the commodity software for sell, so all intellectual property rights belong to Software Company. As regards software project, the integrator expends labour to develop software, so the intellectual property rights of the software belong to the integrator. But generally speaking, owners do not want to give away the project to a third party, so they will buy the intellectual property of software, in other words, the integrator transfers the intellectual property of the software to the user in return of a transfer fee.

The intellectual property of software project can be independently owned to the owner or the contractor, or owned to both the owner and contractor. If the general contractor outsources the software project, he should abide by the principle that everything belongs to the people who expend labour for it and let the labourers own the corresponding intellectual property, which the general contractor can also buy and sell to the owner. [3-7]

3.7 The cost of R & D
The cost of R & D is referring to the expenses taken to research and develop new equipment, materials, techniques and methods in the construction period of IT project.

3.8 The cost of training
The cost of training is the outlay on training the owner, technical staff or managers.

3.9 The cost of finance
The cost of finance refers to all sorts of fees for the contractor to raise funds, including net expense of short-term loans interest during operating, net losses of exchange rate, handling charge for changing foreign exchange and financial institutions, as well as other financial cost.

3.10 The cost of project acceptance
The cost of project acceptance means the fees for the owner and Quality Control Institution to checkout the quality of IT project.

3.11 The cost of operation and maintenance of IT project
The cost of O&M of IT project is referring to the necessary maintenance costs of equipment, labour and materials after the project comes into use normally.

4. The composition and content of reserve cost and Financing interest

4.1 Reserve cost

4.1.1 The basic reserve cost. The basic reserve cost is the money prepared for accidents to happen in the implementation period of IT project. With the project being carried out, there is some likelihood of change or adjustment, which may lead to increased cost, so the basic reserve cost will be of use.

4.1.2 The cost reserved for inflate. During the construction period of IT project, it is essential to keep some money back for the rising price of wages, materials, mechanical equipment, permanent equipment and unexpected adjustment of standard cost, which is so-called the cost reserved for inflate.
4.2 Financing interest of the construction period
According to State regulations and the financial and monetary policies, financing interest refers to the cost which is need to pay and included in total investment cost of IT project and other interrelated financial costs during the construction period of IT project.

5. Static investment and total investment of IT project

5.1 Static investment
Static investment costs of IT project contain the engineering cost of IT project, the other costs of IT project and the basic reserve cost involved in reserve cost. The relevant calculation formula is as follows:
The static investment costs of IT project = the engineering cost of IT project+ the other costs of IT project + the basic reserve cost of IT project.

5.2 Dynamic investment (total investment)
Dynamic investment costs of IT project are consisted of the engineering cost of IT project, the other cost of IT project, reverse cost made up of the basic reserve cost and the cost reserved for inflate and financing interest of the construction period. The relevant calculation formula is as follows:
The total investment (dynamic investment) costs of IT project =  the engineering cost of IT project+ the other costs of IT project + the basic reserve cost of IT project+ the cost reserved for inflate+ financing interest of the construction period.
The total investment (dynamic investment) costs of IT project =  the static investment cost of IT project+ the cost reserved for inflate+ financing interest of the construction period.

6. Conclusion
a) The investment costs of IT project include the engineering cost of IT project, the other costs of IT project, reserve cost and financing interest of the construction period. The compilation of the investment costs of IT project should be in accord with the average wage level or the average wage level advanced in the country.
b) The investment costs of IT project comprises the static investment costs, involving the engineering cost of IT project, the other costs of IT project and the basic reserve cost, and the dynamic investment costs, which include the engineering cost of IT project, the other cost of IT project, reverse cost made up of the basic reserve cost and the cost reserved for inflate and financing interest of the construction period.
c) There is a close relation between the composition and content of the investment costs and each stage of IT project life cycle in the performance of IT project management. Generally speaking, the investment costs of IT project would be assigned a higher level early in the IT project preparation period to a lower level later with the progress of IT project. [8-10]

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