

Outsourcing DSDM Projects

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1 Introduction

This White Paper was produced in response to a significant level of interest reflecting concern about whether a DSDM project could be outsourced, particularly within a Fixed Price contractual arrangement between a customer and a supplier. The stance taken in response is to state that it must be possible to outsource such a project providing that care is taken to accommodate the particular opportunities and risks presented. Using the DSDM Framework provides a disciplined development approach in order to minimise the risks of contractual agreements where the requirements are initially “incomplete” in their specification.

1.1 Audience

The audience for this White Paper are potential purchasers and external suppliers of DSDM projects.

1.2 Contributors

This White Paper was put together by a Task Group that was chaired by Bernard Northmore of Science Systems and reporting to the Technical Work Group. The members of the Task Group are all drawn from the supplier community, but feedback is eagerly sought from all sections of the IT industry which are concerned with outsourcing; of particular interest would be case studies showing different types of contract “in action” - whether successful or not! Any feedback should be addressed either to the Consortium secretariat.

The paper was updated for conformance with DSDM V.4x in 2003 by Jennifer Stapleton, Independent Consultant.

1.3 Section Structure

Section 3 is concerned with outsourcing in general (why, when, who and how).

Section 3 considers each of the nine DSDM principles in the context of a contract.

Sections 4 to 6 then consider each of the main types of contract (Fixed Price, Time Hire and Framework) that are most commonly used for outsourced software development projects. The final section summarises the main conclusions of the White Paper.

Two appendices outline certain essential characteristics of two particular contracts that have been agreed for software development projects. Appendix A refers to a Fixed Price contract, while Appendix B concerns a Managed Time Hire one.

2 Background

2.1 Why Outsource?

An organisation can have many reasons for considering the outsourcing of a development project, including :

- lack of staff
- lack of appropriate skills
- lack of time
- lack of confidence in an ability to deliver to meet user expectations.

These considerations can apply to a DSDM project just as they can to a traditional one, but additional aspects must be taken into account because the very existence of a contractual agreement may detract from the collaborative teamwork between customer and supplier staff which is so essential to the successful completion of a DSDM project. Unless all these additional aspects are carefully considered, many of the potential benefits of the DSDM approach may be lost.

With all developments (whether in-house or outsourced), an early decision must be taken concerning the applicability and appropriateness of DSDM. If the project may be outsourced, then management should also assess whether their organisational culture, particularly within the user community, is ready to adopt a DSDM style of working with an external supplier.

If an outsourced approach is chosen, whether in part or in total, then the most important initial consideration is to forge a good working relationship with the chosen supplier such that DSDM will be fully effective.

2.2 Types Of Contracts

There are many different types of contract that may be used to govern the relationship between a customer and a supplier for the development of a particular system. The most common types of contract fall into two broad classes: “Fixed Price” and “Time Hire”. In general, a Fixed Price contract requires that the supplier develops a system to meet an agreed specification for a defined amount of money and within a defined period of time. In contrast, a Time Hire contract usually requires that a supplier supplies resources (in particular staff effort) to work under the direction of the customer, with the customer retaining responsibility for achieving the requirements and managing the expenditure and duration of the project. Time Hire contracts are unpopular with some customer organisations because poorly structured ones have in the past been found to expose the customer to unexpected expenditure and/or a lack of achievement of the project requirements. To address these concerns, the Time Hire contract type can be extended to cover provision of management resource (including planning and quality management); this extended type of contract is referred to as a Managed Time Hire contract.

A third type of supplier-developer relationship, which is becoming more common, is where a “Framework” contract is agreed. Such a contract usually specifies a service that

the supplier is called on to provide for an extended period of time (usually at least one year, possibly five years or more). The scope of the service will be specified, as will the value of the contract, but specific business or functional requirements will not be identified within or from the contract.

This White Paper considers the implications of these main types of contract for the outsourcing of a DSDM project and identifies a number of variations and extensions that may be relevant.

