

Managing Discontinuous Change

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A white paper modelling the level of complexities in scoping and managing discontinuous change in business, by adopting the degrees of freedom concepts of engineering, physics and chemistry

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Introduction

During the 1980's manufacturing organisations were introduced to Manufacturing Resource Planning (MRP II) systems. These systems were limited to the manufacturing environment and although they represented new planning and control concepts, the scope of the implementations were well defined, the projects were easily contained and by large reasonably successful.

In the late 1980's and early 1990's these solutions merged with the financial systems of organisation and the concept of Enterprise Resource Planning (ERP) was introduced. The size of system implementations increased exponentially as did the complexities in defining and managing the scope of these projects. In 2000 industry observers estimated that 50% of all ERP implementations were failures or delivered below expectations.

The early 1990's also introduced a competition between incremental business improvement methods like Total Quality Management (TQM) and the radical rethinking of business processes (Business Process Reengineering). Business Process Reengineering projects became common, but unfortunately also with limited success.

Organisational restructuring initiatives typically follow the same vein. Organisations restructure to remain competitive in the ever changing environment; sometimes with mixed results.

Either individually or as a combined project all the initiatives described are attempts by organisations to keep ahead of changes demanded by the external environment. However, change is exponential in its nature and companies struggle to maintain their position solely through continuous improvement and have to initiate projects like those described.

The purpose of this document is to present management teams with a practical framework and approach to define the scope and nature of discontinuous change initiatives that draws from the fields of technology management, engineering and physics.

Discontinuous change

Whilst *continuous* improvement advocates an *evolutionary* approach with employees improving productivity on a daily basis, a *revolutionary* approach to improving the organisation can be defined as a *discontinuous* change. Discontinuous change projects have a predefined timeline and allocated budget. These projects are typically done with employees removed from their normal positions and dedicated to the project, together with external consultants.

The figure below illustrates the difference between continuous and discontinuous changes. The red line represents continuous improvements whilst the blue lines represent discontinuous projects. Continuous improvements alone, although important, do not assure a competitive advantage in the long run. In order to maintain a competitive edge, organisations have to embark on revolutionary projects that change the business.

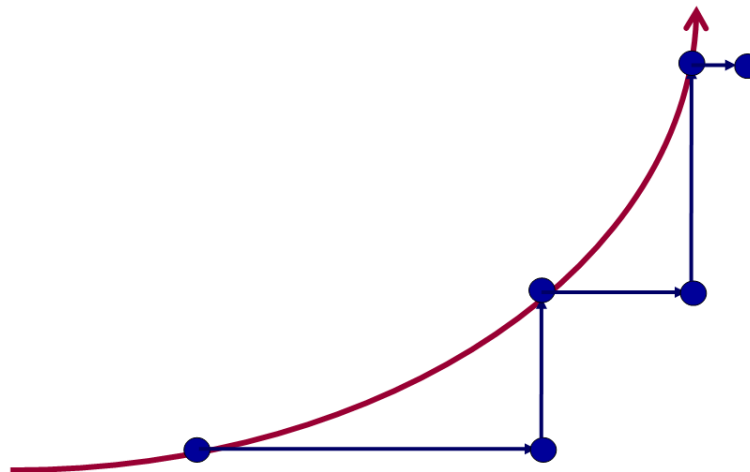


Figure 1: Continuous vs. Discontinuous change

From my personal observations and interpretations of case studies I conclude that a frequent cause of failure for these projects is management's inability to define and manage the scope of these initiatives in a structured manner.

An Engineering Approach to Discontinuous Change

Discontinuous change implies changing the organisation towards a predefined end state, with dedicated resources and a limited time frame. Although the different types of change initiatives each have their own method of defining a project, a generic framework can be used to compare and communicate all projects of this nature.

The most frequent of discontinuous change projects is the implementation of new technology solutions. The implementation of business systems like Enterprise Resource Planning or Advanced Planning and Scheduling are text book examples of discontinuous change initiatives that transform an organisation in a short period of time. In modern organisations almost all discontinuous change initiatives are associated with technology to the extent that technology management provides a helpful approach towards defining a framework for discontinuous change.

