Software Project Management

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Contract management

Contents

Introduction

- Many organizations choose to obtain their software externally. Given their limited capability for developing new and reliable software, this seems sensible.
- These organizations think that it is more cost-effective to employ outside software developers for new development while a reduced group of in-house software development staff maintain and support existing systems.

Introduction cont…

- The buying of goods and services, rather than 'doing it yourself', is attractive when money is available but other, less flexible, types of resource, especially staff time, are in short supply.
- It is essential that customer organizations should find time to clarify their exact requirements at the beginning, and to ensure that the goods and services delivered are satisfactory.

Introduction cont…

- Potential suppliers are likely to be more accommodating before any contract is signed than afterwards – especially if the contract is for a fixed price.
- Thus, as much forethought and planning are needed with an acquisition project as with internal development.

Types of contracts

- *Bespoke system* - created specially for one customer
- *Off-the-shelf package* - bought 'as is' (also known as shrink-wrapped software)
- *Customized off-the-shelf* (COTS) software - a core system is customized to meet needs of the client

Types of contracts cont …

- Where an equipment is purchased, it is referred to as a contract for the supply of goods.
- With the supply of software this may be regarded as supplying a service (i.e. to develop the software) or the granting of a license (i.e. permission) to use the software which remains in the ownership of the supplier .

Types of contract cont …

Another way of classification based on the calculation of payment to suppliers is as follows:

- fixed price contracts
- time and materials contracts
- fixed price per delivered unit

Fixed price contracts

- In this case, the price is fixed when the contract is signed.
- The customer knows that, if there are no changes in the contract terms, this is the price they will pay on completion.
- The customer's requirement has to be fixed at the outset, i.e. the detailed requirements analysis have already been made.
- Once the development is under way, the customer cannot change their requirements without renegotiating the price of the contract.

Fixed price contracts cont …

Advantages to customer

- known expenditure
- supplier motivated to be cost-effective

Fixed price contracts cont …

Disadvantages

- supplier will increase price to meet contingencies/absorb risks
- difficult to modify requirements
- cost of changes likely to be higher
- threat to system quality

Time and materials contracts

- In this case, the customer is charged at a fixed rate per unit of effort, for example, per staff-hour or per person-month.
- The supplier may provide an initial estimate of the cost based on their current understanding of the customer's requirements, but this is not the basis for the final payment.
- The supplier usually sends invoices to the customer for the work done at regular intervals, say monthly / quarterly.

Time and materials contacts cont …

Advantages to customer

- easy to change requirements
- lack of price pressure can assist product quality

Time and materials

Disadvantages

- Customer liability - the customer absorbs all the risk associated with poorly defined or changing requirements
- Lack of incentive for supplier to be cost-effective

Fixed price per unit delivered contracts

- This is often associated with function point (FP) counting.
- The size of the system to be delivered is calculated or estimated at the outset of the project.
- The size could be estimated in lines of code, but FPs can be more easily derived from requirements documents.
- A price per unit is also quoted.
- The final price is then the unit price multiplied by the number of units.

Fixed price per unit delivered contracts cont …

FP Count	Design cost/FP (in Rs.)	Coding cost/FP (in Rs.)	Total cost/FP (in Rs.)
upto 2000	200	700	900
2001-2500	240	760	1000
2501-3000	260	780	1040
3001-3500	270	800	1070
3501-4000	280	820	1100
4001-4500	300	840	1140
4501-5000	330	870	1200

Fixed price per unit delivered contracts cont …

- The company that produced this table in fact charges a higher fee per FP for larger systems.
- For example, a system to be implemented contains 2700 FPs.
- The overall charge would be 2000 X Rs 900 + 500 x Rs 1,000 + 200 x Rs 1,040 = Rs 25, 08,000.

