Changing Model Ownership When Needs Must: Experiences within the Business Consultancy Department of Shell International Petroleum Company Ltd.

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Introduction

Advocates of the "Modelling as Learning" philosophy would not endorse a policy of handing over a ready-made model to a new client. In commercial environments, however, consultants and clients move on and there is pressure to maximise return on investment. This often means that existing System Dynamics models must be transferred between consultants and clients. Within the Business Consultancy department at Shell both the consultants and clients change jobs every three years or so and model handover is an issue that must be managed.

This paper details cases where, even though the rules of problem-ownership are broken, a successful result can be achieved. The authors show that some of the learning experienced during the initial modelling process can be shared with newcomers after the event and a framework for thinking through model handovers is offered.

Much of the value of the System Dynamics approach to problem structuring is in the learning that goes on during the process of building the model, rather than in actually delivering a finished model at the end of the project. One of the keys to a successful modelling project is that the client, whether a collective or an individual, is confident that the model represents his view of the problem. Problem ownership is a very personal matter, as anyone who has seen a client's eyes glaze over at the sight of a pre-prepared causal loop diagram will know (even if the consultant believes it to be a more complete representation of the problem than that of the client)!

There is no shortage of texts that propagate the 'Modelling as Learning' point of view and the Business Consultancy team within Shell International advocate this approach in all new System Dynamics projects. Not all projects a consultant works on, however, are new ones; some involve the continued support of an existing model over time. The challenge is then one of managing model transitions between consultants and clients.

The importance of such transitions is accentuated in the case of Shell for the following reasons: System Dynamics projects are usually led by a consultant, rather than the client. That is to say, the consultant is both facilitator and model builder and there are few cases where the problem owner will build his own model. This style of relationship magnifies the effects of any hiatus due to client or consultant handovers.

The second reason accentuating the need to manage handovers at Shell is that it is common for a person to be in a job for only two to three years before moving on, sometimes to a different function or to a different Shell company altogether.

> *When consultants move job, they take their expertise with them but when clients move on, the problem (and partial solution) stays behind, for it is a function of the business, rather than of the individual.*

The extreme case is where a new client is faced with an old problem (inherited from his predecessor) and is supported by a new consultant (who inherited very little). In such a case, the only thing linking the two individuals is the model, built by another consultant for another client.

This situation is extreme, and undesirable, yet asking the right questions and looking for the right signs can help both parties capitalise on the investment in time and resources made by their predecessors. In other words, a framework for handling model transfer is required. Such a framework should be easy to use and help the consultant and client understand both what their objectives are and how they are going to attain them.

A Framework for Thinking Through Model Handovers

This framework is built on two main assumptions. **The first assumption** is that a System Dynamics model, or any other for that matter, will typically follow a life cycle similar to that shown in Figure 1, below, where contribution to the client's understanding (of the problem investigated in the model) is measured along the vertical axis and time along the horizontal axis.

In the case of a **new** System Dynamics project, it can be expected that most of the learning takes place during the developmental phase of the model. This is where the consultant's role is to elicit the client's core assumptions, values and beliefs, in order to make explicit the client's view of the problem. In Shell, this phase is typified by the use of problem-structuring tools, such as magnetic hexagons and causal-loop diagramming in a workshop environment.

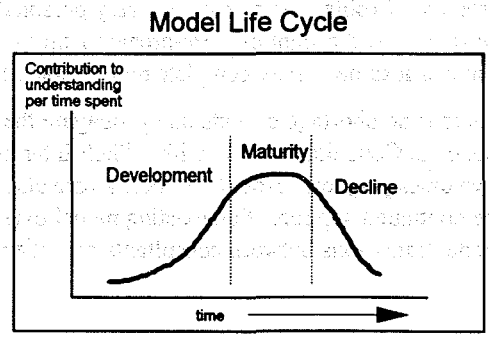

Figure 1

The next stage of the project life cycle sees the development of an Ithink model, during which time the client and consultant work together to ensure that the model is a fair representation of the problem. At this time, the usefulness of the model is at its height, as the consultant helps the client to test out scenarios and his own assumptions about the how the system will react. This phase can be called maturity.

