

# Participative Modelling To Facilitate Organizational Change: A Case Study

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## ABSTRACT

The main objective of most system dynamics modelling projects is to support some kind of strategic decision making activity. This paper describes a modelling project where the primary goal was to establish an organizational platform for change. The project was conducted with a group of mid-level managers of a company at the eve of a period of organizational change. This group of managers engaged in a series of participative modelling sessions, facilitated by the authors. Extensive evaluation of the project results indicates that such a platform for change has been established.

## INTRODUCTION

Over the past decades system dynamics modelling has evolved as a well-accepted method to support strategic decision making (De Geus 1988, Morecroft and Sterman 1992). In system dynamics modelling this support is provided by construction of a model of the issue or issues at stake. This model is then translated into simulation equations. Next various policy options and scenarios are explored with a computer simulation model (cf. Forrester 1961, Richardson and Pugh 1981). In this manner a solid conceptual and quantified base for taking a particular decision is provided.

However, sometimes the main objective in strategic processes is not just to take a sound decision. Often the primary objective of strategic discussions is to achieve commitment from the stakeholders to help make the realization of this decision into a success. Often strategic decisions have a profound impact on the organization. For such a decision to become really implemented, it is necessary that the main stakeholders, in particular managers, change some of their attitudes and beliefs. In short, what needs to be established is an organizational *platform for change* (Beer 1971).

In the past few years an emerging trend in the system dynamics community has been to employ a mixture of system dynamics modelling techniques, brainstorming tools and process facilitation insights in achieving precisely such an organizational platform for change (Senge 1990, Kim 1990, Kreutzer 1992). At the core of all these new approaches lies the thought that if real commitment and consensus regarding policy recommendation is to be achieved, a high level of ownership for the model upon which these policy recommendations are based is required. That means that this model will have to be understood by the decision makers. For this to occur, the decision makers will have to engage actively in the modelling process. The modelling will have to be "participative".

In this paper a case study is described in which such a participative modelling approach was employed to establish the necessary ingredients of a platform for change amongst a group of mid-level managers in a multinational company entering a period of organizational change. In this case study

considerable effort has been spent in trying to evaluate if such an organizational platform for change has indeed been established.

## PARTICIPATIVE MODELLING FOR ORGANIZATIONAL CHANGE

At the core of participative modelling lies the following notion: Models, both conceptual and quantitative, can be very helpful in supporting strategic decision making. However, if one wants managers to act upon the policy recommendations these models provide, these managers will have to understand and believe these models. For this there is only one way, which is to involve these managers as much as possible in the modelling process. This is what is called participative modelling.

Participative modelling supports two aspects of strategic discussions. It structures the strategic discussion *process* and it structures the strategic *problem* itself. For these two purposes an impressive library of techniques has been built up in recent years (see e.g. Senge 1990, Kim 1990, Vennix et al. 1990, Morecroft and Sterman 1992). In this particular case study only a small subset of these techniques has been used. Most of these are listed in Table 1. As one can see, some of these techniques stem directly from the field of system dynamics proper. However, many of them originate from other areas, such as from organizational development or operations strategy.

TECHNIQUES EMPLOYED FOR STRUCTURING THE PROCESS	TECHNIQUES EMPLOYED FOR STRUCTURING THE PROBLEM
<ul style="list-style-type: none"> <li>• Semi-structured interviews</li> <li>• Nominal group technique (NGT)</li> <li>• Inter-session workbooks</li> <li>• Questionnaires</li> <li>• Evaluation interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Mind mapping</li> <li>• Hexagon brainstorming</li> <li>• Causal diagrams</li> <li>• Behaviour over time diagrams</li> <li>• Systems archetypes</li> <li>• Strategic fit matrices</li> <li>• Propositions</li> </ul>

Table 1: Techniques employed in the case study for structuring both process and problem

## THE CASE STUDY

The client company was a multinational company that was just entering a period of organizational change. In the past the company had been very successful in a particular market, in what we will call its "Old Business". Partly this success could be attributed to the company's particular organizational structure. Traditionally, this structure had been a decentralized one, with highly autonomous business units operating on a regional basis. The management style in these business units was entrepreneurial and was perhaps best typified as "healthy egoism". In this structure, each business unit tried to serve as best as it could its own particular corner of the market. This structure had provided the company with a highly flexible and dedicated work force close to the customer base. This clearly was an asset for the "old business".

