

# MIDTERM ASSESSMENT (MONITORING) OF VERA

## 1 Introduction

The overall aim of the monitoring work was to assess the present state of the programme and the realised impacts to the industry as well as to challenge the validity of VERA objectives at the beginning of the programme. In other words to assess the impacts of VERA to the industry, whether the objectives are still valid and whether they should be adjusted in any way. The monitoring work was carried out by an assessment team consisting of internal and external assessments. Co-ordination of the assessment and internal assessment was carried out by Innovation Management Institute of Tampere University of Technology (Pekka Berg, Satu Raak, Juha Nummi, Jussi Pihlajamaa), external assessments by Professor Mathew Bacon from BAA, Great Britain and Kaj Hedvall, the programme manager of REMBRAND technology programme.

The focus of Professor Matthew Bacon's assessment was to assess (1) whether the expectations of the construction industry have been or are being met, (2) how well the results of the projects are disseminated and whether the mechanisms for dissemination are appropriate and (3) how the industry is applying the results of finished projects. The assessment was carried out by interviewing ten projects which were mostly completed/completing.

Kaj Hedvall's assessment focused on (1) whether the role of VERA as a generic tools programme for the entire real estate and construction industry is being met, (2) what is the interaction between VERA and the other technology programmes and (3) what are the benefits of VERA as a programme to the projects and what is the contribution of the "fringe" projects to the cohort of VERA initiatives. The assessment was carried out by interviewing ten projects that were more closely related to property management and real estate business.

The internal assessment focused on (1) the hoped for and so far reached impacts, (2) outputs/results and (3) activities of the programme management of VERA. The work was carried out as top-down assessment (interviews and workshops for steering committee members) and bottom-up assessment (15 interviews and 48 answers from the postal survey from the projects). The aim of the internal assessment as a whole was to provide as an objective information as possible to the steering committee for decision making.

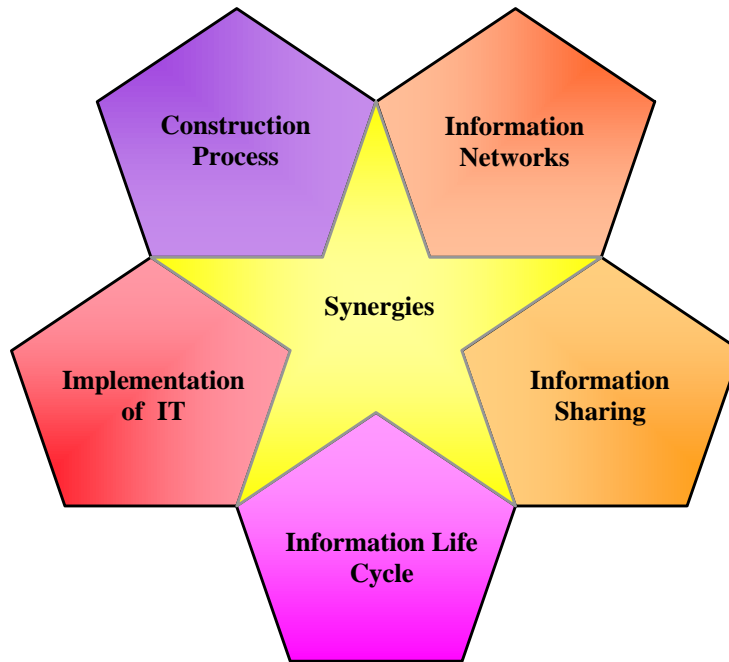
This paper is a summary of the monitoring work from the different assessment viewpoints focusing on central findings. Findings are discussed in the following entities:

- General findings
- Direct and indirect impacts
- Nature of the projects
- Outputs of the projects
- Activities of the programme management
- Impact of Tekes funding
- Validity of VERA objectives
- Recommendations.

The summary is also available at the home pages of VERA programme ([www.tekes.fi/teknologia/kaynissa.asp](http://www.tekes.fi/teknologia/kaynissa.asp)). The monitoring work as a whole will be published later in the spring as a full version.

## 2 GENERAL FINDINGS

The stated objective of VERA programme is: “...to promote the utilisation of product information technology and information networks in the construction processes and to make it possible to manage information flows during the entire life cycle of the building.” The stated themes are seen in figure 1. The overall objective of VERA programme is hoped to be obtained by first recognising and then utilising the synergies between these goals.



*Figure 1. The programme recognises the need to exploit synergies.*

The programme has identified that at the heart of VERA must be the recognition of the synergies that exist between each of the five themes. For the moment there seems, however, to be no clear mechanism of where the synergies are identified. It was seen that the synergies would become self evident to some extent through the process of gathering the learning from the projects. The greatest synergy of all will be understood through way in which *people* and *organisations* work in new construction and real estate business processes, *enabled* through IT to *share* data across information networks over the life cycle of the facilities.