2.3 When To Outsource

In the traditional waterfall lifecycle the approach frequently taken is to outsource the main development activity after producing a specification of requirements, i.e. between the requirements specification and high-level design activities. If suppliers are to compete for the work, this approach then requires that an Invitation to Tender is produced, tenders are sought, proposals are awaited, preferred suppliers are selected, further questions are resolved, a final supplier is selected and contractual terms are agreed. Such a process adds little if any value to the finally developed system and clearly delays its development.

In the time taken to write the initial requirements specification on paper, it may well be possible to develop the first iteration of a functional prototype, and by the time the contract is agreed in the above scenario, it may well have been possible to make substantial progress with design iterations. Assuming that time is critical for the business, it is clearly preferable to be making substantive progress rather than to be concentrating on detailed requirements and contractual negotiations.

Consequently, the best time to outsource a DSDM project is as early as possible. There could be a lot of benefit in involving the supplier in the Business Study, but - to ensure objectivity - it may be advisable to separate the outsourcing of the Feasibility Study from the main development (if indeed the customer needs any external support for the Feasibility Study).

It should be clear that, to avoid delaying the project, it is advisable to have preferred suppliers already identified.

2.4 Choosing A Supplier

A DSDM project is very likely to be time-constrained and so there are significant time savings to be gained if the customer already has a selected supplier or limited set of suppliers who can be approached to bid for any outsourced work. In any case, due to the special need for trust, collaboration and co-operation in a DSDM project, customers should aim to choose suppliers who they already know or who have a proven track record in the particular type of project.

If the customer decides to take a DSDM approach, or if the supplier proposes one, then customer management must recognise that they share responsibility with the supplier for achieving a successful outcome, whatever the type of contract. Furthermore, both the customer and the supplier must be prepared to commit jointly to placing a higher priority on achieving the stated delivery date than on meeting every functional requirement.

3 DSDM Principles – Implications of Outsourcing

With a traditional development approach the functionality required of the system is usually fixed at the time suppliers are invited to tender and embodied in some form of requirements specification. The resources (particularly effort and time) required to develop the system are then dependent on the amount - or 'size' - of the required functionality. The fundamental difference with a DSDM project is that it (the project) is time constrained, with the functionality becoming a flexible concept taking lower priority than time. It can be very difficult to reconcile this fact with the trend over recent years to Fixed Price development contracts.

It is important that the contractual relationship between the customer and supplier should not compromise the application of the nine DSDM principles; the following sub-sections present some considerations relating to each of those principles.

Note: Each of these contractual implications is addressed in the terms contained within the template for DSDM contracts, which is available on the DSDM website. The contract is based on UK law but can form the basis for considering what adjustments are required under other legal systems.

Active user involvement is imperative

The customer should ensure that the right users are allocated to support the supplier and that they are trained in the principles and practice of DSDM. They must be committed to the project and not develop an assumption that the supplier carries more responsibility for success than is actually the case.

The role, contribution and level of authority expected of business users should be declared in the contract. To encourage interaction between customer staff and supplier staff, customers should encourage the supplier team to work on the customer site, preferably in close proximity to the system's eventual users.

DSDM teams must be empowered to make decisions

The customer management must be prepared to empower their representatives on the project and to respect the empowerment given to the supplier's team by their management. This is true whether or not the team is solely from the supplier or whether it is a joint team.

The focus is on frequent delivery of products

The customer should expect to have a lot of visibility of the development as it progresses. Intermediate deliveries may well allow beneficial use to be made of core functionality at an early stage. Under some Fixed Price contract terms, such beneficial use may imply contractual acceptance.

One of the drawbacks of traditional waterfall developments has been that the customer has had little visibility of progress and has suffered from the "90% complete" syndrome for perhaps 50% of the programme. That has reinforced the customer's desire for Fixed Price contracts, often with severe penalty clauses. With DSDM's frequent deliveries, these concerns are largely eliminated, as the customer can see a working, usable system

being developed and made available for his use. This in turn may allow a supplier to remove contingencies from the price.