However, the market appeared to be changing. A trend could be distinguished towards what we will call the "new business". In the "new business" it appeared that the autonomous organizational structure seemed less well fitted to serve the market optimally. In this "new business" units would need to collaborate closely if the company were to remain competitive. And inter-business-unit collaboration was not a *forte* of the company at that time, due to the attitude of "healthy egoism" mentioned above. Clearly the ruling attitude of most BU management teams would have to change into a more collaborative

attitude. But how could this be achieved? The existing attitude had been carefully created and nurtured by management over a number of years.

On the request of the company's top management a pilot study was conducted by the authors with a group of BU managers. The primary goal of the pilot study was to evaluate if participative modelling could indeed achieve, in a time efficient manner, the kind of change in management attitude that was considered necessary. A secondary goal of the project was to come up with a sound analysis of the problem at hand and, possibly, with some good suggestions as to how the problem should best be handled.

## PROJECT PHASING

### Project Set-Up

Five managers were selected from one particular geographical region. In this region, several disputes over collaboration had occurred in the recent past. With these managers a total of five sessions of two hours each were conducted. Between each session a workbook was constructed and sent to the participants. In these workbooks the main results (e.g. diagrams) of the previous session were recapitulated and questions leading up to the next session were provided. In several instances responses to these questions were collected before the session, to enable the project team to better focus the actual session itself. This way an optimal use was made of scarce management time.

The project team consisted of the three authors. Each project team member had a particular role in the sessions (cf. Richardson et al. 1992). The "process coach" facilitated the group and monitored group dynamics. The "model coach" focused on the models that were being produced and did most of the analysis. The "recorder" noted down what happened during the sessions and took care of the questionnaires and evaluation interviews.

### Preparatory Interviews: More Consensus Than Expected

Preparatory interviews were conducted with the managers involved in the project. The results of these interviews were noted using a "mind mapping" technique (Eden 1989). Two aspects of these interviews are particularly worth mentioning: The first aspect was the relatively low awareness of the urgency of the problem with several interviewees. The second aspect was the surprisingly high level of consensus regarding the main causes of the collaboration problem. Although these managers were supposed to disagree frequently regarding collaboration issues, they seemed to

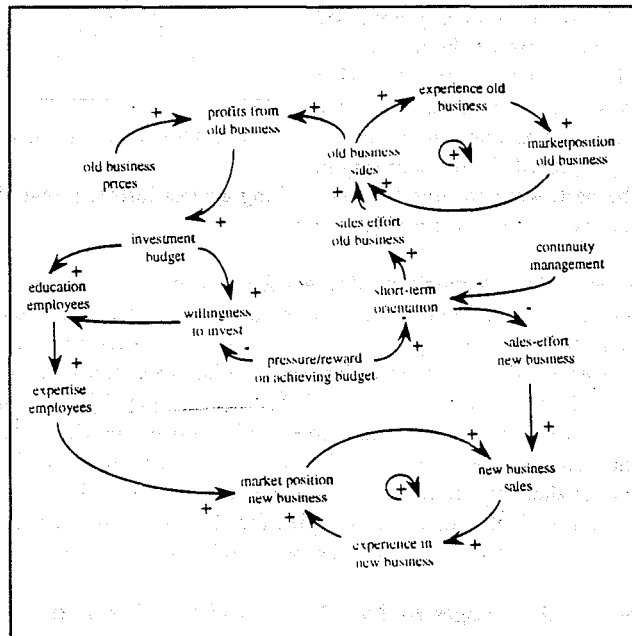


Figure 1: A causal diagram from the intermediate report, showing how the Success-To-The-Successful archetype prevented the company from acquiring a good position in the new market

the surprisingly high level of consensus regarding the main causes of the collaboration problem. Although these managers were supposed to disagree frequently regarding collaboration issues, they seemed to

agree considerably in their analysis of why collaboration was necessary in theory and failed often in practice.