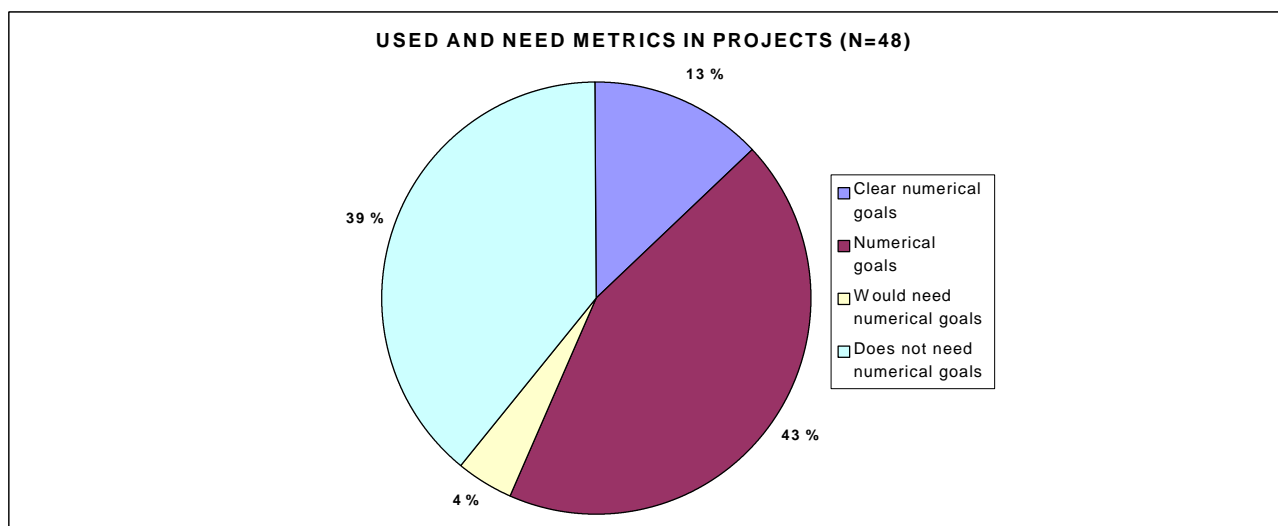
The general feeling of many project participants was that VERA is a programme of one issue having “core” projects and “fringe” projects. Participants commenting this regarded themselves as “fringe” projects. Answers from the projects closer to the “core” or in the “core” indicated, however, that the core of VERA is in fact diverse rather than focusing just on single issues such as IFC (more information about IFC and IAI can be found through the web-links at the home pages of VERA). In any case, such attitudes were assessed to be a threat for achieving all the potential synergies created or to be created in VERA. If several of the more applied projects regarded themselves as on the fringe of the programme, the hoped for impacts may not be fully realised. This issue relates to a more general question concerning VERA being a general tools programme for the entire real estate cluster compared to the original objective focusing on the information exchange in the design and construction process.

### 3 Impacts of the programme

#### 3.1 Direct impacts

The so far realised impacts of VERA cannot be quantified as there was no tangible measurement taking place within the projects Professor Matthew Bacon interviewed. No attempts to measure the efficiency of current working practices or to produce any form of cost benefit model were identified. Some projects did recognise the importance and the need for metrics but complexities of establishing robust metrics were perceived too difficult to address.

The projects were also asked in the internal assessment whether they had set numerical goals (figure 2). The outcome is somewhat different from the previously described. Most of the projects did not, however, define what the metrics were or they were very imprecise. Among most commonly mentioned metrics were such as: budget, scheduling, sales volume, market share, number of (new) customers, customer satisfaction, turnover, profitability, share of exports. Mostly, the mentioned metrics were those that were given as examples in the survey. Projects answering not needing any measurements were mainly research projects.



**Figure 2. Numerical goals used in the projects.**

#### *National level impacts*

National level impacts of VERA were discussed in the interviews and workshops of the steering committee (top-down assessment). Increase in the *national level competitiveness* as well as increase in *the productivity and the competitiveness of the property sector* were seen important hoped for impacts. Whether any of these, very general, impacts has already been obtained, was considered minor importance and hard to value at this point among the steering group.

The integration problem in the construction and real estate industry and the lack of common will to communicate across the border lines were seen as hindrance in reaching industry level and not to mention national level impacts in the first three years. Improvements in the atmosphere, attitudes as well as awareness were, though, already seen to have been taking place in the construction and real estate industry. This issue needs to be addressed by the programme level activities.