It is hoped that the client found the exercise useful and that his new understanding of the issues involved in the system modelled will help him address these issues in a more enlightened way and make better business decisions. If this is the case, then it can be expected that the model has served its purpose and further time spent on the analysis will offer diminishing returns. The length of the model's useful, mature life will, naturally, vary from project to project, as issues within projects change focus at different rates.

The second assumption reflects the scope of this paper and the authors' experience to date. It is that handovers from 'old client' to 'new client' and 'old consultant' to 'new consultant' take place during the maturity phase of the model life-cycle. This is seen as a valid assumption because it is unlikely that a client/consultant pair would undertake a new project, were either expected to move on before the completion of the development phase. Similarly, investing in model handover is not an issue if the model is no longer suitable for addressing current business problems and is regarded to be at the end of its life cycle, i.e. in 'decline'. At best, this latter case is one of model redefinition, rather than managing the transition from one individual to another.

Now that the assumptions have been established, it is possible to transpose the most common forms of client/consultant transitions into the matrix shown in Figure 2, below.

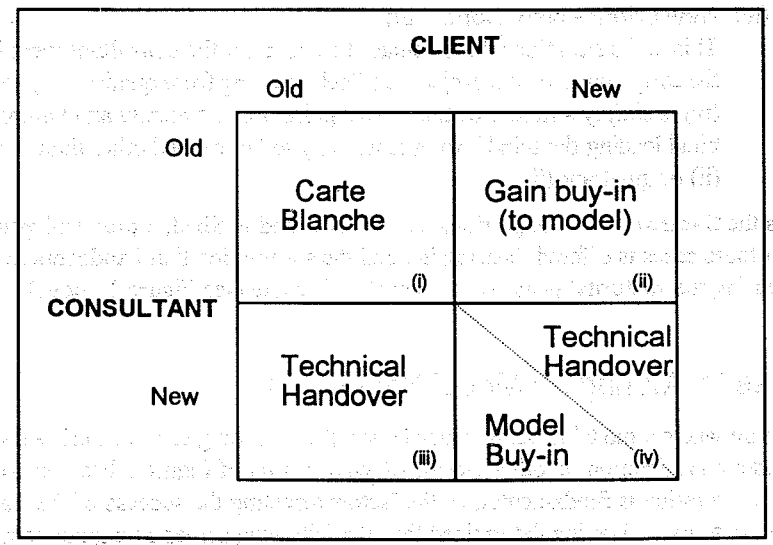

Figure 2

This matrix takes the simple case of a one-to-one client/consultant modelling project and considers two possible states for each of these players. Either they were involved in the original development (labelled 'Old') or they have taken on this role since the project reached maturity (labelled 'New'). In this context, 'New Client' does not suggest that the successor will automatically become a customer of the consultant. Indeed, this is one of the unknowns that must be established during the transition.

This categorisation leads to the following client/consultant relationships, each one requiring a different focus to the handover process:

Quadrant (i) Old Client - Old Consultant
This is the original pairing that is taken to be the norm for the development phase of the model. It does not involve a transition to new players and handover is not an issue.

Quadrant (ii) New Client - Old Consultant
This pairing arises when the client who commissioned the project moves on and his job is taken on by a new person who, at that moment, has no relationship with the consultant. In fact, until this person is established in his new job, he may even be unaware that the project has been carried out.

Quadrant (iii) Old Client - New Consultant
This pairing is often the case in Shell Business Consultancy, where consultants change jobs or take on new projects more rapidly than the average client, leaving the original client to be supported by a consultant who was not involved in the development phase of the project.

Quadrant (iv) New Client - New Consultant
This is the situation where neither the client nor the consultant were involved in the early stages of the project. In Shell, moving from quadrant (i) to quadrant (iv) is simply a matter of time. This pairing is not merely an example of "the blind leading the blind", for it is unlikely to be reached other than via quadrant (ii) or quadrant (iii).

