Business Change and Process Improvement

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Preface

Purpose of document

This document provides an overview of recent trends in management strategy and business improvement. It shows how the management agenda has evolved from simple BPR to include TQM and Relationship Management. We discuss the implications of this evolution for the provision of IT systems and services.

Questions and exercises

This material has been developed for training purposes. The reader is invited to engage actively with the material. To this end, questions and exercises are interspersed with the text.

> Q   Do you want to enrich your understanding of the SCIPIO method by answering the questions as you along?
>
> Q   Do you want to test your understanding of the SCIPIO method by answering all the questions after you've read the whole document?

Acknowledgements

Overview

- Business demands **flexibility**. Business flexibility comes from taking a **relational** business strategy, based on relationships with customers. A relational strategy also focuses attention on internal and third-party relationships, moving the organization away from traditional hierarchies and fixed market positions.

- Business excellence is promoted by **organizational learning** and **best practice** sharing.

- **Components** contribute to satisfying both these demands. Components include software components as well as work practices.

- Task flexibility is aided by **workflow** and equivalent mechanisms. Components may be joined together by workflow to form flexible business processes.

- Distributed business computing (e.g. via Internet) also demands that software services be delivered as components. It is now possible to be a **global niche** player - small companies can achieve very high volumes with a well-thought-out and well-executed service. This creates many more opportunities for outsourcing and value-adding.

- In many industries, there is increasing opportunity for **mass customization**. Component-based services allow each customer to receive a personalized service, while supported by a highly efficient process infrastructure. (The insurance business is leading the way - others will follow.)

- SCIPIO analyses the requirements for flexible components in terms of the business relationships and practices (internal and external) that need to be supported. It also provides the business modelling techniques to explore the business opportunities of component services. It therefore helps align the business strategy with the IT strategy, and supports the delivery of business services through components.

Business Change

Introduction

Uncertainty and flux: this forms the explicit context for many IT writings. The enterprise of IT is encircled by accelerating rates of change: the business world generates an unending flow of urgent demands for new and enhanced IT systems; meanwhile the technological world generates an unending flow of fascinating new opportunities.

Faced with this situation, many IT writings retreat into solutions that aim to improve IT potency, by addressing the productivity and quality of the IT process. If we can satisfy business demands faster and more accurately, then perhaps we will catch up.

Worthy though these attempts are, they are doomed to fail, because they allow both IT and Business to position themselves as passive: IT is merely responding to demands from an insatiable Other, while Business is crying out for satisfaction from an unreliable Other.

In this document, we shall explore how business and IT can engage actively with demanding change.

How does IT support business?

Information Technology failures are commonplace. Statistics can be obtained from many sources, showing alarmingly high rates of software wastage and project cancellation. Furthermore, many case studies have been described in which IT systems have had a disastrous impact on the business. An IT system that cost less than a million dollars to design and implement may contain an error that will cost the company tens of millions to put right. In extreme cases, the survival of the whole business will be put at risk.

> Q   How many IT failures have you read about in the papers?
>
> Q   How many IT failures have you personally experienced? Did any of these reach the papers?

Some cynical commentators have suggested that, if there is any statistical correlation at all between IT expenditure and business profitability, it may be simply because profitable companies have more money to waste on IT.