A formal definition of technology is: "All knowledge, products, processes, tools, methods and systems employed in the creation of a product or service"¹.

De Wet² enhances this definition through his graphical representation of technology:

¹ Tarek M Khalil, *The Key to Competitiveness and Wealth Creation*, 2000

² De Wet, G. *Technology Space Maps for Technology Management and Audits*, 2001.

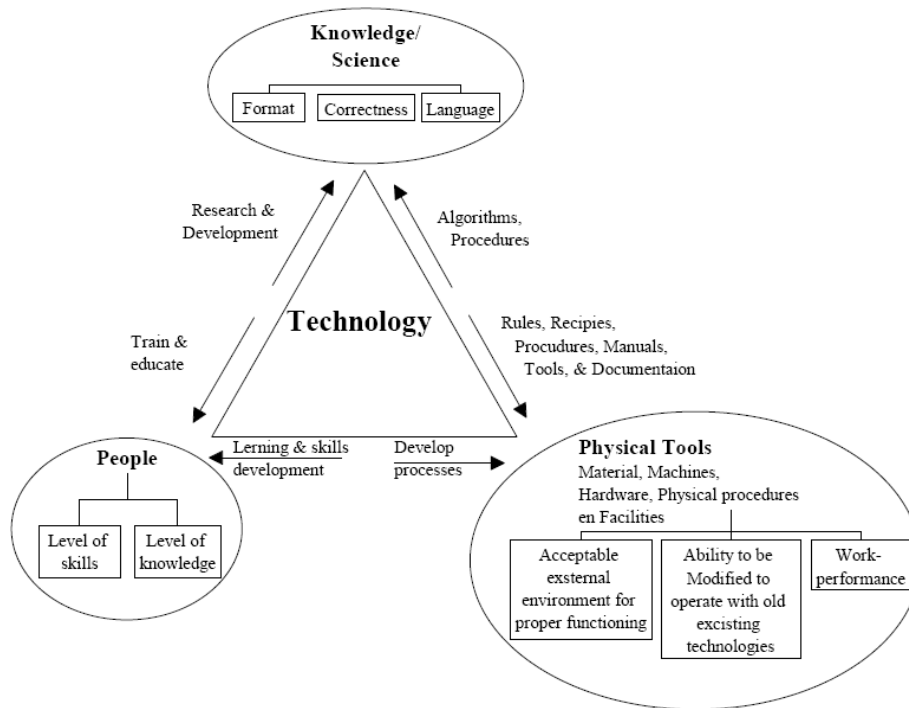


Figure 2: de Wet's definition of technology

In his diagram De Wet defines three sides to technology that can also be applied to discontinuous change projects i.e.

- a knowledge perspective,
- a tools perspective; and
- a people perspective.

The Knowledge Axis

For discontinuous change the knowledge perspective represents the methods and techniques used in any part of an organisation. Business Process Reengineering is a typical example of initiatives where the change is focussed on changing the methods & techniques deployed in an organisation.

The Tools Axis

The tools axis could refer to changing physical plant or equipment. However, more frequently this axis would reflect a change in the systems and data used in the organisation.

The People Axis

The restructuring of an organisation could be initiated by external or internal forces. Typical examples are centralisation strategies, head count reduction programmes or statutory requirement changes. All these projects affect the people in the organisation, both as individuals and as a group of people fulfilling specific responsibilities. Any change in this regard is represented on the people axis.

Using these three perspectives as the three axes of a three dimensional space a conceptual framework is created within which the size, scope and implications of a discontinuous change initiative can be contextualised.

This conceptual framework can successfully be used to communicate:

- Where an organisation's current capabilities are;

- The end state as defined by strategic objectives;
- The implications on the business as a result of change.