With this as the framework for the pairings commonly found in Shell, a practical guide to dealing with each of these cases is offered, bearing in mind the assumption that handovers are expected to take place during the 'maturity' phase of the model's life cycle (see Figure 1 above).

Guidelines for Managing Model Handovers

In any situation where a model is being handed over, the first thing to determine is the type of handover under consideration, in other words, which quadrant of Figure 2 best describes the situation. This question is fundamental, as the factors affecting the success of the transition can differ from case to case. Having determined this, the following serves as a guide to managing the transition from a consultant's point of view, although the key questions are equally valid for the client.

Quadrant (ii) Key Issue: Gaining model buy-in from the client

Handling the transition of a model from an old client to a new one is an issue of general consultancy skills. The consultant should not assume that the successor has an obligation to continue with initiatives taken before his arrival and will automatically be willing to spend time learning the model. This approach is likely to be seen as unwelcome 'technology push' and could very well deter the new client from continuing the project. The consultant should bear in mind the original reasons for undertaking the modelling effort. It is more likely to have been an approach to a problem articulated by the old client, rather than because the consultant and the technology were available.

Check list of issues to be aware of:

1 *The new client's perception of his new responsibilities*: Does he face the same business problems as his predecessor ? If not, then the model is unlikely to fit his perceived needs.

2 *The personality of the new client:* Some people are keener than others to stamp their identity and make their mark, especially at the start of a new job. If this is the case, then it may be difficult to interest the new client in work that was initiated by his predecessor. Conversely, others may be keen to assimilate any tools and techniques available which might help them in their new job.

It has been said that within Shell there is a tendency for a person in a new job to go that little bit further than the person he replaced. When this is the case, it could even be possible to raise the height of the maturity plateau to a new level of 'contribution to understanding', or at least get the 'same value' from the model with the new client.

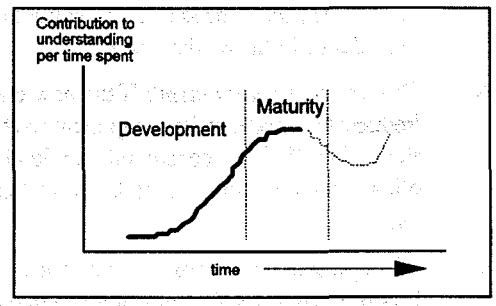

Figure 3

However, the contribution the model makes to problem-solving will fall, until the new person is settled into the job. Figure 3 shows the path of the model life cycle during a successful handover.

3 *Handing over models takes time:* how busy is the new client? Is he prepared to invest the time necessary to understand the model and interpret the results? The new client ultimately has three choices: invest time in understanding the model, have a new one built, based on his understanding of the system, or scrap the exercise, in which case the handover process will not have capitalised on the previous modelling effort.

4 *System Dynamics models capture the experience and views of the problem owner* and these are woven into the model logic. One important consideration, therefore, is the level of respect the new client holds for his predecessor's views and work. If these are held in low esteem, it is unlikely that the new client will buy into the model and its logic without challenging them first. It is therefore important that the consultant be able to explain the assumptions and logic in the model. To this end, there is no substitute for clear and comprehensive documentation and records of the original problem-structuring sessions.

Issues surrounding trust in the model can also stem from the actual data used in the model. Again, the consultant should be able to quote the data source and be prepared to incorporate new data, if this is helpful to the new client.

5 *The new client's experience with Systems Thinking:* If this is limited or non-existent, the best approach may be to first introduce the principles of feedback, system/behaviour pairs and the factors that make this modelling approach different from, say, spreadsheet modelling or discrete-event simulation. Without this appreciation, the model could be perceived as an impenetrable "black box".

6 *Getting the timing right*: Handovers stand most chance of success when the consultant is introduced to the new client at an early stage. Avoid calling unannounced but do not wait until the new client has established his own approach to his job (which, of course, could be superior to that of his predecessor!) as the right moment will have been missed.