### Session 1: Explanations For Company Growth

The authors felt that many of the explanations the interviewees had given had their roots in the way in which the company had operated in the past and the way it had been organized. Therefore in the first session the question was addressed how the client company had grown in the past. This surprised several of the participants, since they did not see the relation with inter-BU collaboration. On the spot a causal diagram was created by the group that explained the company's rapid growth and success in the past decades. To a large part, this was considered to be due to the company's particular highly decentralized organizational structure.

### Session 2: Collaboration And The Limits To Growth

In the second session it became apparent why the project team had chosen to model the client company's growth in the past first. Now the limits to that very same growth were modelled as well. And here the variable "willingness to collaborate" suddenly appeared in the centre of the new causal diagram that was created. What was striking, was that the same mechanisms that had produced rapid growth for the company in the past, were apparently now working against further growth in the future. Truly, yesterday's solutions had become today's problem causes!

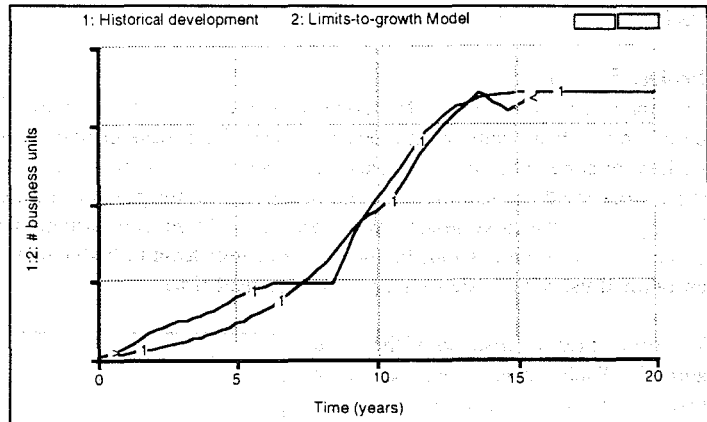


Figure 2: Limits to company growth, historical and simulated

Truly, yesterday's solutions had become today's problem causes!

### Intermediate Reporting: Process And Content Results

After the second session an intermediate report was produced for top management. In this report both content results and process results obtained so far were fed back. As far as content results were concerned, a.o. the causal diagrams that had been constructed during the sessions was explained step by step. Here several archetypes that were mentioned by the managers during the second session were explained in detail<sup>1</sup>. In order to establish process results, a questionnaire was filled in by the managers that tried to measure these. These results were also positive (see Figure 3). As it turned out, this intermediate report did have a considerable impact on the company as a whole. Several extra copies were requested, including a set of copies for all of top management. People throughout the company felt that the essence of the problem was very well captured in the analysis.

### Session 3: Changes In The Market And Collaboration

In the third session the project team wanted to start with looking at factors that were mentioned earlier on as reducing the "willingness to cooperate". The group members, however, objected. What they wanted to know was why collaboration was presented as a goal in itself. Why should they collaborate in the first place? This then became the focus of the discussion. At the end of the session it had become clear why

<sup>1</sup>Figure 1 shows a causal diagram of one of these archetypes. Here the "success-to-the-successful archetype provides one explanation why the company found it difficult to establish a good position in the market for "new business".

collaboration was essential: the market was changing. More and more the market was indeed asking for products that could only be delivered by collaboration between business units.