Fixed price per unit delivered contracts cont …

- The scope of the application can grow during development.
- It would be unrealistic for a contractor to be asked to quote a single price for all the stages of a development project: how can they estimate the construction effort needed when the requirements are not yet established?
- In this case, one approach would be to negotiate a series of contracts, each covering a different stage of system development.

Fixed price per unit delivered contracts cont …

Advantages for customer

- customer understanding of how price is calculated
- comparability between different pricing schedules
- emerging functionality can be accounted for
- supplier incentive to be cost-effective

Fixed price per unit delivered contracts cont …

Disadvantages

- difficulties with software size measurement - may need independent FP counter
- changing (as opposed to new) requirements: how do you charge?

Types of software contracts cont …

Another way of classification based on the approach that is used in contractor selection is as follows:

- Open tendering process
- Restricted tendering process
- Negotiated procedure

The open tendering process

- Any supplier can bid in response to the *invitation to tender (ITT) / request for proposal (RFP)*
- All tenders must be evaluated in the same way
- Government bodies may have to do this by local/international law
- With a major project this evaluation process can be time consuming and expensive.
- Where the client is a public body, an open tendering process may be compulsory.

Restricted tendering process

- In this case, bids are received only from those suppliers who have been specifically invited
- Unlike, the open tendering process, at any time, the customer can reduce the number of suppliers being considered at any stage

Negotiated procedure / Single tendering process

- Open or restricted tendering process may not be suitable in some particular sets of circumstances.
- For example, suppose, there is a fire that destroys some ICT equipment. The key concern here may be to get replacement equipment up and running as quickly as possible, and there may not be sufficient time to embark on a lengthy tendering process.

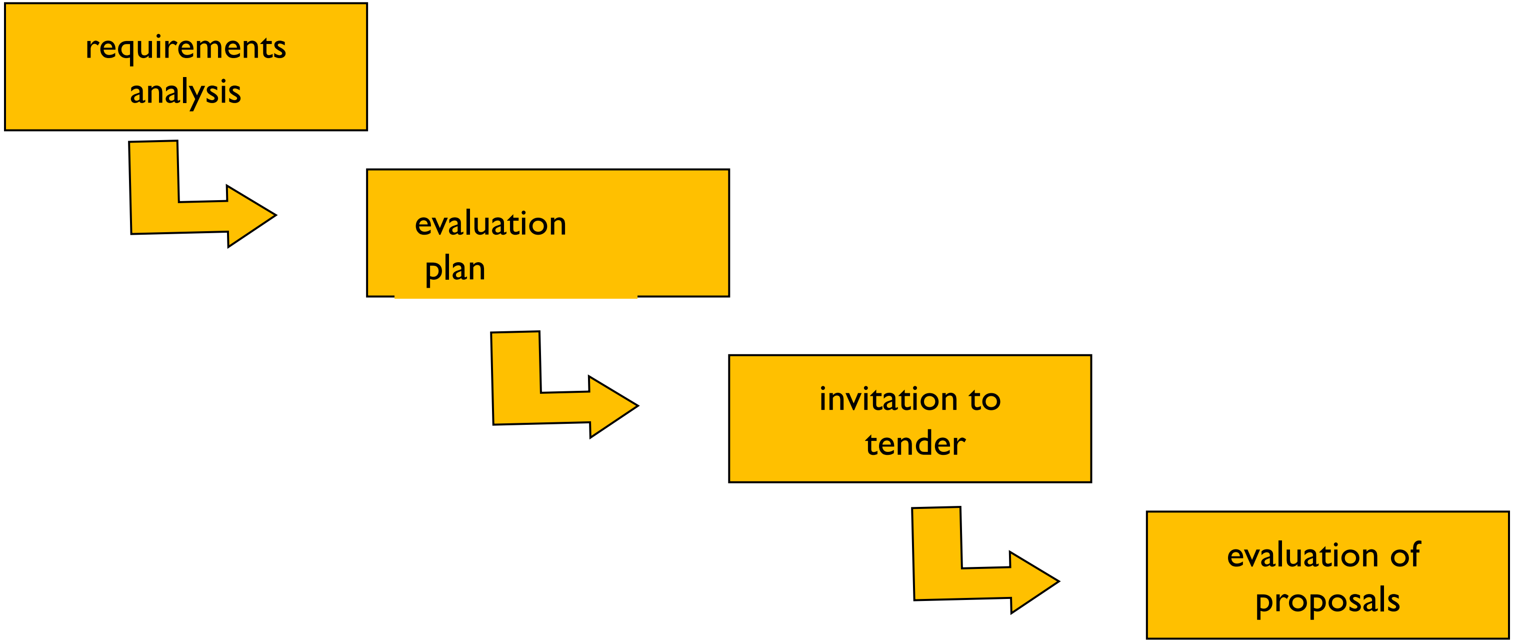
Negotiated procedure / Single tendering process cont …