### Impacts on the construction and real estate industry

The projects as well as the steering committee members were asked about their opinions of the significance of the already obtained impacts of the projects to the entire construction and real estate industry (figure 3 - The impacts (goals) in the figure are a consensus of the steering committee for the most hoped for impacts of VERA to the construction industry). *Increase in the utilisation of IT in the processes* was regarded as having mostly “from big to very big impact” to construction and real estate industry among projects (72 %). *Increase in improving the quality and effectiveness in the construction industry* was on the other regarded as having mostly “from no impact to some impact” among the projects (53 %). Improvement in quality and productivity was argued as being very generic and common to many technology programmes. The differences within and between the impacts are rather small as it can be seen from figure 3.

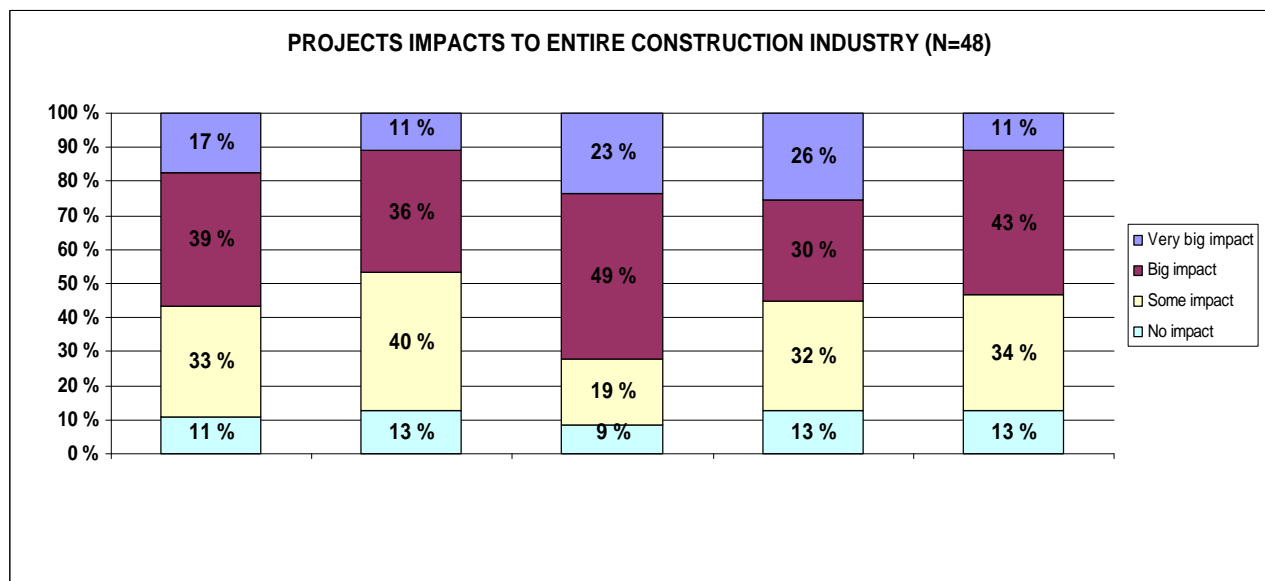


Figure 3. Opinions of the projects about the significance of the obtained impacts so far in VERA.

According to the steering committee there have been many positive improvements and promising results already in some of the VERA projects but not yet as a whole. Expectations are quite high for the last three years. More emphasis is especially needed within the *life cycle concept* as well as *process re-engineering* to enhance those impacts. During the monitoring work *management of information through the entire life cycle of building* was raised as the most important issue to which the other impacts (goals) should be connected. Among the projects, however, the life cycle concept and process re-engineering were found having more clear impact than some or no impact. Reason for slightly different views between the steering committee and the projects is apparently that the project participants estimate impacts rather from the viewpoint of their business than from the viewpoint of the entire construction and real estate industry. In other words the estimation of the project participants is a question of indirect impacts to the industry.

In addition it was emphasised that the integrated information management concept cannot be created during the six years in VERA. To create real activity was found much more important than the development of the standard. The effort was considered to be in a good direction as the atmosphere and attitude were seen changing. It was assumed that the development of an international software industry based on IAI was necessary to overcome some of the obstacles in the tools development.

### 3.2 Indirect impacts

In contrast to the direct impacts, the indirect impacts were found significant to the construction industry as well as to the real estate industry. The majority of the project members saw benefits from the projects in which they had participated. Industry seemed to be deriving value from the projects, all be it, only that part of industry that participated in VERA.