Fitness for business purpose is the essential criterion for acceptance of deliverables

DSDM encourages all parties to keep focused on the business requirements and to refine the functionality as the project progresses. This is hindered if a detailed specification of requirements forms part of a contract (as is often the case with a traditional Fixed Price contract), because any change to those requirements would then require contractual negotiations.

Iterative and incremental development is essential to converge on an accurate business solution

Many of the functions that could usefully be incorporated into the system may only become apparent as the system is being developed and as the users gain greater appreciation of the possibilities. In these circumstances, the value of a detailed requirements specification could be called into question, particularly when account is taken of the time required to develop it.

If a Fixed Price contract is required then the supplier can be expected to limit the number of iterations and increments so that he can more accurately estimate and agree the effort and timescales.

All changes during development are reversible

While DSDM can readily accommodate change, no change can ever be totally free of extra costs. Furthermore, given the iterative and incremental approach of DSDM, change is in any case more difficult to identify and thus developers have more difficulty predicting and controlling their effort expenditure. A supplier working under a Fixed Price contract therefore tends to impose more stringent change control than would be the case for a Time Hire contract (regardless of whether it is a DSDM project or a traditional waterfall one). In a Time Hire contract however, the customer management retains full control over the cost versus function balance.

A Time Hire contract is however no substitute for effective change management; it remains an essential management process whatever the type of contract. Furthermore, such a process must not merely assess and agree the impact of change on time and cost; it should facilitate the examination of potential trade-offs whereby the impact of a proposed change could be accommodated by de-scoping existing requirements (e.g. from “should-haves” to “could have”). This is essential to maintain management focus on keeping the project within original time and costs as far as possible.

Requirements are baselined at a high level

Customer management should recognise the difficulty of bidding a Fixed Price contract if requirements are imprecise and deliverables cannot be defined in detail. Suppliers will as a result often propose a segmented or phased approach which may diminish the benefits of DSDM. Customer management should accept that contracts based on high-level requirements are unlikely to deliver precisely the same system as originally envisaged and

must consider different ways of measuring the supplier's success in completing the contract.

With a DSDM project, however, the customer has clear visibility of the functionality as it is being developed and always has the opportunity to vary the implementation as it progresses.

Testing is integrated throughout the lifecycle

With the traditional waterfall approach, there has often been a lengthy acceptance test phase between the main development activities and delivery/handover of the system. In many cases this has been the users' first real sighting of the system and has required a lot of effort from them, both in learning about the system and then in validating it against its requirements. It is also a phase whose duration and effort requirements are frequently grossly underestimated by both parties.

With DSDM, the continual user involvement (particularly in the testing of each increment) means that they develop their knowledge and understanding of the system throughout the project. They can therefore have much more confidence as the project nears completion that the system not only does what it should (in terms of supplying the required functionality) but also that it is fit for its purpose.

A collaborative and co-operative approach between all stakeholders is essential

Teamwork, within a DSDM framework, is a cornerstone of successful projects. Each member of a team needs to fulfil a broad range of roles that can change dynamically during the project. A traditional Fixed Price arrangement can sometimes create tension and conflict between the parties because it stipulates rigid responsibilities for each party which can seriously impact the success of effective teamwork. Any such stipulations should be carefully phrased so as to avoid formal demarcation and instead create an environment that encourages teamwork to flourish. On the other hand, a Time Hire contract may tend to foster a more natural sharing of responsibilities, although care must be taken to ensure that the supplier accepts those responsibilities and does not try to claim that all responsibility for the successful conclusion of the project lies with the customer.

4 Fixed Price Contracts

4.1 Definition

This type of contract typically requires that the developer deliver a fixed requirement for a fixed price and within a fixed timescale. Prior to completion of the contract, the purchaser can be expected to want to verify that the delivered development meets his needs and in order for the supplier to be confident of achieving that verification, he (the supplier) will normally need the customer's requirements for the development to have been defined in some detail at the start of the contract.