- Another situation might be where a new software application had been successfully built by an outside supplier, but some extensions are required to the system. As the original supplier has staff familiar with the existing system, it might be inconvenient to approach other potential suppliers via a full tendering process.
- In these cases, an approach to a single supplier may be justified, i.e. negotiate with one supplier.

Negotiated procedure / Single tendering process cont …

- However, approaching a single, supplier could expose the customer to charges of favouritism.
- So, it should only be done with a proper justification.

Stages in contract placement



Requirements document: sections

- Introduction
- Description of existing system and current environment
- Future strategy or plans
- System requirements -
  - mandatory/desirable features
- Deadlines
- Additional information required from bidders

Requirements

- These will include
  - functions in software, with necessary inputs and outputs
  - standards to be adhered to
  - other applications with which software is to be compatible
  - quality requirements e.g. response times

Evaluation plan

- How are proposals to be evaluated?
- Methods could include:
  - reading proposals
  - interviews
  - demonstrations
  - site visits
  - practical tests

Evaluation plan cont...

- Need to assess value for money (VFM) for each desirable feature
- VFM approach is an improvement on previous emphasis on accepting lowest bid
- Example:
  - feeder file saves data input
  - 4 hours work a month saved at £20 an hour
  - system to be used for 4 years
  - if cost of feature £1000, would it be worth it?

Invitation to tender (ITT)

- Note that bidder is making an *offer* in response to ITT
- *acceptance* of offer creates a *contract*
- Customer may need further information
- Cons: Different technical solutions to the same problem, so difficult to evaluate

Memoranda of agreement (MoA)

- Customer asks for technical proposals
- Technical proposals are examined and discussed
- Agreed technical solution is MoA
- Tenders are then requested from suppliers based on MoA
- Tenders are judged on price
- Fee could be paid for technical proposals by customer

Evaluation of proposals

- It is needed to produce an evaluation plan describing how each proposal will be checked against the selection criteria.
- This reduces risks of requirements being missed and ensures that all proposals are treated consistently.
- It would be unfair to favour a proposal because of the presence of a feature not requested in the original requirement.

Evaluation of proposals cont…

- An application could be bespoke, off-the-shelf, or customized.
- In the case of off-the-shelf packages, the software itself could be evaluated and it might be possible to combine some of the evaluation with acceptance testing.
- With bespoke development, it would be a proposal that is evaluated, while COTS may involve elements of both. Thus different approaches would be needed.

Evaluation of proposals cont...

The process of evaluation may include:

- Scrutiny of the proposal documents
- Interviewing suppliers' representatives
- Demonstrations
- Site visits
- Practical tests

Evaluation of proposals cont...

- The proposal documents provided by the suppliers can be scrutinized to see if they contain features satisfying all the original requirements.
- Clarification might be sought over certain points. It is important to get a written, agreed, record of these clarifications.
- The customer might take initiative by taking minutes of meetings and then writing afterwards to the suppliers to get them to confirm their accuracy.
- A supplier could, in the final contract document, attempt to exclude any commitment to any representations made in pre-contract negotiations – the terms of the contract need to be scrutinized for this. Where there is an existing product, there could be a demonstration.