Themes that consistently appeared in the interviews of the construction industry projects were: (1) much improved awareness of the issues that need to be addressed in terms of IT, (2) indirect learning of the participants in general and (3) need to have start-up briefing for all participants of the project to educate the project partners in the key concepts relevant to the project. As the indirect learning of the projects was clearly seen to be of benefit, it was also seen to have created complications. For example some participants wanted to change the direction of their project after learning had taken place during the project. In other words they then realised their own needs or the needs of their companies.

Numbers 1 and 2 (above) also came up in the interviews of the real estate and property management projects. Among these projects it was regarded especially important that project participants were ready and available when the market was demanding IT-tools to manage the information that had been created as a result of consulting projects. This was the case in organisations where the consulting business would continue to be the core business while the IT developed was supporting tools only.

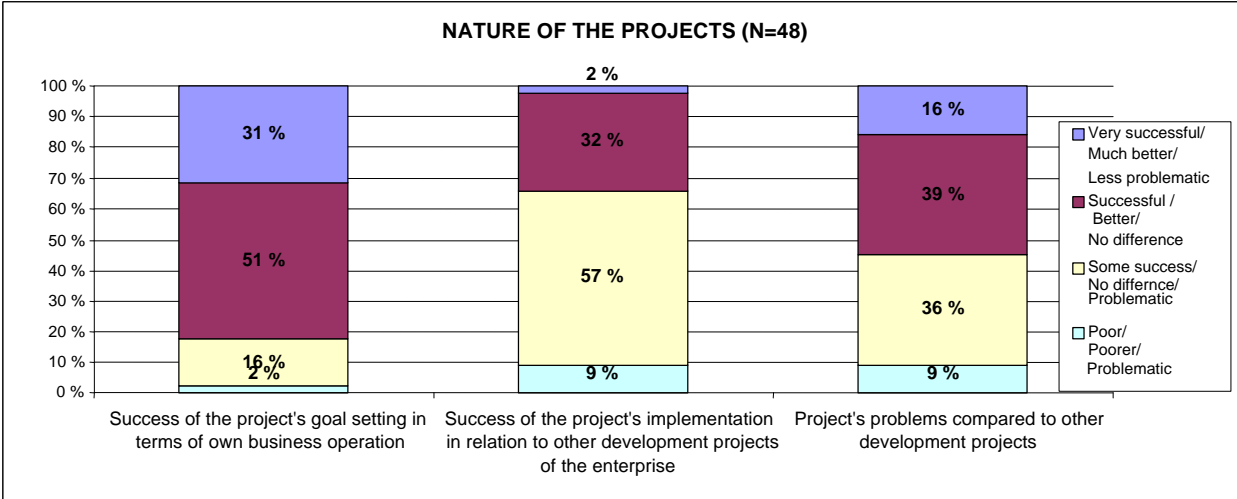
In the software business the situation was different since the IT-products are their core business. The projects found the development work very important in terms of renewing their core products. These projects were seen as creating a competence to work in open and modular environments, all be it, only inside the firms of the participants. As a whole, it appeared that interoperation was in practice being limited to creating readiness for data exchange between separate applications. The success of developing the joint parts in the programme integration was considered less than expected. One reason for the limited success to create programme integration was the rapid change in the business environment during the projects. In several cases, where major changes had occurred in the business structures and strategies, even the indirect impacts of the projects were found hard to assess.

## 4 NATURE OF THE PROJECTS

The development projects of VERA seemed to support their business operations very well (figure 4). Only one participant of the total 48 considered the *success of the objective setting poorer in relation to the business* and almost third of the projects regarded it as very successful.

The *success* of the projects was also found successful or having no difference compared to *other development projects of the organisation*. Four projects regarded the success as poorer compared to other development projects and one as very successful. The same trend was seen when the participants were asked how *problematic the project had been in comparison to the other development projects* of the company. In other words the majority of the participants considered that VERA projects had no more problems or even less problems than the other development projects in the organisation. Only four participants thought that the project had been much more problematic.

The above output can be considered quite expected as the majority of VERA projects are close to the everyday business (not so much strategically driven) and thus mostly applied compared to many other technology programmes. Another reason for such an outcome is probably the lower risk level in the construction industry in general than in other industries. The projects' risk taking as individual development projects has therefore been similarly lower than in development projects of other industries. It can be concluded that the answers of the projects in the internal assessment support well the external assessments - the indirect impacts are in deed significant in VERA to the construction industry as well as to the real estate industry.