If however there is any scope for the purchaser and supplier to interpret those requirements differently, then there may be a possibility that such differences will only be appreciated some time after agreement has been reached on price and timescale. Consequently, the supplier will need to have protected himself by allowing a contingency in determining the price.

In order to keep the price to a minimum, it is therefore necessary to define the requirements in as much detail as possible, thereby reducing the scope for misunderstanding and conflicting interpretations. It should be noted that the "requirements" need not include only those requirements which define the functionality of the delivered development; they may also include non-functional requirements such as performance, capacity, resilience, etc..

Note: The contractual terms of the contract template (see Section 3) provide significant assistance in achieving the flexibility in requirements necessary to gain the maximum benefit from DSDM.

4.2 Characteristics

The most stringent form of this type of contract therefore has fixed price, fixed timescale and fixed requirements (these last being defined to some level of detail).

Other characteristics (which may be common to other types of contract) may include :

- the scope for damages to be paid by the supplier in the event of late or non-delivery
- requirements on the purchaser (for example to supply information, equipment or other resources)
- a defined mechanism for agreeing changes to the requirements
- definition of interim deliverables and/or milestone payments
- procedures for accepting and delivering the development
- ownership of intellectual property rights
- reporting paths, mechanisms and responsibilities
- payment terms and conditions

- relationships between the contractual parties and other organisations (for example the purchaser's customer or the supplier's sub-contractors if appropriate)
- warranty conditions.

These issues are all addressed in some form by the template contract.

4.3 Advantages And Disadvantages

The main advantage of a Fixed Price type of contract is that both parties believe at the start that they know what they are committing themselves and each other to do.

The disadvantages, which stem from the need for a specification of the requirements for the development, are many and varied, including:

- It can take a lot of time (and expense) to develop the specification to a level that is acceptable to both parties, while the net value to the purchaser's business of a requirements specification is usually negligible in the long term.
- The specification is "frozen" at the time of contract agreement, so that the purchaser needs to be able to predict at that time what his requirements will be at the time of delivery; he cannot thereafter easily take account of changing business needs, or change his requirement to reflect a developing appreciation of the system's potential.
- The mere presence of a detailed specification may act to the detriment of co-operation between the parties, encouraging both parties to hide behind the specification rather than seeking mutually beneficial solutions.
- Every change to the specification needs to be carefully considered to determine its impact on the scope of supply before commitment can be given that the change will be implemented.

Fixed Price contracts can also be difficult to reconcile with mixed-team working, which can be an effective development approach, particularly where the transfer of skills from the supplier to the customer is a long-term aim. However, with careful consideration of the legal contract, all of these points need not be showstoppers with respect to the use of DSDM on Fixed Price projects.

4.4 Implications Of DSDM

The need to specify requirements in detail runs counter to the whole idea of DSDM. For many developments, it is possible to deliver initial prototypes (or even the final system) in the time it could take to develop, review and agree a detailed specification. The purpose of iterative co-operative development is to allow the refinement of requirements as the development proceeds and as the user appreciates the capabilities of the new system.

Consequently, if a detailed requirements specification exists, then the project may already be too far into the classic waterfall lifecycle for the remainder of the development to be outsourced under this type of contract and in accordance with DSDM - although many of the DSDM techniques may well be appropriate.

What is required is to break the link between the purchaser's need for a fixed price and fixed timescale and the supplier's consequential need for a detailed specification.

Firstly, it is essential that the business requirements be defined, even if only at a high level. These requirements would then be issued to each potential supplier as an Invitation To Tender. Note that if the required system is to replace an existing one, then specifying those requirements that are common to both old and new systems could be an exercise of questionable value; it may be more useful, accurate and efficient to allow the suppliers to study the existing system to determine its capability.

If a formal proposal is required from each potential supplier, then that proposal should reflect the business requirements and it may add some detail in terms of an outline database design and a proposed architecture (i.e. the main components of the solution). The proposal may also present a suggested style for the user interface, but it should in general not include technical detail. This style of proposal is usually more suited to data-rich projects than it is to functionally rich ones.