Evaluation of proposals cont...

- A frequent problem is that while an existing application works well on one platform with a certain level of transactions, it does not work satisfactorily with the customer's ICT configuration or level of throughput.
- Demonstrations might not reveal this problem. Visits to operational sites already using the system, could be more informative.
- In the last resort a special volume test could be conducted.

Evaluation of proposals cont…

- Finally, a decision is made to award the contract to a supplier.
- The reason for following a structured and objective approach to evaluation is to demonstrate that the decision has been made impartially.
- A project manager cannot be expected to be a legal expert – needs advice.
- BUT must ensure that the contract reflects true requirements and expectations of supplier and client.

Contract checklist

- Definitions – what words mean precisely e.g. ‘supplier’, ‘user’, ‘application’

- Form of agreement - For example, is this a contract for a sale or a lease, or a license to use a software application? Can the license be transferred?

Contract checklist

Goods and services to be supplied –

- *Equipment and software to be supplied*: this should include an actual list of the individual pieces of equipment to be delivered, complete with the specific model numbers.
- *Services to be provided*: This would cover such things as
  - Training
  - Documentation
  - Installation
  - Conversion of existing files
  - Maintenance agreements
  - Transitional insurance arrangements

Contract checklist - continued

- Ownership of software
  - Can client sell software to others?
  - Can supplier sell software to others? Could specify that customer has ‘exclusive use’
  - Does supplier retain the copyright?
  - Where supplier retains source code, may be a problem if supplier goes out of business; to circumvent a copy of code could be deposited with an **escrow** service

Contract checklist - continued

- Environment – for example, where equipment is to be installed, who is responsible for various aspects of site preparation e.g. electricity supply, back up facilitation etc.?
- Customer commitments – for example providing access, supplying information

Contract checklist - continued

- Acceptance procedures – Good practice is to accept a delivered system only after user acceptance tests.
- Part of the contract would specify such details as the time that the customer will have to conduct the tests, deliverables upon which the acceptance tests depend and the procedure for signing off the testing as completed.

Contract checklist - continued

- Standards to be met – This covers the standards with which the goods and services should comply.
- For example, a customer could require the supplier to conform to the ISO 12207 standard relating to the software life cycle and its documentation (or, more likely, a customized sub-set of the standard).

Contract checklist

- Project and quality management – the arrangements for the management of the project must be agreed. These include the frequency and nature of progress meetings and the progress information to be supplied to the customer.
- Timetable of activities – This provides a schedule of when the key parts of the project should be completed

Contract checklist

- Price and payment method– obviously the price is very important. what also needs to be arranged is when the payments are to be made.
- payments may be tied to completion of specific tasks.

Contract management

Some terms of contract will relate to management of contract, for example,

- Progress reporting
- Decision points – could be linked to release of payments to the contractor
- Variations to the contract, i.e. how are changes to requirements dealt with?
- Acceptance criteria

How would you evaluate the following?

- usability of an existing package
- usability of an application yet to be built
- maintenance costs of hardware
- time taken to respond to requests for software support
- training

Contract management cont …

- Contracts should include agreement about how customer/supplier relationship is to be managed e.g.
    - *decision points* - could be linked to payment
    - *quality reviews*
    - *changes to requirements*

Summary

- Presented an introduction to managing contracts.
- Discussed the different classifications of contracts along with their advantages and disadvantages.
- Also discussed which type of contract is best suitable in which cases.
- Explained the different stages in contract placement
- Discussed the typical terms of a contract
- Explained some terms of contract which relate to management of contract

References :

1. B. Hughes, M. Cotterell, R. Mall, *Software Project Management*, Sixth Edition, McGraw Hill Education (India) Pvt. Ltd., 2018.

Thank you