**Figure 4. Nature of the project in terms of success in the goal setting and success in the project implementation as well as existing problems in relation to other development projects.**

**5 Outputs/results**

Output is defined as something tangible coming out of the projects. Outputs are divided here into three categories: (1) new knowledge, (2) piloting and new experience, (3) new commercial products, methods and services. New knowledge is understood as the technology being developed and the information necessary in the development or research project. Knowledge can be new in the company, in the industry, in Finland or in the world. Piloting can be defined as testing new ideas and participants gaining experience (e.g. learning) during the project.

New information into the construction and real estate business fields was regarded as a minor output objective of VERA as the problems were considered already known. The focus was seen in bringing the new knowledge into Finland which would then be applied within the industry. In other words there is no demand for new knowledge as understood in the basic research. It is a question of utilising the existing knowledge efficiently in piloting and commercialisation of the developed technology.

Figure 5 illustrates the significance order of the output types in the different impact areas (themes) and VERA as a whole (all projects). The viewpoints of the steering committee and the projects are combined in the figure, as their significance order was identical in both the top-down and the bottom-up assessments. New commercial products, services and methods were seen as the most important outputs in every area of VERA. There is variation between the impact areas in terms of importance order of new knowledge and piloting. The borderline between knowledge and piloting is not so clear cut and not even so important in a programme like VERA where the emphasis is on the introduction of technology. New

knowledge is something needed in the piloting where also learning and new experience are accumulated.

According to the top-down assessment, the most important outputs pursued by VERA were regarded to be within the life cycle concept. There have already been good and promising outputs in that area except in piloting which should bring more favourable and comprehensive outputs in the second half of VERA. Commercialisation was regarded as a bigger challenge than any lack of technologies within the information networks. More emphasis should also be put into e-commerce in the future. There was also seen a need for enhancement in the area of construction process.

As a whole, there seem already to exist quite a lot of “commercial” products, services and methods produced in VERA. The lack of users was found a problem, though, in relation to large amount of developers. The real issue is therefore the amount of new business activity these artefacts (which have been developed with the help of public subsidies) have the potential to produce in the near future. The part of these products that will really commercialise will determine the true success of the programme. Activating and creating markets, both externally and internally in the participating organisations, for the products were therefore seen important.

**Opinions of steering committee and the projects about the significance of the different outputs obtained in the impact areas**

1. = most important 2. = second important 3. = third important output type

	<b>New knowledge</b>	<b>Piloting</b>	<b>New products, services and methods</b>
Improvement of the processes	2.	3.	1.
Utilisation of information through the entire life cycle of building	3.	2.	1.
Improving the quality and effectiveness	2.	2.	1.
Integration of software in the industry	2.	2.	1.
Utilisation of IT in the processes	2.	3.	1.
<b>VERA AS A WHOLE</b>			
<b>Steering committee</b>	2.	2.	1.
<b>Projects</b>	2.	3.	1.

*Figure 5. Project outputs in the importance order (results) by impact areas and VERA as a whole.*

On the bottom line it is a question of dissemination of the results regardless of the output type. Dissemination of knowledge and all types of results is a crucial issue in VERA.

## **6 ACTIVITIES OF THE PROGRAMME MANAGEMENT**

Among the projects, the three most important supporting activities of VERA were (1) impacts to common attitudes (86 %), (2) programme information (63 %) and (3) the support from the programme man-

ager (62 %). These activities were also regarded (including the programme seminars) as the most well managed (figure 6). As a whole, VERA was, though, found well managed (figure 6). The professionalism of the programme manager, his time availability and the information provided were regarded as of high quality. Also the seminars and workshops were valued professionally organised. The steering committee of VERA was, on the other hand, seen distant as there has not been immediate interaction between the projects and the steering committee. It must, naturally, be questioned whether such interaction is a common practise in technology programmes in general and should it be an objective of VERA.