For an outsourced waterfall development within this type of contract, timescale and requirements are well defined, and hence implicitly the business benefit for the customer is not dependent on the choice of supplier. Consequently selection of a winning supplier usually relies primarily on price, subject to the purchaser having sufficient confidence in the supplier's ability to deliver at the end of the contract.

For a DSDM project, however, significant attention should also be paid to less quantifiable aspects, particularly the confidence which the purchaser feels can be placed in working with the supplier, i.e. the confidence that a co-operative and trusting relationship can be developed, thus helping to maximise the potential benefit to the customer's business. Furthermore, the supplier will also want that same confidence. This may result in requiring that certain individuals (from either party) should perform certain specified roles on the project.

In order that a DSDM project succeeds, it is necessary that individual participants are suitably empowered, i.e. authorised to make decisions affecting the capabilities of the developed system.

Requirements for such roles and the corresponding authority levels should be agreed contractually. For example, "A Bought Ledger Clerk will be made available to the project team, and he/she will be authorised to agree all aspects of data presentation relating to purchase orders". This may appear in the contract itself, although naming of individuals is usually best left to subsidiary documents (such as a Statement of Work, or project plans) which, although contractually binding, are more easily changed, for example to cover for a named individual changing employment during the project.

Suppliers should also want agreed at a contractual level the amount of user involvement expected. This may be expressed as, for example, "The Chief Accounts Clerk is to be available for two hours each Wednesday afternoon during the Functional Prototype iteration".

4.5 Variants Of The Fixed Price Type Of Contract

There are many possible variations to the Fixed Price type of contract. One variation that is considered feasible, though there is as yet little experience to verify it, is known as a “Function Point” contract. This avoids the problem of needing a detailed requirements specification by “converting” the requirements into Function Points and contracting for the development of a defined number thereof. Clearly both the purchaser and the supplier must have a mutual understanding of the mechanism to be used for counting Function Points. This may result in the requirements being defined to a lower level than would otherwise be ideal, but it does readily allow for the conversion of requirements between “must haves”, “should haves”, “could haves” and “won’t haves”. A mechanism will be needed to support both parties in agreeing when a Function Point has been completed, thus protecting the supplier from too much backtracking (which could otherwise result in significant extra effort, even though the final number of Function Points was not increased).

Another refinement of the Fixed Price type of contract is an “Incentive Fee” contract where, although both parties believe that they have a mutual understanding of the requirements, it is nevertheless recognised that there is still scope for some interpretation. In this case, a fixed price is agreed corresponding to a budgeted level of effort, but it is also agreed that the purchaser will have visibility of the effort actually expended by the supplier. If less effort is used than was originally expected, the purchaser will benefit by means of a reduction in the final price. If more effort is expended, then the price is increased. The amounts of reduction or increase are dependent on the effort discrepancy and are usually based on a discounted man-day rate. Consequently both parties have an incentive to restrict the extension of the requirements (for the customer because the cost will increase, while for the supplier the rate earned for such excess is discounted).

5 Time Hire Contracts

5.1 Definition

There are many “flavours” of Time Hire contracts (also known as Time and Materials contracts), but in general they require that a supplier provides development resource to work on a customer’s project, with charges being made on the basis of time spent (usually per hour or per day) and materials used. For software development projects, there are usually no materials involved but expenses may also be charged within this contract type.

In its most basic form, a Time Hire contract relies on the supplier providing the skills, with the customer having responsibility for achieving the requirements and for managing the project (including planning, lifecycle selection and management, progress reporting, quality assurance, quality control, staff selection, co-ordination, tool selection, etc.). Many customers may wish to share these responsibilities with the supplier, in which case a more appropriate approach may be to arrange a “Managed Time Hire” contract, where for example the customer may look to a supplier to propose an appropriate development method and/or toolset and to define the roles, responsibilities and resources needed. The supplier then commits to manage and undertake the development tasks. Having made contractual commitments regarding the service provided, the supplier will then typically provide timely reports of project status to the customer. The commitments made will vary in both scope and depth depending on the ability of the customer and/or the supplier to define their needs.