**Session 4: Market Characteristics And Organizational Fit**

In the fourth session the characteristics of this new market were explored. In particular, the group looked at the kinds of demands that "new business" placed upon the company's organization. In matrices differences in characteristics between "old business" and "new business" were noted down. Table one gives an example of such a matrix<sup>2</sup>. Here the participants found that, apparently, the original decentralized structure was still the ideal structure for the "old business", which would probably remain the main money maker for the company for several years to come. The group discovered that it was for the "new business" that changes to the current organizational set-up might be in order.

MARKET CHARACTERISTICS	"OLD BUSINESS"	"NEW BUSINESS"
duration of ordering process	short	long
size average order	small	large
customer-supplier relationship	business-like	co-makership-like
decision making level	mid-level	top-level
number of competitors	large	small
<b>ORGANIZATIONAL REQUIREMENTS</b>		
investment level	low	high
skills sales management	medium	senior
number of business units involved	one	several
short-term flexibility required	high	low
geographical orientation	local	international

Table 2: Selected differences between market characteristics and organizational requirements for two types of business

**Session 5: Recapitulation And Solutions**

The final session was to serve as a consolidation of the findings so far. The project team felt that by now much statements had been made by the group that would be hard to capture in a diagram. The team therefore decided to present the managers with a number of propositions which would partly summarize the discussions so far, partly feed the discussion in the last session. From the forty-two propositions that were presented, only six gave cause to disagreements among the group. It was around these few disputed propositions that the final session centred. However, in the end the group could not reach a consensus regarding what actual changes should be implemented in the organizational structure.

<sup>2</sup>This procedure was adapted from Terry Hill's work on Order Winning Criteria and Process Choice (cf. Hill 1985).

## CONTENT RESULTS: PROJECT FINDINGS

What were the main findings of the team? In a project like this it is perhaps better to speak of "lessons", rather than findings. Lessons there have been many in this project. The six lessons that are listed below are among the most important.

### **Lesson 1: The World Is Changing**

The first lesson for several of the managers was that, indeed, the market was changing, even though they had not noticed it yet. And, indeed, even though this change did not affect them seriously at this point, it would probably affect them considerably in the near future. The importance of "new business" would continue to grow over the importance of "old business". And this new business would place quite different demands on their units from what old business had been doing. Collaboration was one of those demands.

### **Lesson 2: Yesterday's Success Story, Tomorrow's Problem Cause**

This second lesson was far more profound. Through the causal diagramming exercises, the managers found that precisely those mechanisms which had proved to be so successful in the past, now appeared to be blocking success in the future. The original characteristics of the company's organizational structure promoted entrepreneurial behaviour, promoted closeness to the regional customer base, promoted "healthy egoism". This was perfect for the "old business", but not at all fit for the "new business". Yesterday's strength had become today's weakness.

### **Lesson 3: Put Your Money Where Your Mouth Is**

The behaviour and attitudes of the managers were partly the result of a closely balanced mix of selection processes, reward systems and value statements by top management of the company. If the desired behaviour was to change (i.e. if collaboration were to be sought instead of avoided) then this mix of top management policies would also have to change. At this time top management did indicate that it wanted attitudes to change. What the BU managers told them was that top management would have to back these statements up with changes in reward systems as well.

### **Lesson 4: Never Change A Winning Team**

Although the importance of "new business" was rising quickly, "old business" was still the main money maker in the company, and was bound to stay that for several years to come. The organizational structure best fit to serve the market for "old business" still was the original structure. Now the problem became how to adapt the organization to the "new business" without this adaptation resulting in an organization which would no longer be fit to serve the "old business". This turned out to be very difficult indeed.