Many writers attribute all this wastage to poor software practices. Let us suppose they are right, and focus the question on successful IT projects. In the best-case scenario, how can IT be beneficial to business?
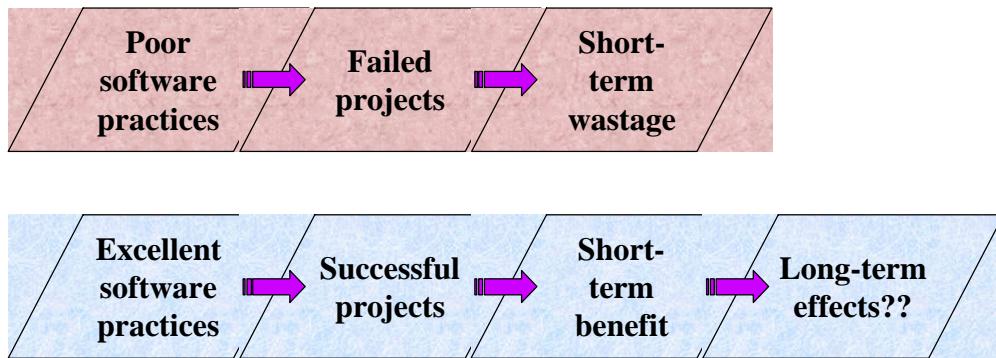
A successful IT project enhances the adaptation of the business to its environment. But adaptation to a specific situation usually compromises adaptability to future situations. For example, each more sophisticated marketing strategy may increase the interdependence between a business and its market, making it more difficult for the business to develop in new markets. As a company develops ever more flexible and powerful techniques of direct mail marketing, and embeds these techniques in its IT systems, it reduces its ability to use any other marketing channel.

Furthermore, as some management gurus have pointed out, success can be treacherous. As IT pervades a business organization, the organization has an ever-increasing investment - both financial and cultural - in an emerging configuration of formalized systems, which IT both enables and encourages. This formalization always omits something important. Furthermore, the identity of the organization is bound up with its systems. Thus the very systems that allow the business to survive in the short term may impede its survival in the medium or long term.

How does business survive?

Sometimes an organization suffers a clear death. The Soviet Union failed to survive. Some politicians and historians attribute this to long-term environmental hostility: the Cold War. Others attribute this to internal contradictions: the inability of central planning systems to satisfy expectations fairly. Note that these explanations are not mutually exclusive: external hostility and internal injustice may each have reinforced the other. Note also that both explanations rely on the notion of long-term attrition: another theory of what actually finished the Soviet Union off was that it was not the contradictions themselves, whether internal or external, but the brave attempt (by Gorbachev) to resolve them.

Sometimes, however, the survival or death of an organization is itself problematic. Does a corporation survive (in some sense) even when it is chopped into pieces (British Rail)? Does a company survive (in some sense) even through a history of insolvency (Rolls Royce)? Does a company survive when it is taken over by a larger company, perhaps even based in another country (ICL, Rolls Royce)? What about an organization (such as the Third Reich) that only survives in the heads of its enemies or victims.

IBM is not the same as it used to be. It was once supremely powerful, confident, complacent. It went through a period of uncertainty and downsizing, when it lost its 'identity'. It is now finding a new identity. Has IBM survived? In one sense, it has not survived. But some of the characteristics of the old IBM may now be associated with Microsoft. What kind of survival is this?

If we extend this line of thought, we could argue that any sufficiently radical change to an organization makes it a different organization. An organization may change its mission, its entire management team, even its name. The organization may retain customers, staff, premises and legal obligations from before, or it may not. Or it may be that only the name

remains the same - everything else has changed. In such cases, we have a notion that **something** has survived, but we find it difficult to say what that something is.

How does business change?

In a large organization, every day sees many changes. Most of these changes seem fairly superficial and reversible; the challenge that is experienced by consultants and managers is to make deep and meaningful changes to the organization. However, the distinction between superficial change and deep change is not always clear-cut. What some people see as a minor reform, others may perceive as a major disruption.   Indeed, the person championing the change may describe it differently for different audiences.

In the previous section, we looked at IBM, a business that survived by redefining itself. Xerox is another well-known example. There are countless examples of other organizations that have remained committed to a particular identity and have, as a consequence, not survived. There are many others in the IT industry alone whose long-term survival appears unlikely.

In understanding how change can coexist with continuity, we need to see both change and continuity as properties of **descriptions**. There are some descriptions of IBM and Xerox that remain true, and there are other descriptions of these companies that were once true but are now false. This notion of change has been well explored by Bateson, and more recently by K.K. Smith.