The Managed Time Hire contract type has characteristics in common with DSDM, especially the fact that both seek to provide a way of overcoming seemingly incompatible needs. In the case of DSDM it is the need to deliver a solution to a requirement which at the outset cannot be fully defined, while in the case of a Managed Time Hire contract, it is the need for a customer to obtain a level of commitment from a supplier when it is not possible to describe fully what is required.

The remainder of this section of this White Paper is concerned specifically with a **Managed** Time Hire contract, rather than the more basic variant. Section 5.5 below provides information on some possible additions to the basic contract.

5.2 Characteristics

A Managed Time Hire contract has the following basic characteristics:

- The customer may well be relying on the supplier to recommend and/or confirm the most appropriate development approach. This approach may be formally documented within a proposal from the supplier.
- Resource type and numbers are specified and selected by the supplier, who may have some say in the selection or approval of suitable customer representative staff.
- The supplier provides appropriately skilled and qualified development and project management resources.
- Payment terms are time and materials.

- The period of the contract is determined by agreement between the customer and the supplier (usually depending on the supplier's estimate of the effort required).
- Notice periods usually relate to a time period, typically a month.
- A warranty may be provided. Any long-term maintenance requirement will probably be provided on a time and materials basis and may include a commitment to provide access to resource used within the original project.
- Requirements on the customer will usually be defined, but they are unlikely to be as prescriptive as for a Fixed Price contract.
- The supplier usually provides regular reports to the customer covering time spent, work achieved and progress against plan and budget.
- Suppliers will have an organisational structure, backed up by formal development methods in addition to staff management, project management and quality management.
- There is an emphasis on the supplier to assure the delivery (in terms of verification and validation activities) and on the supplier formally to accept delivery.

5.3 Advantages And Disadvantages

Work can usually proceed more quickly than for a Fixed Price contract, often as soon as a letter of intent is provided by the customer and the relevant resources are available. If necessary, resources can be obtained to supplement the customer's own resources to provide an integrated team without incurring the risks of demarcation which would be incurred with a Fixed Price contract

It is usually relatively easy for the customer to curtail a Time Hire contract. This is generally an advantage to the customer but is a risk to a supplier who is managing the utilisation of their staff.

This type of contract is inherently very flexible. Change can be easily accommodated and co-operative working is not inhibited by potentially confrontational discussions about who pays for changes and extensions to the original scope of work.

Compared with a Fixed Price contract, the customer knows that he will only pay for the time spent on the project, i.e. there will be no contingencies or contractual costs associated with negative cashflow, performance bonds, warranties, protection from liquidated and/or consequential damages, etc.

It is important that the expectations of the customer staff are very carefully managed; the responsibilities and risks are shared between both parties.

5.4 Implications Of DSDM

DSDM projects are often invoked at short notice and customers may not be able to redirect internal resources quickly enough to meet the need.

The DSDM principle of frequent deliverables enables the contributions of resources to be assessed on a regular basis. Seeing tangible progress should allay a customer's concerns over cost and time overruns with this type of contract.

The DSDM Consortium membership, Accredited Training Organisations and DSDM Practitioner Certificate process give customers additional ways of selecting supplier organisations and validating individual resource experience.

DSDM projects are concerned with managing change to achieve business solutions. It is essential to have a contract that addresses this need and accommodates it rather than hinders it.

DSDM projects will only succeed with a collaborative and co-operative team approach. The contract type must support this and help prevent combative situations between customer and supplier.

Again, the template contract provides assistance in these topics.

5.5 *Extensions To Managed Time Hire Contracts*

5.5.1 Team Rate

If the customer requests the supplier to provide 'the development team' for a fixed period the supplier may be able to commit to a rate for the team for that period. There is however no commitment as to what functionality is to be delivered within the period. This is fixed time and fixed cost, but not fixed functionality.