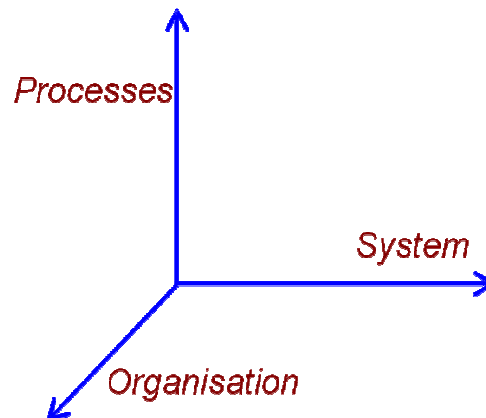


Figure 3: Three dimensional space of discontinuous change

Scoping a discontinuous change initiative

The above described framework provides management with a structured environment to consider when scoping a discontinuous change initiative. The initiative can be visualised as a specific point in the three dimensional space, as determined by the size of the change as plotted along each of the axes.

Understanding the position of an initiative in this space is critical in determining the actual content of the project. If an organisation decides to embark on an initiative that represents a big change on the tools axis, with little impact on the knowledge or people axis the project should typically be short with a least cost approach to budgeting. The project will be technical in nature, focussing on the commissioning of the tools and operational training of the users.

If the organisation is more ambitious in its approach and attempts a project that requires significant changes on the tools and knowledge axes, the time line will increase, benefits case approach is used to determine the budget and the contents will typically expand to include business process engineering and high level education.

Likewise the scope of the project would increase almost exponentially if the size of change is significant along all three axes. In addition to the technical and process aspects, change management and labour relations become more and more relevant.

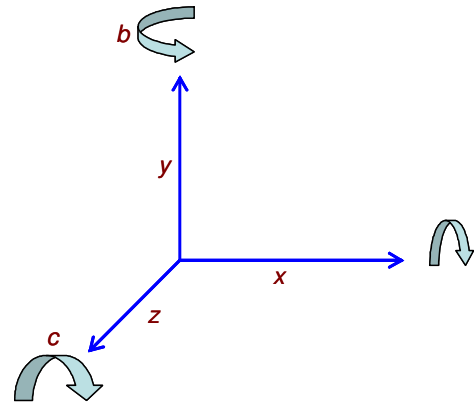
Understanding a change initiative's position in this framework also allows the management team structure the intended change into a number of smaller but separate steps. It would therefore be acceptable for an organisation to decide to implement all the change that would reflect a change on the tools axis, and then move along the knowledge axis and then the people axis.

The framework described does not remove all the practical problems experienced in projects of this nature but it does allow the management team to scope and communicate their intentions unambiguously, creating the correct expectations and giving the project a solid footing on the road to success.

Managing Discontinuous Change

The framework described in the previous section enables an organisation to conceptually understand and communicate the scope and intention of a discontinuous change initiative. This same framework can also be used during the active deployment of the described initiative as each of the axes represents a *degree of freedom* that must be managed during the deployment or implementation.

The concept of degrees of freedom is well known in the fields of physics, chemistry and engineering. In the more traditional engineering environment it is understood that a body, in a three dimensional space, has three translational components that will in part describe the displacement of the body. In addition to the three translational components, there are three more rotation components, describing the rotation of the body around each of the axis of the three dimensional space. These six components specify completely the displaced or deformed position of the body or system, and are called the degrees of freedom of the body. The concept of degrees of freedom applies to rigid bodies or to dynamic systems and is used in mechanical, aeronautical and structural engineering, as well as robotics.



In physics the simplest explanation of degrees of freedom is found in the field of mechanics. A particle, as part of a system, is said to have two degrees of freedom for each independent direction in which movement is allowed. This again implies six degrees of freedom for a three dimensional system, and as in engineering the first three is used to describe the displacement along the axis. However, in mechanics the other three pertains to the momentum of the particle along the applicable axis.

The same principles can be applied to the management of discontinuous change. By its very nature these project infer a translational component along each of the axes defined in the framework. It can therefore be said that the size of the change, and the complexity of the change also represent two degrees of freedom for each of the axes in the framework. However, in business projects the size of the change and its complexity are often one and the same thing, simplifying the model to three degrees of freedom that should be managed during the deployment.

This literally means how much freedom for movement will be allowed along each of the axes during the deployment. Using the framework and its accompanying degrees of freedom gives the project management team a direct correlation between the scope of the project, and detail decisions that must be made on a daily basis. Project decisions can be benchmarked according to the freedom they require along each of the axes, and must correlate with the original scope definition.