For something to change, it must remain something.	IBM: "We are becoming a service company."	IBM: "We are still a major software vendor."
For something to survive, it must lose something	Xerox: "We are pre-eminent in photocopiers."	Xerox: "We are pre-eminent in quality."

Q   Name some other examples.

Q   What changes has your organization already made? What descriptions of the old organization remain valid?

Q   What changes does your organization face? What descriptions of the current organization need to remain valid?

An organization is typically subject to several competing descriptions. (This insight can be traced to the industrialist Lord Brown.) The **effective organization** will often differ in structure and culture both from the **formal organization** (as shown on organization charts and job descriptions) and from the **perceived organization** (as described by organization members in interviews).

The formal organization is usually frozen. Formal responsibilities, authorities and reporting relationships are fixed. Changes are effected instantaneously, and the structure is immediately refrozen. Informally and covertly, the effective organization may nonetheless change. Formal reporting lines are bypassed, managers take more initiative than they are officially permitted, people find ways of evading the more bureaucratic controls. The level of awareness of these informal changes may be very variable. Politically naive participants may only gradually become aware of discrepancies in the formal account. Politically astute managers may be highly aware of them, may plan such changes consciously for their own benefit or what they

believe to be in the interests of the larger organization, and may attempt to deliberately distort the way the organizational structure is perceived by others.

IT systems reflect this. People frequently find ways of making computers do things that their designers had not intended them to do, or had even specifically intended that they should not do. Thus there may be several competing descriptions of an IT system.[1]

A similar consideration can be made at the engineering level where computer systems are constructed from heterogeneous components and principles, and are the work of many hands.[2]

How does technology change?

In Borgmann's account of technological development, technology typically connects a set of **services** with a set of **devices** that deliver these services. As technology develops, the availability of the services usually increases (in terms of access, ease of use, cost and safety); meanwhile the devices themselves retreat into the background. Borgmann calls this the **device paradigm**.

The current software trend towards Component-Based Development (CBD) exemplifies this. IT systems are designed as a configuration of defined services. These service definitions then act as the specifications for a set of software components. IT systems can then be assembled from existing components that satisfy these specifications.

One aspect of the CBD approach is that the technology of implementation is hidden and can therefore can be improved to take advantage of new technology without this impacting services. It leaves open the question whether the set of service specifications are apposite to the exigencies of changing business requirements. Current, secure, extensions to Java (i.e. Java Reflexivity) support these changing requirements.

Open Distributed Processing (ODP) takes a further step in making the device invisible. The identity and location of the actual component is hidden, not only from the user but also from the IT system designer. Instead of the designer fixing the association between the required service and the delivery mechanism, this is done automatically by software artefacts known as object request brokers (ORBs).

This is because a fundamental principle is that everything is distributed i.e. separate; co-location is the special case. A mind-set that tries to modify these development methods by grafting on bits of distribution is fundamentally mistaken. The focus now becomes discourse, legitimacy, intentionality, etc. At the technical level the broking paradigm also means that composition is not fixed and that (emergent) service changes and technology improvements can be composed automatically.

This is not the place to discuss the extent to which CBD and ODP are supported by today's technology. My point here is that both CBD and ODP follow a general technological trend, of separating the services from the devices, and this separation will increase as the standards and tools improve.

Thus more than ever, the work of IT is concerned with descriptions - composing, decomposing, verifying and validating specifications.

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[1] See paper by Veryard & Bhabuta.

[2] See paper by Nuseibeh.

What makes things flexible?

One of the benefits claimed for CBD and ODP is that these technologies enhance the flexibility of IT systems. Such metaphors as "plug-and-play" are used to imply that IT systems can accommodate changed requirements simply by replacing and reconfiguring components. Even if the plug-and-play metaphor is an oversimplification, it certainly seems plausible to claim that increasing the flexibility of IT systems may be worth more to the business than increasing the speed and accuracy of the IT process.