5.5.2 Incentive Rate

In circumstances where a supplier can more accurately judge the size of the system an incentive rate may be offered. This would typically be an offer to charge at a reduced rate if the project exceeds an agreed cost.

5.5.3 Ceiling Cost

In exceptional circumstances a supplier may be able to commit to deliver a set of requirements for a ceiling cost and will charge on a time hire basis up to that cost (which will probably include some contingency). This is fixed functionality (and possibly fixed time), with variable, but capped, cost.

5.5.4 Timebox

Timeboxes can be reflected within contracts and suppliers may be able to commit to certain 'must have' functionality being delivered within the timebox. This is fixed time (and possibly fixed cost), together with a guaranteed minimum level of functionality. Alternatively, or additionally, a project may be broken down into smaller sub-projects. This will help with budgetary planning and may assist in implementing some of the above contract extensions, but both parties should be careful to avoid introducing several occasions for potentially protracted contractual negotiations.

6 Framework Contracts

A third type of contractual relationship exists where a “Framework” contract has been agreed between the customer and a supplier. Under such a contract, the supplier agrees to a specified scope of work, possibly confined to a defined business area (e.g. “applications support and development of the ABC and PQR systems within the XYZ department”), while the customer agrees to spend a defined amount of money with the supplier over a defined period.

At the start of the contract, the work to be done is consequently not defined in any detail, but as and when work is identified, a “work package” or “work parcel” is agreed, with functionality, time and costs defined. For such a relationship to exist, there must be a high degree of trust between the two parties and there will often be a history of successful past projects. Because of this relationship, it should only be necessary to define the functionality at a high level. The supplier should be more comfortable with agreeing a fixed cost for each work package, because he should have a good understanding of the customer’s business and culture, each work package is usually smaller than would otherwise be the case and he is confident of further revenue from the customer. This approach is well suited to DSDM.

7 Summary

In principle, the most suitable types of contract for DSDM are undoubtedly Managed Time Hire or Framework contracts. If the customer has insufficient trust or confidence in a supplier (or the customer's procurement function will only allow Fixed Price contracts to be let) then it is possible to agree a Fixed Price contract, with particular note being taken of the following points:

- Development of a detailed requirements specification can run counter to the principles of :
 - empowerment
 - fitness for purpose
 - iterative and incremental development
 - reversibility of changes
 - high-level requirements
 - collaboration and co-operation.
- The need for user involvement should be written into the contract, identifying who should be involved, what their remit is and when they should be involved.
- Functional acceptance criteria cannot and should not be defined in detail at the start of the contract; the acceptance process is continuous throughout the development.
- Warranty is likely to be limited to fixing system failures, rather than changing the delivered functionality.

Appendix A Case Study; A Fixed Price contract

This appendix identifies some of the key features of a Fixed Price contract that has been agreed for the development of an administrative database system, with supporting user functionality. The customer is a government department, the supplier a software house.

- 1) **Requirements** The system's scope was defined by business requirements which were specified and agreed at a high level (e.g. "suitably authorised users will be able to add new users"). The system was a replacement for an existing computerised system, supplemented by a number of extensions reflecting changes in working practices and business requirements since the development of that original system. At no stage were the requirements defined on paper in greater detail; the incremental iterations would serve to add that detail as they were developed. There were no explicit non-functional requirements. The customer did not specifically state that a Rapid Application Development approach was required.
- 2) **Estimation** The customer had made a data model available to all potential suppliers, while the number of screens and reports could be fairly confidently estimated from the existing system (taking into account the various new requirements). The successful supplier used established productivity metrics to estimate the effort required, and hence to derive the fixed price and timescale.
- 3) **Design** Prior to the start of the project, the successful supplier had prepared an outline database design and functional design. These designs did not form part of the formal proposal (i.e. they were not binding) and were done at the supplier's risk. The database design was formally approved by the customer at the first prototype review session.
- 4) **Payments** A number of stage payment milestones were agreed, corresponding to major events (e.g. completion of database design, completion of acceptance tests).
- 5) **User Representation** The contract stated that certain roles were to be filled by suitably authorised personnel, though those personnel were not named. For example "the chief purchase clerk shall be available for five hours each week for reviewing development products. He/she shall be empowered to approve those products on the customer's behalf."
- 6) **Iterations** The proposal limited the number of iterations for each user function (implemented as a screen or report) to one during the Functional Model Iteration and two during the Design and Build Iteration.
- 7) **Approval** The customer was required to approve each screen or report as it was generated during Functional Model iteration and then again as it was "fleshed out" during the Design and Build Iteration. These approvals effectively updated and replaced the system's requirements. In principle, backtracking was not allowed to positions before these approvals, but in fact the supplier's Project Manager had a remit to authorise limited rework in agreement with the customer's representative. The size (or even the existence) of this remit was not widely known to the developers or users.