As mentioned earlier it is unlikely that any project can be limited to only one of the axes in the framework. This is because the success of the project is greatly influenced if the organisation and project management team can maintain a balance between the three axes during the deployment. This implies that when a decision is made, the team must consider its implication on all three axes and maintain a careful balance.

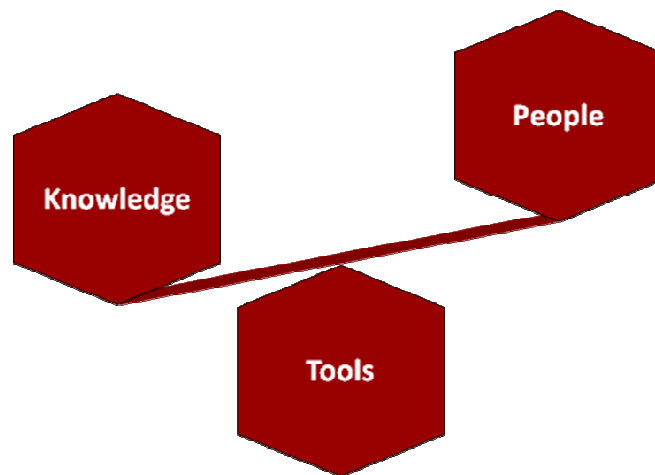


Figure 4: A balance must be maintained in the management of discontinuous change

This implies that if an organisation embarks for example on a technology replacement project, but do not want to change the inherent knowledge or any people aspects, the size of the change along the tools axis must be limited. If a highly advanced technological solution is implemented in this scenario it is very likely that the project will fail.

Taking the balance into consideration a project can however be defined as a one degree of freedom project along any of the axes. This will communicate the focus of the project and the level of freedom the project will be allowed along the various axes.

Practical Applications

Discontinuous change is invariably in response to market opportunities or threats. In this regard the change is directly linked to the strategy of an organisation i.e.:

- Where is the business now?
- where does it want to be?; and
- How is it going to get there?

The “How are we going to get there?” question is normally answered with a number of change initiatives with project objectives in support of the business strategy. It is at this level that the described approach fits in and allows for the clarification and communication of each of these initiatives.

Indigo Cosmetics – A case study of a one degree of freedom initiative

Indigo Cosmetics is a manufacturer of fragrance and beauty product based in Cape Town South Africa. The company manufactures product under its own brand names like Yardley and Lenthéric, or under licence agreements with worldwide brands like Coty, Rimmel and Adidas. In 2000 the company was a growth point in the Anglovaal Industries Group and was quickly becoming the centre for future growth for the whole group.

Due to perceived market potential and the company’s good performance at that time the management team formulated an exponential growth strategy with international expansion and acquisition objectives.

One of the change initiatives identified as a prerequisite to the implementation of this strategy was a complete replacement of all business systems, specifically the Enterprise Resource Planning solution.

Indigo Cosmetics had implemented Data3 in 1989. The implementation was considered to be successful and the organisation adopted all the key MRP II principles it embodied. In 2000 the implemented solution still supported all the business processes, and where it fell short, customised developments were made to fill the gaps, causing the business systems to become fragmented. The core solution was no longer supported and it became clear that the expected expansions and growth will only be accommodated if the ERP solution was replaced and more modern technology was used.

At this stage the degrees of freedom came into play, as the organisation had to define the scope of the ERP implementation project. The management team agreed that the best approach in their environment would be to handle the project as a one degree of freedom initiative. The project would be seen as an ERP replacement project, focussed on the active deployment of the solution. The business processes would remain as is, and no organisational changes would be made. This implied that expansion and acquisition initiatives will be postponed, or at least be kept separate from the ERP implementation project.

Defining the scope in this fashion allowed the company to opt for a fast, low cost implementation. The software selected was SAP, and the project was implemented on time and within budget.

Three years after the implementation the managing director of the company confirmed that the replacement of their ERP system did indeed allow them to pursue expansions into other countries and acquire other business, all of which was done on a sound information technology platform.