But although it may be fairly easy to identify and eliminate specific or general patterns of inflexibility, it is much more difficult to define a positive notion of flexibility. If change is a property of descriptions, then flexibility is only meaningful relative to a given set of descriptions. Thus we can only make IT systems flexible, or even assess the degree of flexibility of a given IT system or design, within the context defined by a given business and technological agenda.

In the technical literature, change management is often formalized by specifying a class of changes that are to be considered, so that it becomes a formal mathematical puzzle. This work may be useful at the technical level, but raises questions about the extent to which these formal models represent the actual requirements for change and flexibility in the real world.

Some people think that flexibility is best achieved by being vague and non-committal.

- In business terms, this means keeping your options open. The "lean and mean" firm attempts to survive by exporting uncertainty to its customers, suppliers and contract workers.

- In technological terms, this means adopting highly generic systems and components, which will satisfy a wide range of descriptions.

An alternative view is that flexibility comes from cooperation and making commitments. This raises the question: what commitments should we be making, if we want to remain in business?

Business Excellence

Process focus

There is a wide consensus that a process focus is essential to the achievement of business excellence. This is particularly visible in the European Quality Award, which clearly places PROCESS in the centre of its model of business excellence.

Enablers		Results
Leadership → People Management, Policy & Strategy, Resources → Processes		Processes → People Satisfaction, Customer Satisfaction, Impact on Society → Business Results
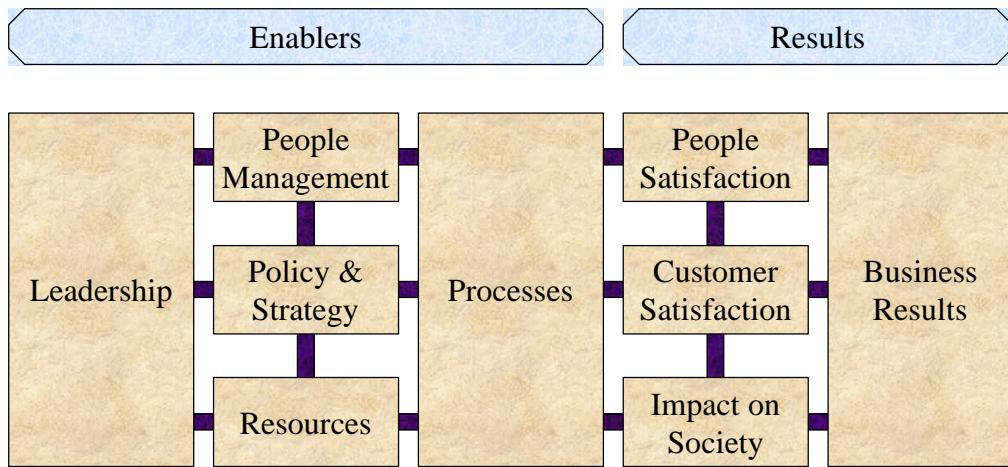
Best practice sharing

One of the characteristics of an excellent company is the ability to identify and share best practices across the organization.

For example, when Xerox started to distribute colour photocopiers in Europe, it found that the French sales force was far more successful than the sales force in any other country. For a short period, the French sales accounted for about half the total European sales. This prompted a careful analysis of the components of the French sales success. Could any of these components be taken out of the French context and used in other countries for selling colour photocopiers? Could any of these components be used to improve operations in general? This analysis identified a number of factors, which were then regarded as candidates for dissemination across Europe as best practices. These included a particularly effective training programme for the sales force, and a particularly effective marketing information system.

Such best practices can then be packaged as components for dissemination. Sometimes a software component already forms an essential part of the best practice itself. In other cases, a best practice can be embedded into a software component, which then serves as a delivery mechanism for the practice to be disseminated. Even if software components are not involved, the work practices can still be regarded as clerical components.

> **Q**   What are the potential advantages of using software components to deliver best practices across an organization? What are the potential disadvantages? Which of these advantages and disadvantages are applicable to your organization?