### **Lesson 5: The Captain Has To Set The Course**

The group of mid-level managers achieved almost perfect consensus regarding the analysis of the problem of collaboration and its causes. At the same time they could not agree on a concrete action program to promote inter-BU collaboration. This, they said in retrospect, was because any change immediately cut into the roots of the old organizational structure, into what had made the company successful in the "old business". So designing such an action program would mean redesigning the entire organizational structure. And that, they indicated, was not their job. "A company needs a philosophy, a clear course", they indicated. And this course has to be set by top management. Only the captain can set the course, or redesign the ship.

### **Lesson 6: Improve The World, Start With Yourself**

What our managers could change was themselves. And themselves they certainly changed. Over the course of the project the issue of the changing market and collaboration gradually shifted from being a far-away, external issue into being a very tangible, internal issue. The managers discovered that perhaps

the best action to be taken to promote collaboration was just to change their own personal attitudes towards collaboration and their own way of working with other managers. In the true entrepreneurial spirit of the company the mood became somewhat like: "We don't need top management to tell us we should collaborate. We can deal with this issue very well ourselves." Probably, this spirit was just what top management hoped to achieve with the pilot study in the first place...

## PROCESS RESULTS: ORGANIZATIONAL CHANGE IMPACT

### Requirements For Organizational Change

Top management of the client company realized that the company would have to change. And for a company to change, its employees will have to change. Of those employees, it is first of all management that has to change. But changing attitudes is hard. In any organization there is always a natural "resistance to change". Therefore an organizational platform for change (Beer 1971) will have to be created first, before any real organizational change can occur. A platform for change implies that each manager:

1. is *aware* that there is a problem and that something has to be done;
2. has obtained *insight* into the nature of the problem, what is causing it and how something could be done to solve it;
3. has developed a *shared vision* of the problem together with his peers; some degree of consensus has developed;
4. is fully *committed* to actually change something about the situation and make this change into a success.

These four conditions: awareness, insight, shared vision and commitment, seem obvious conditions for organizational change. As will be shown in this section, this project has achieved both awareness, shared vision and commitment regarding the issue of inter-business unit collaboration.

In addition, two more process results were evaluated. These are related to the efficiency of the method employed. For if a method is to achieve the four goals mentioned above, it will have to ensure:

5. good *communication* between the participants.
6. fast and *efficient* decision making.

Therefore, we will also show that the managers have that they felt that this particular method has helped them in communicating effectively and fast. Evaluation results on all six factors just mentioned will be discussed. First some remarks should be made on the evaluation procedure.

### Evaluation Procedure

The purpose of this pilot project was to see if indeed a platform for change could be established. Therefore special attention has been paid to evaluating these "soft results" as accurately and fully as possible. For this purpose four categories of evaluation material were used:

- A pre- and post-test that the participants filled in at the start and at the end of the project. This test asked about causes and solutions for insufficient collaboration between units.
- A more elaborate questionnaire directly aimed at measuring awareness, insight, shared vision and commitment<sup>3</sup>.
- Semi-structured evaluation interviews with the participants at the end of the project.
- A post-project analysis of the minutes of the sessions and interviews.

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<sup>3</sup>This questionnaire was developed by Jac Vennix (Vennix et al. 1993) In it participants are asked to give their opinion to a number of propositions regarding their perception of the process. This is done on a five-point scale, ranging from very bad to very good. This questionnaire was filled in by the participants on two occasions: after session 2 and after session 5. The main results of that questionnaire are shown in Figure 3.