Namitech – A case study of two degree of freedom initiative

Namitech is highly specialised manufacturing concern focussing on credit cards, sim cards and prepaid cell phone vouchers. In 2004 Namitech experienced exponential growth mainly due to exports into sub-Saharan Africa. At that stage the company was unable to cope with the increased demand and a consolidation strategy was adopted, focussed on customer service delivery.

This strategy initiated a project to formalise and implement best practice planning processes across all activities in the organisation. The project involved implementing best practice planning processes including the implementation of Sales & Operations Planning, as well as the restructuring of the organisation to perform these processes efficiently. The business was already using Oracle Business Systems and now system upgrade was anticipated as part of the project.

Using the degrees of freedom this project was scoped as a change in the knowledge deployed in the organisation, as well as the people, whilst the tools being used remained exactly the same.

The project was completed in three months. Two new positions were created and filled internally. New planning processes were designed and implemented, with extensive education sessions being run explaining the concepts and methodology behind these processes. Although some reports and system changes were needed to implement the new processes, no money was spent in this area, with all the work being done by the internal IT staff.

The project was completed on time and in budget, creating visibility of total demand and their ability to supply for the first time.

Dunhill – A case study of a three degree of freedom initiative

Dunhill is an international company retailing luxury men's goods and fashion items. The company is based in London but has stores in the UK, Europe, Japan and the Pacific rim.

In 2003 Dunhill was a marginally profitable organisation with a new management team focussed on turning the company around in substantially increasing shareholder value.

One of the key initiatives was to change the planning processes from a distributed planning environment to a centralised global planning environment.

This project was scoped to include the change in how planning is done and changing the people responsible for planning whilst at the same time centralising this responsibility in London. Both of these required that the existing IT infrastructure be replaced with a state of the art planning solution.

This project was scoped as a three degree of freedom project. The inherent knowledge and processes in the organisation was upgraded, people and the organisation structure were changed and the tools being used were to be replaced.

Projects with three degrees of freedom are complex, and have a high level of risk. At the same time, if successful the return is much higher than more restricted projects. Accordingly Dunhill approach their project with care, allocating sufficient resources and an appropriate timeline for a project of this magnitude.

The planning processes were redesigned in their totality and all decision making was centralised in London. The company moved from a "pull" strategy by the regions, to a "push" strategy from the central facilities in London. This was all made possible through the selection and implementation of a sophisticated forecasting, replenishment planning and Sales & Operations Planning solution.

The project was completed on time and within budget, in the process identifying £50 million's inventory that were redundant in the global supply chain. Subsequently the organisation has streamlined their planning processes and is now managing their business accordingly.

Conclusion

The rate of environmental changes is forcing companies to initiate discontinuous change projects more and more frequently. Since the late 1990's and after 2000 it has become the norm that different business change initiatives should be combined to ensure the success of any individual component. These initiatives are normally driven by an ERP implementation project, but it is now a common practice to reengineer the business processes whilst implementing, and at the same time putting in the new supporting organisation structure.

The ability to manage and complete these projects successfully is becoming increasingly relevant to the total success of organisations. This paper discussed a conceptual framework and approach management can use in scoping and managing projects of this nature.

The concepts presented here allows management to describe and communicate the objectives and scope of each of these projects as well as define a roadmap where a number of projects must be sequence to achieve a strategic objective.

The approach is exemplified as a three dimensional space, with knowledge, tools and people forming the three axes. A project can be positioned in this space, explaining its implications and subsequent expectations in terms of these three perspectives.

The three framework axes also translate into three degrees of freedom, a concept that can be used in managing the project, describing the leeway the project will be allowed along each of the three axes.

This approach has been adopted by a number of companies in the implementation of their business systems technology or implementing radical changes of their organisation. The approach in itself does not remove all the practical hurdles involved in projects of this nature but structures the project in a simple way that is easy to explain and communicate facilitating the project management duties and expectation management.

Bibliography

1. Tarek M Khalil, *The Key to Competitiveness and Wealth Creation*, 2000
2. De Wet, G. *Technology Space Maps For Technology Management and Audits*, The University of Pretoria, Faculty of Engineering, South Africa, 2001