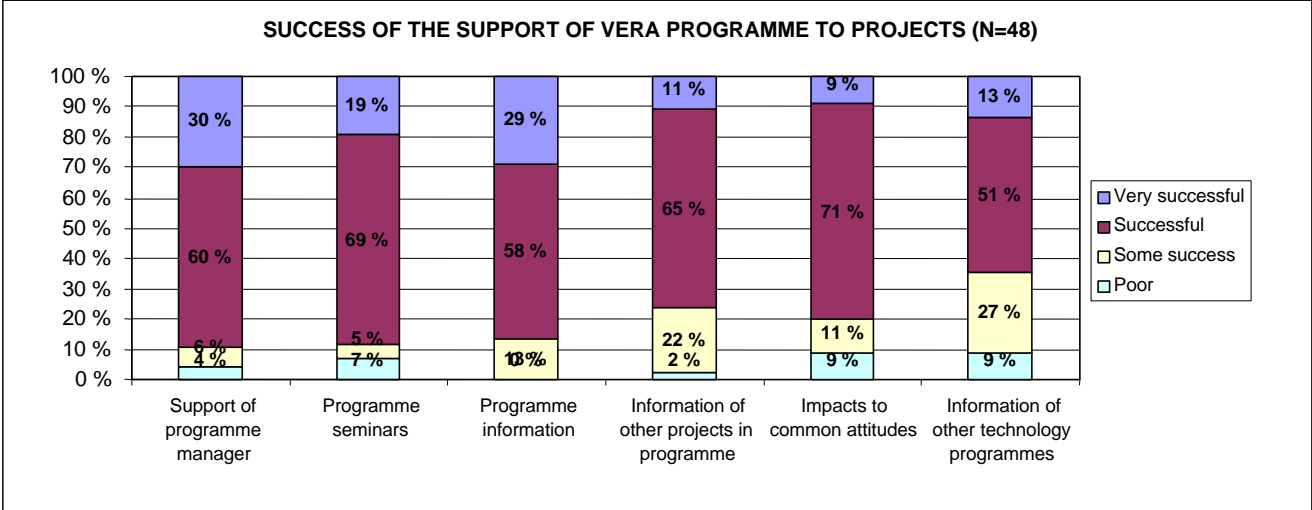


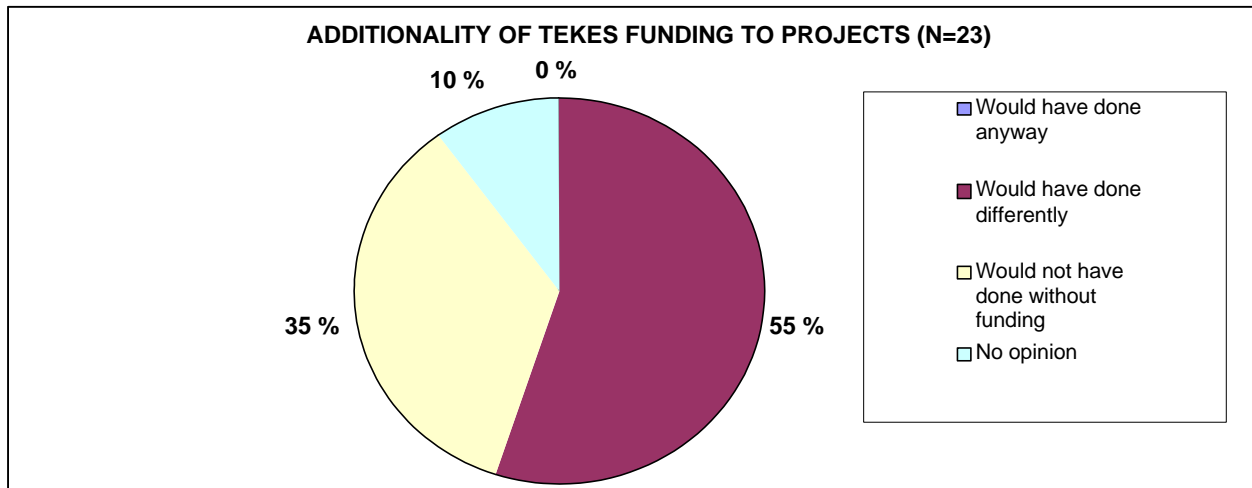
Figure 6. Success of the activities arranged by VERA programme.

The interaction between the projects through the VERA web-site in general was observed rather minimal and contacts to the research projects among these projects almost non-existent. The awareness of the Finnish research projects of construction and real estate fields, in general, was regarded as very low among the projects.

The content of the general information of VERA was assessed quite homogenous. International co-operation was found too much concentrated on the IFC and IAI issues among the fringe projects.

### 7 IMPACT OF THE TEKES SUPPORT

More than half of the completed or to be completed projects would have launched the project without Tekes support but would have implemented the project differently (figure 7). A little over a third of the projects answered they would not have launched the project at all without Tekes fund. None of the projects admitted implementing the project in the same extent regardless of Tekes fund.



**Figure 7. Additivity of Tekes funding to the completed projects.**

As a whole, Tekes funding was regarded as important and extremely helpful. Strategic projects and technically high risk projects were seen in great demand for Tekes support. Whether the project was put into a certain programme or into a programme at all, was in minor importance for many of the participants. In other words the ultimate goal of many projects was to get Tekes funding.

There is much potential to make a direct impact. It was assessed, however, that not enough had been done to achieve the objective of VERA. The essence of the message to TEKES must be that a rich body of work has been undertaken, and the results of that work hold huge potential for exploitation. Nevertheless the success of TEKES and VERA programme in being able to realise that potential will be dependent on the *willingness* of people in the industry to change. In other words, there has to be believe in the need to change and also encouragement to the change.