7 *Building confidence*: Encourage the new client to see the modelling work as an approach to a business problem, rather than just another computer model he must become familiar with. If possible, give a presentation of the project, not only a demonstration of the model. The consultant can be an important source of continuity and should be seen as an aide to problem-solving, not just as technical support for the model. The consultant should be sympathetic to a new client who is sceptical of the logic behind the model and receptive to any comments he makes. Data validation and logic checking are common ways of building confidence in the model (see 8)

8 *Beware of 'reductionism'*: If the new client is interested in the model, it may be tempting to 'reduce' the model to its component parts in order to understand how it works. Although this is justified, the consultant should always encourage a holistic view of the model, in other words, not only 'what' the model is, but 'why' it exists at all and 'how' it got to be that way.

9 *Managing expectations:* At first, the new client will not know what to expect of the model. It is important for the consultant to make this clear, as high expectations can lead to disappointment and lack of confidence in the model. Low expectations can result in inertia and uninterest in a potentially useful tool.

The authors have had success with this type of handover by showing a willingness to incorporate the new client's assumptions and data, rather than protecting the integrity of their modelling work. At all times, the model is viewed as a decision-support tool, not an end in itself.

Quadrant (iii) Key Issue: Technical handover between consultants

Compared to handovers involving a new client, those between consultants are fairly straightforward. This is because the transition is more a question of on-going support than problem ownership; achieving model buy-in from the client has already been established. The challenge of managing the handover is retained within the consultancy department and issues relate to resourcing and training.

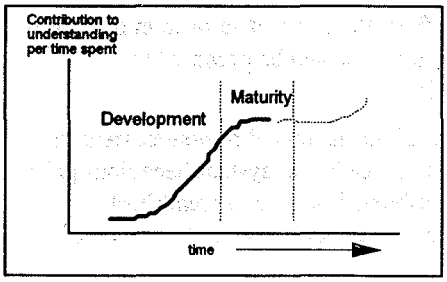

Figure 4

If, as we have assumed, the model is at the peak of its life cycle at the time of handover, the aim of the consultants should at least be to maintain the current level of 'contribution to understanding'. Depending on the skills and experience of the new consultant, it may even be possible to raise this plateau to a higher level, as shown in Figure 4.

There is always a chance, however, that a new consultant will find inconsistencies in the model which, once highlighted, could pull down the contribution curve. In extreme cases, the value of all the previous work could be brought into question, resulting in a total lack of client confidence.

Check list of issues to be aware of:

1 *Maintaining expertise within the consultancy department:* ensuring the availability of a replacement consultant with the right skills and experience requires careful planning. It is a difficult task in the context of an internal consultancy department, where there is pressure to do 'paid' work. A long and smooth handover is a luxury, since opportunities to gain experience in the particular problem area are often sparse. In some cases, it may be impossible for the consultancy department to provide a suitable replacement. This can be extremely frustrating for the client!

2 *Who pays for the new consultant to be brought up to speed?* Is it the client's right to expect expertise to be retained in the consultancy department at no cost to him?

3 *Taking the handover seriously:* Internal consultancies, especially within Shell, can be busy places and it is natural for a consultant to want to work on those projects he finds most interesting. For the new consultant, therefore, getting to know a model that has already been written can sometimes be given low priority. This can only be managed by fostering a sense of responsibility for old products at a departmental level. Indeed, the consultancy group should establish policies and procedures for handovers, whether these be agreed at project level, or become a standard practice.

4 *Training the new consultant:* To maintain service levels to the client, the new consultant must be competent, not only in the model functionality, but also in the business reasons underpinning the project. If this is the new consultant's first experience in System Dynamics, he should undertake to learn about the Systems Thinking *approach*, not just the technical aspects of the modelling language. In this respect, the comments on reductionism made in the previous section (point number 8) are valid.