- 8) **Timeboxes** Timeboxes were usually between two and eight days (typically five days) in duration, and once planned were inviolable. (This took some determination for the first few products, when the users tended to ask for “just another few hours”).
- 9) **Environment** The customer was responsible for providing all equipment and tools, as well as an office for the development team, based on the customer’s premises.
- 10) **Acceptance** Formal contractual acceptance is against the business requirements, as demonstrated by the developing prototypes.

Appendix B Case Study : A managed time hire contract

This appendix identifies some of the key features of a Managed Time Hire contract which developed a production modelling and forecasting system for an engineering company.

- 1) **Requirements** The system's scope was defined as the replacement and enhancement of an existing system. The enhancements were documented at a high level in earlier work by the supplier before the contract for development was agreed.
- 2) **Estimation** This was difficult because the nature of the considerable enhancements was not fully understood by either the supplier or the customer. The optimum supplier team size was agreed (Project Manager, Technical Co-ordinator and three developers - one per Ambassador User). The end date for the first increment was fixed so the estimate was for the team for that period with additional costs as required. These included standard project costs, such as Quality Assurance, as well as ad-hoc expert advice.
- 3) **Design** In bidding for the contract, the supplier defined the system architecture at a high level. While not contractually binding, this was part of the basis for awarding the contract. The high-level design did not change during development but was refined as the system developed.
- 4) **Payments** Interim payments for time used were linked to the completion of various functional components (accepted as complete but not delivered to the customer). Payment for an increment delivered to the customer included productivity and quality bonuses which were calculated for the whole increment.
- 5) **User Representation** The effort required of the Ambassador and Advisor Users was not defined in the contract. It was agreed verbally that all Ambassador Users would supply up to full-time assistance as needed by the project. The involvement of the users was in fact nearly full-time for the duration of the contract with formal meetings of the whole team at least three times a week.
- 6) **Iterations** The project plan used the functional components of the system to divide activity into combined Functional Model and Design and Build timeboxes. Each timebox contained three top-level iterations with an objective setting session at the start and a quality review or formal test at the end of each iteration. Lower level iterations with less formal starts and ends were possible inside the high-level timeboxes.
- 7) **Approvals** A timebox was allocated to one developer and one Ambassador User as leads for the work. Each top-level iteration was signed and approved as complete by both the lead developer and the lead Ambassador User. The whole timebox was signed off by the lead Ambassador User and the supplier Project Manager.

- 8) **Timeboxes** Timeboxes were on average about three weeks and were planned to be inviolable. This was true for all but one timebox which was the interface between two major components of the system and had to be perfect or the system was useless. Faults in the development tools made this timebox overrun by a matter of weeks. Fortunately for both the customer and the supplier, the end-date for that increment was postponed for business reasons by a month.
- 9) **Environment** The work was carried out on the supplier's premises which were very near to the customer. The supplier was responsible for providing all equipment and tools.
- 10) **Acceptance** Formal contractual acceptance was against the system as placed in the customer's environment with live data which was unavailable during development.