Business Risk

Introduction

One of the prime concerns of any living body is to control the flow of fluids in and out. In a commercial enterprise, the first level of control is a financial one. So let us think of benefits, costs and risks as being fluid. Unless properly contained, revenues may leak out of an enterprise, and excess costs and risks may leak in.

So what is the business equivalent of the cell membranes that prevent the body from drying up or bursting? The structure and viability of the enterprise are maintained by its interfaces: the commercial contracts and intra-organizational agreements that control the inward and outward flow of benefits, costs and risks.

In this section, therefore, we shall explore the use of enterprise modelling techniques for understanding and managing the distribution of benefits, costs and risks in large federated business situations

Context

This document supposes a large complex development, involving multiple parties. Negotiation between the parties determines how the benefits, costs and risks of the development shall be distributed among the parties. The resulting agreements are captured in contracts or other agreements between the parties.

(If the parties are parts of a single large corporation, these agreements may be relatively informal, and enforced/adjudicated by senior management. If the parties are legally independent entities, then the contracts may be legally binding documents, enforced/adjudicated by the public legal system.)

Any given party has a **bearing limit**, which defines how much cost and risk it can bear. Above this limit, the party cannot be expected to contain the costs and risks allocated to it, and these may spill over the contractual boundaries to its partners. In the worst case, a party unable to bear its costs and risks goes into liquidation, and the remaining costs and risks then have to be picked up by another party.

In some cases, the bearing limit can be determined fairly precisely. This is particularly true in cases that are covered by various forms of indemnity insurance, since the bearing limit can be taken to be equal to the level of insurance cover. In other cases, the bearing limit is itself a matter for negotiation.

Within a hierarchical organization, there is a bearing limit at each level of the management hierarchy. In other words, there is a maximum level of responsibility that can be delegated downwards. Above this limit, the responsibility remains with upper management. (For example, if a trading bank loses half a billion dollars, this cannot be blamed solely on a rogue trader with an authorization limit of 50 million dollars. To pretend otherwise is either foolish or corrupt.)

Distributed Cost-Benefit Analysis

Costs and benefits are distributed in three ways:

1. They are more or less likely to occur. (In other words, they are distributed in 'probability space'.)

2. They are likely to occur at different times. (In other words, they are chronologically distributed.)

3. They affect different people, in different organizations, units, locations, enterprises. (They are distributed in 'stakeholder space'.)

Traditional cost-benefit techniques cater for these three dimensions of distribution in the following ways:

1. Various (more or less mathematical) techniques are used to reduce the complexity of many different possible futures down to a single expected outcome.

2. To compare costs and benefits occurring at different times, accountants use the techniques of discounted cashflow (DCF) to reduce all cashflow to its net present value (NPV).

3. Various (more or less political) stratagems are used to reduce the complexity of many different stakeholders with competing perceptions and preferences. These include power politics (where a single stakeholder dominates the decisions), compromise, log-rolling, consensus-seeking and various forms of voting.

However, these three dimensions of distribution are not orthogonal. You don't necessarily get the same answer if you collapse probability space and stakeholder space before discounting for time as you will get if you collapse probability space and stakeholder space after discounting for time. Among other things, this is because each stakeholder has a different risk profile and a different cost of capital.

In any case, if the procurement decisions are also distributed, there is little point in artificially centralizing the costs and benefits (and risks). Instead, each stakeholder needs to develop a business and risk case from his/her/its own perspective, while considering the likely procurement behaviour and risk management strategies of the other stakeholders. Thus in a federated world, it is not enough to do a business case and risk management strategy from your own perspective. You have to work out ways of making a system or process profitable and safe for each of the participants, as well as making services attractive and affordable to the customer. This means that you need to have an estimate of the likely business case from the other stakeholders' perspective. You need to have some appreciation of each stakeholder's intentions. An indication of intentions can be based on an analysis of responsibilities.

Business Strategy

We identify two kinds of enterprise: positional and relational.