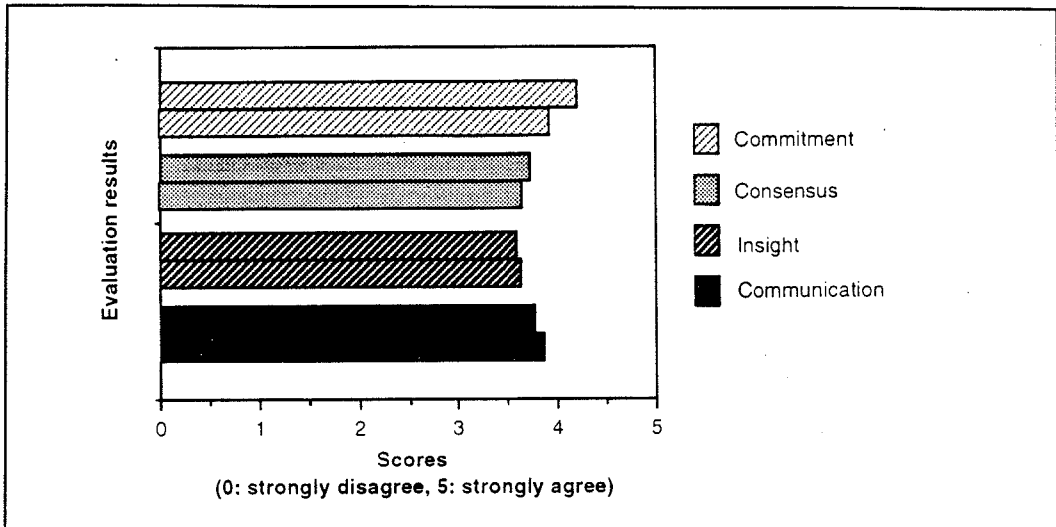


Figure 3: The Main Results Of The Questionnaire Evaluating Process Results

### 1. Awareness

At the outset of the project several managers indicated that they did not think that inter-BU collaboration was really a problem to them. It might be a problem for other business units, but they had not encountered it often. This perception certainly changed over the course of the project. Some selected remarks from managers were:

- (in session 3, when asked why collaboration was important):  
"Why? Because else we will be bankrupt in a couple of years."
- (after the project, when asked what the best characteristic of the project had been):  
"Becoming convinced of a new future. In short: the problem exists." and:  
"This subject is a critical success factor for the whole company".
- (at the end of the project, when asked what the main benefits were to him as a manager):  
"I now have a different view on collaboration. I will now search more for collaboration. If that does not happen the company will go down."

### 2. Insight

It is also safe to say that the participants have gained considerable insight in the problem. From a comparison of the kinds of solutions to the problems that were filled in before and after the project it becomes apparent that before the project the emphasis was on measures to be taken for the whole of the company and after the project the emphasis was on measures that could be taken at the business unit level. One anecdote in that respect:

In Session 5 the group came up with the idea that a specialized BU for "new business" might be in order. Then the question came up who should pay for such a BU. Here one of the managers said that he would be willing to allocate say 8 % of his revenues for such a unit. Then a second manager made a higher bid: 10%! "I bid 12%!" said a third. No one suggested that the holding should provide this money. For who needs top management, anyway?

As one of the managers indicated at the end of the project: "It has increased my insight. I realize I am working on a problem with which my colleagues are struggling just as hard as I am."

### 3. Shared Vision

After session 4, 44 propositions were formulated that summarized the main findings up to that point. Of those 44 proposition, responses to 38 of them were almost unanimous. So certainly quite some common



ground had been established. Some selected statements from managers made in the post-project interviews indicate the same:

- "This method is a way to bring participants on one line, to achieve convergence"
- (when asked what were the main benefits for him as manager):  
"Convergence of opinions in the our region"
- (when asked what were the main benefits of the project for the company as a whole)  
"The main benefit of this project is convergence of opinions. It is part of the whole change process."

#### 4. Commitment

Commitment to change is hardest to achieve in this kind of process. And also, incidentally, hardest to measure. However, the scores in the evaluation questionnaire regarding commitment were the highest ones of all: 4.03 and 3.92 on a scale of 5. So it is safe to say that the participants feel that yes, commitment for the conclusions and recommendations of the sessions has been achieved<sup>4</sup>. With "commitment", one of the managers indicated, was meant: "Now everyone is convinced that something has to change".