## **8 VALIDITY OF VERA OBJECTIVES**

There seem to be no strong evidence to question the over all objective of VERA programme nor to set more ambitious goals. However, some findings indicated that the steering committee needs to enhance and clarify the goals.

The following suggestions are made to enhance and clarify the VERA objectives:

1. The need to deal with the question of VERA being a generic tools programme for the entire real estate cluster or a programme concentrating on the integration of the design and construction processes (concerning all the programmes of real estate cluster and Tekes as well).
2. The need to understand how to effect change in working practises. There is a call for both believing and understanding the need for change (concerning all the projects and the whole VERA as well).
3. The need to promote the concept of process management tools (concerning the goal of construction process).
4. The need to identify coherently and clearly the impacts, goals and outputs (concerning the whole VERA) serving as base for the value model.
5. The need to focus the programme more towards customer/user, to create a market pull for the technologies developed. By trying to induce change in the organisational processes of e.g. real estate

owners, the programme can create markets for various IT products as well as valuable information about future demand of them (concerning the whole VERA).

VERA has fulfilled its role as a generic tools programme as the scope and focus of the projects are diverse. There were seen many approaches among the assessed projects related to property management and real estate business some of which being very far from the “core” projects. The extent to which VERA has been able to increase the integration of the various fields of industry was, on the other hand, less clear. There seemed to be an increased awareness of the importance of openness and interoperability, but the networks were seen on the firm level and being consisted of strategic alliances between producers or between the client and the producer. Neither many really strong links were observed between the core and the fringe projects of VERA leading also to a poor sharing and dissemination of knowledge and results in the programme as well as into the industry.

## 9 RECOMMENDATIONS FOR FURTHER ACTIVITIES

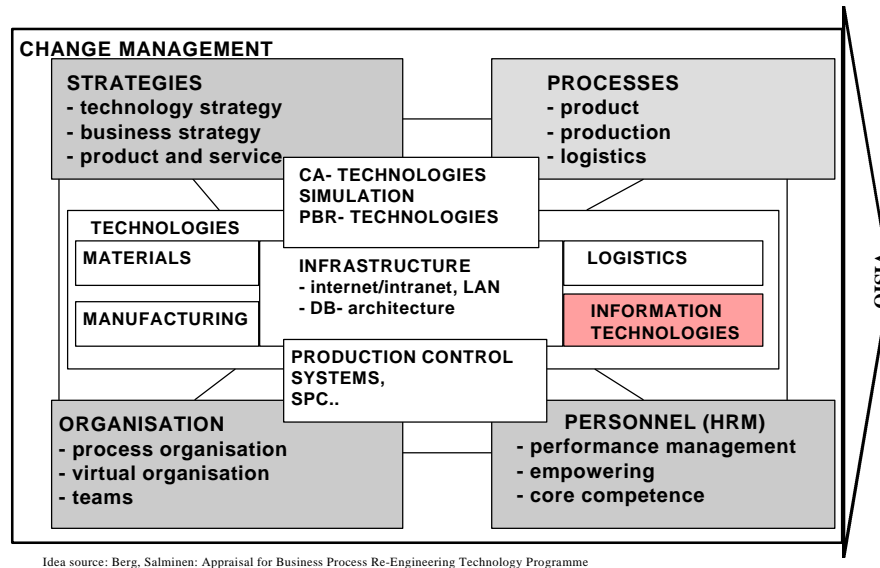
*The steering committee of VERA needs clearly to define and to separate the different objectives and their levels* (e.g. impacts, output areas or goals, tangible outputs under each output area), *to quantify the objectives* and to build *a value model on the identified objectives* (a value model is a common basis for the measurement of the objectives). An objective framework could serve as a starting point for the value model. The TIMI project in VERA was regarded as a potential tool for establishing a common basis of measurement for all VERA projects. In other words objectives and metrics (qualitative or quantitative) need to be discussed and determined in VERA, if direct impacts of the programme are willing to be assessed and quantified in the future. It is suggested that the steering committee continues the work already started during the assessment (defining the objective frame and metrics) and makes an action plan for the measurement of the projects for the rest of VERA.