Positional enterprises are those that try to defend a fixed position - for example, a fixed competitive niche or market share.   This is similar to an army that selects a favourable position, which it then occupies and defends. This is a good strategy in slow-moving battles, but is a poor strategy when battle lines move rapidly.

There are many examples in the computer industry, of companies that have adopted a positional strategy: Apple is a good example. The Macintosh computer was highly favoured for many years; but now the market has moved on, and Apple remains stranded in a position that is no longer commercially favourable.

> Q   What positions does your organization defend? Are they still worth defending?
>   Under what circumstances would it become necessary or appropriate for your
>   organization to abandon these positions?

Relational enterprises are those that are driven by the demands (actual or anticipated) of their customers. Some people interpret the demands of Total Quality Management (TQM) to include a focus on customer relationships - this makes TQM into a relational strategy.

At one time, Microsoft had a clearly negative position on the commercial exploitation of the Internet. However, Microsoft changed this position very quickly and decisively, withdrawing resources from other major development programmes where necessary, in order to become a dominant player in the Internet marketplace. Such flexibility of response is what characterizes relational enterprises.

Relational enterprises may be more difficult to manage than positional enterprises. However, in turbulent environments, their survival chances may be considerably higher.[3]

Positional and relational enterprises are structured differently.

Positional enterprises

In positional enterprises, the service/obligation structure dominates the conversation/ collaboration structure. Additional conversations/collaborations may be required for survival, but these are not legitimated by the service/obligation structure.

Actual responsibilities of individuals and groups (what they really strive for, get blamed for) can be derived from their position in the organization hierarchy.

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[3] Philip Boxer has developed a mathematical justification of this judgement, using a topological theory of knowledge, variety and integration, drawn as a three-dimensional catastrophic surface, together with a value system that attributes greater value to some parts of the surface than to others. For more details, see his website: http://www.brl.com.

Much of the activity of the enterprise goes to serve the interests of an elite within the enterprise (upper management, the family, the clan). Often there is no wider sense of the interests of the enterprise as a whole.

Relational enterprises

In relational enterprises, the conversation/collaboration structure dominates the service/obligation structure. Obligations (including management authorities and reporting relationships) are set up to support meaningful (customer-facing) responsibilities.

An enterprise can be characterized as a set of exchanges.

We change an enterprise by interchanging its exchanges.

Transforming a positional enterprise to a relational enterprise involves legitimizing new types of conversation or exchange.

There are four levels of conversation.

WHY
- Values
- Demand
- Desire
- Responsibilities

WHO/M
- Stakeholders
- Agents
- Actors
- Machines

HOW
- Procedures
- Skills
- Professional 'Good Practice'

WHAT
- Operations
- Outcomes
- Obligations
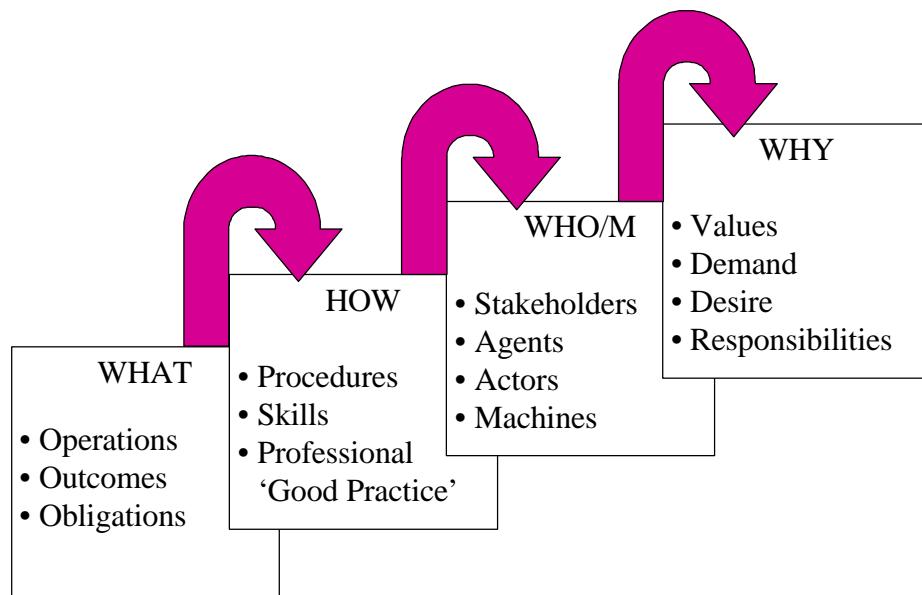
Most enterprises are unable to handle all four levels of conversation.