5 *Competence in front of the client:* It is possible that the client will be anxious about the replacement of his original consultant partner. The old consultant must take the lead in introducing his successor to the client. This is best done gradually by attending meetings together, until such time as the client appears to be satisfied and the old consultant can withdraw. Though the client may have little say in the choice of replacement, the more gradual the transition, the more receptive he is likely to be.

6 *Model documentation:* This can be very helpful in introducing the new consultant to the model. Old models, however, can be big and may not necessarily lend themselves to documenting assumptions and scenarios, which makes handovers all the more difficult. The new consultant should be encouraged to challenge any assumptions in the model he does not understand.

7 *Status quo or push for change?* A new consultant would always have done things differently and will have inherited a model he is not entirely happy with. He now faces a dilemma: to stay with things the way they are or to push for change with the client. In this situation, attempting to lift the model contribution plateau by introducing new ideas could, in fact, produce the opposite effect by casting doubt on the model's fitness-for-purpose.

There is no solution to this dilemma. Pointing out pitfalls in the model could highlight the new consultant's technical competence, but any adverse implications need to be considered.

Quadrant (iv) Key Issue: Depends on the route taken to get here

There are two routes to the new client/new consultant pairing. Either the client changed first or the consultant did. In both cases, the issues affecting the success of the handover will be the combination of those listed under quadrant (ii) and quadrant (iii) handovers. Regardless of how smoothly the previous handover went, there is no hiding the dilemma of a consultant supporting a model he did not create, for a client who did not commission it.

For both the old client and the old consultant to have moved on, it is likely that quite some time has elapsed since the model was originally conceived. This distance from the origin means that it is no longer valid to assume that the model will be at the top of its life cycle at the point of handover as the business may have changed significantly. The diluted sense of ownership felt by the new client/new consultant pair towards the model will only accelerate the model's decline.

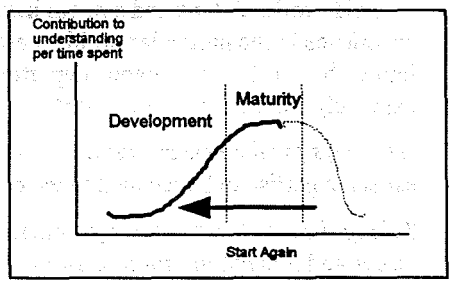

Figure 5

At this point, the client and consultant are best advised to 'return' to quadrant (i) and approach the current issues with a carte blanche; see Figure 5.

Conclusion

In commercial environments, the success of a System Dynamics project depends not only on the mathematical correctness of the model code; the most elegant of models is only as valid and current as the problem it sets out to solve. The success of any System Dynamics model with a business focus depends on modelling skills, consultancy skills and the changing business environment.

Handing over models adds a potential threat to the return on modelling investment, but this can be managed, to some extent. The issue is one of change management where the circumstances (context) of the transition and the way it is managed by the consultant/client pair (process) are as important as the model (content) itself. These issues are summarised in Figure 6, below.

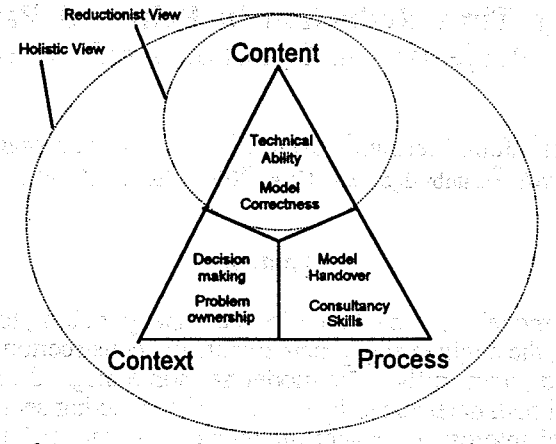

Figure 6

Clients and consultants involved in any type of model handover should take a holistic view instead of a purely reductionist attitude to understanding the model. Due consideration of these points, and those given within each of the handover quadrants, will help client, consultant and the business gain value from the initial modelling investment.