*The steering committee should focus on more efficient knowledge and result capture and dissemination both in VERA among the projects and from VERA towards industry.* This could be achieved e.g. in collaboration with the monitoring team of VERA by making a realistic strategy for knowledge and result capture and dissemination with a follow-up. Such an effort would result (1) increase in learning in the projects, between the projects as well as in the industry, (2) increase in the rate of the change in moving towards the objectives of VERA. In other words it is a question of increasing the generic learning. If direct impacts on the industry, not to mention on national level want to be achieved, at very least the findings of the projects are to be disseminated. It was seen rather ironic that a primary objective of the programme is to achieve more effective information transfer in the industry, and yet it is this very issue that was not been addressed within VERA itself. The consequences of the lack of knowledge capture and result dissemination is that projects are not learning from each other (many projects being unaware of the existence of other similar projects), the industry is not learning either.

*The steering committee should develop and apply a change-management strategy for the key parts of VERA.* The key components for such strategy are suggested to be: knowledge bank of the VERA projects (into which the generic learning from the projects is gathered which enables the assimilation and sharing of learning for the benefit of the whole industry), resources for collecting the knowledge and learning from the projects, focus on content and quality of the information disseminated. Creation of toolboxes for different types of companies based on their needs would then enable the use and dissemination of knowledge. Contents of the toolbox should include a developing plan, resources, “how to” guides, training needs, information management, development of IT infrastructure and standards. The aim of the change-management strategy is to help to recognise and exploit the synergies in VERA by developing the ideas of people issues, metrics and toolboxes and further on by applying them in VERA. If this can be achieved, VERA will have established a powerful model for other countries to follow.

*The organisations participating in VERA should develop and apply a change-management strategy (human issues, metrics, nature of the business, supporting IT) inside their companies as well.* This would enable the companies to adapt much more efficiently and comprehensively the new ways of thinking, acting and doing business as a whole (figure 8).

## DEVELOPMENT AREAS OF A COMPANY



**Figure 8. Recognition of the synergies – so that they can be exploited in the companies.**

*The steering committee needs to enhance the re-engineered processes as a whole and the life cycle concept (particularly piloting).* To encourage the firms to implement technology strategies was suggested as one enhancing solution within the re-engineered processes. The process models are not, however, an end in their own right. They are the tool by which the delivery of construction and facility operation is controlled. It is suggested that VERA programme amends the goal of the re-engineered processes as “the development of process management tools will enable the control of production based on common process models”. In addition, there is a need for more support within the information management in terms of getting more high quality research groups and firms into VERA and within the information networks in terms of e-commerce. In conclusion, the steering committee should make a tangible action plan stating what will be done and how to improve these areas in the last three years.

As a result of the recent development in the palette of the other major technology programmes of the field, there is *a need to re-examine what processes VERA is focusing to improve in relation to other related technology programmes (mainly ProBuild and Rembrand).* Information is needed on whether or not there is an application environment for the results achieved in VERA and on the other hand information to other related technology programmes about processes needed to be developed so that the developed IT in VERA would be utilisable. The steering groups of all the related real estate cluster programmes and Tekes should address this issue and decide the roles and the relationships of these programmes.

There seemed to be *a need*, especially among the fringe projects, *for tailored information.* This is especially the case in the information concerning IFC. IFC seemed to have many interpretation and ignorance prevails among the projects that were not involved with the issues concerning IFC. Projects that were involved in the IFC work were regarded as having much more comprehensive view about the objectives and the potential results as well as threats and risks of the IFC work. The step to actively engage in and grasp the information provided by the IAI appeared to be high for the ordinary project partici-

pants. ***More informing and activating is also needed towards the real estate owners.*** In general, ***the interaction between VERA-projects needs to be enhanced e.g. through the VERA web-site*** as the projects themselves found the interaction and co-operation weak between the projects. The steering committee should therefore address this issue by sharpening the information and activation strategy of VERA. The project participants and the industry should also be more active themselves towards the issues of VERA and participating in the programme.

***Start-up meetings for the projects and bettering the overall project management of VERA-projects are also suggested.*** Realising this being mainly a responsibility of the projects, VERA could, however, arrange some supporting activities such as start-up workshops for the projects. The workshops could have sessions such as awareness building, scoping and co-ordination. The projects themselves, on the other hand, should be active to attend and give feedback from the work shops as well as pay more attention to the project management as a whole.

***Emphasis on training and education is needed in general on the issues of VERA.*** There seemed to be disconnection between the industry and academia. On the bottom line it is, though, a question of the role of a technology programme whether it is its responsibility to focus on training and education. For start, the steering committee could activate more academic participation into VERA by tailoring information towards academia. ***Also the awareness of Finnish research and development projects in general was seen very low in the construction and real estate fields.*** Here again, it is a question of the responsibility of a programme to inform about other research and development projects in the field. As an easy and not so much effort taking solution, the programme manager of VERA could list the central national and international links within this area into the VERA web-site.