The physical environment can inhibit conversations.

An office, factory or laboratory provides space in which some conversations (interactions) are made physically easier and/or given symbolic importance. Good architects are conscious of these implications of physical design. However, we don't transform an organization merely by moving it into open-plan offices, or rearranging physical status tokens.

The information environment can inhibit conversations.

Formal information management systems (including bureaucratic measurement and reporting systems, computerized data processing systems, and library and archive systems) provide a data platform for conversations. This means that strategic judgements are based on evidence provided by these systems, and are formulated in terms of the vocabulary of these systems.

In most organizations, the information environment relies on an inadequate, simplistic and out-dated enterprise model.

Underlying the design of these formal systems is a model of the enterprise from the IT perspective - or more often, a series of mutually inconsistent models.

Enterprise models from the IT perspective usually commit three types of error:

- lack of correspondence with users' models

- lack of coherence - the model fragments

- lack of decidability - the IT processes lack any means of detecting or correcting correspondence and coherence errors

Underlying these errors is an IT practice that views the world in an inadequate, simplistic and outdated way.

Implications for IT

How can IT engage actively with business change and technology change?

In this document, I have argued that we need a notion of IT flexibility that is aligned to a notion of business flexibility. The question of requirements change must be addressed in terms of this alignment.

Business Relationship Modelling

In our practice, we use a particular form of enterprise modelling known as Business Relationship Modelling. This describes the relationships between a network of business parties in terms of responsibility and delegation.

The model is used in several ways:

1. Negotiation of costs, benefits and risks

    1.1.   Identification of costs, benefits and risks

    1.2.   Define contractual allocation of costs, benefits and risks

    1.3.   Establish indemnity and liability cover, if necessary

2. Confirm viability of each party's position

    2.1.   Establish cost-benefit position for each party

    2.2.   Check that each party is within bearing limits

3. Confirm viability of entire network

Requirements Analysis

Requirements for information and systems need to be formulated in terms of conversations (collaborations and their vocabularies) rather than services (functions and their procedures).

In contrast to prevailing IT practice, we model information based on how the information figures in conversations. We identify and analyse entity types or objects as 'speech acts', in terms of their declarative content, rather than in terms of their correspondence to imagined chunks of reality and/or procedure.

We use these speech-act-inspired information models to rethink and expose the errors underlying legacy data systems and services, and to plan remedial action.

We specify our requirements for new information systems using these information models, specifying the syntax and semantics of the conversations that the database is to support, rather than merely formatting particular man-machine exchanges.

Meanwhile, business users need to work with what's there.

To support new conversations using old data systems is sometimes inconvenient rather than impossible. To the extent that the false ontologies and epistemologies of the data systems can be made apparent, the data from these systems can be 'shredded' and reconstructed to generate information that has greater meaning and relevance in terms of the desired conversations. Data from the computer can still be used, but with an interpretation that exposes their limitations.

If we get this right, the conversation hierarchy can be turned upside down. Instead of strategic user conversations being framed by IT conversations, now the IT conversations are framed by strategic user conversations.

SCIPIO

The SCIPIO method has been developed to connect descriptions of desired business change with specifications of IT services that will support these desired business changes.

At the business level, SCIPIO concentrates on modelling relationships and exchanges. This should result in IT solutions that support the business trends outlined in this document.

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