#### 5. Communication

In order to achieve awareness, insight, shared vision and commitment it is essential that communication between the participants is good. The participants indicated that they felt this had been the case, indicated by scores of 3.77 and 3.86 on a five point scale regarding the aggregate proposition: "Through this project effective communication regarding the issue has been achieved."

That communication is essential for insight and shared vision also became apparent in a negative way: the effects of non-attendance. Most managers indicated as one of the weak points of the project the changes in actual participants per session. One typical anecdote in this regard:

In Session 5 discussion centred around those propositions where substantial disagreement existed amongst participants. One manager was very disappointed that the group did not discuss a particular proposition that he didn't agree at all with. Looking at the answers to that question, it did indeed turn out that all other participants had answered: "Fully Agree", whereas this particular manager had answered "Fully Disagree" (sic). This was one of the propositions that had been discussed in the previous two sessions. Typically enough, this particular manager was the only one who hadn't attended those two sessions! After some discussion, it turned out that the whole thing was basically a misunderstanding: The rest of the group had developed a particular understanding of the terminology used in the proposition that the dissenting manager hadn't picked up, due to his absence.

additional comments by managers:

- "Without this method people would not have let the other one finish speaking"
- "In all sessions there was an openness that is not "normal" within our company. I had the strong impression that it was felt to be a common problem. Everyone went along, there were no hidden agendas."

#### 6. Efficiency and Effectiveness

The managers were quite enthusiastic about the effectiveness and efficiency of the method employed. The proposition: "This method gives faster insight than ordinary meetings" scored a 100% "Agree". The proposition: "This method creates a shared vision quicker" got a 60-80 % score "Agree".

Selected responses of managers:

- "With little effort a clear image"
- "Quality of the discussions very high, facilitation very good"
- "This is a good method, because every one in our company has no time and this method works efficiently."
- "This approach very well suited to analyze problem. It gives a clear image. Awareness has been achieved."
- "I am very satisfied about this method. Visualization gives an overview, it shows what is growing. In a not too large group in this way everything is seen and captured. Avoids jumping to conclusions."
- "Structuring gives a frame of mind. Effective and yet you can put forward everything."
- "It's exiting too".
- "I am going to steal this method."

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<sup>4</sup>Please note that people who say that they are committed need not necessarily be committed or remain committed. Real commitment is shown in actual actions, not just good intentions.

## CONCLUSIONS

### Organizational Change Or A Platform For Change?

The previous section has shown that this project has resulted in higher levels of awareness, insight, shared vision and commitment. What the authors would like to point out is that this is not the same thing as saying that the project has resulted in organizational change. That is not a matter of academic over-cautiousness. The authors feel that the project has indeed established a "platform for change". Resistance to change has been replaced by *willingness* to change. But the actual changing has only partly taken place. For this organizational change to take place more will be needed: For one thing, more people will have to be involved. Also, as indicated in the section on content results, actual changes in reward systems et cetera will have to back up this willingness to change, or people will soon fall back in their old habits. Creating a platform for change is not equivalent to organizational change, it is a prerequisite to organizational change: No platform, no change.

However, a platform for change alone is not enough. If this company really wants to achieve organizational change, it will have to follow up this first effort with a larger organizational change program. That participative modelling and other techniques from the system dynamics community, such as managerial microworlds, can play an important and very effective role in such a program, is evident.

### Evaluation helps to improve quality of the consultancy process

Many practitioners still see evaluation as some kind of academic passtime, with little relevance to the business world. As this project has shown, asking feedback from your client, both during and after the project, can help one in seeking the best next course of action during the project, and can help one in improving one's methods for the next project. That makes process evaluation fairly relevant to the business world.

### Participative modelling has matured rapidly into established management consultancy

Only a few years ago participative modelling techniques were applied only by a few experts in the world, in particular in the USA and UK. As projects like this one show, the approach has matured and can be used by many practitioners and academics for a broad range of problems all over the world. Surely that is good news for the system dynamics community.

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