1.4. Integrated Service Management (ISM)®

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In 1992, KPN (Royal PTT Telecom) developed the IPW model to realise one of the Netherlands' first successful ITIL implementations. In an increasingly complex environment, the current KPN Datacenter aims to contract the highest service level, the so-called Full Service Management (often by means of a gradual growth), thereby acting as a systems integrator. To realise the required service a reference model, known as Integrated Service Management (ISM) was developed.
This model embodies the way in which several sub-services can be offered to a client as a single integrated service, and includes all of the premium insights of modern IT service management. The model incorporates all that has been learned during the last six years of experience with process based service management.
In developing the model KPN used a highly structured approach. By establishing a number of building blocks (paradigms), the final model is gradually revealed. Since the model is limited to the theoretical fundamentals, it offers a set of tools instead of a definitive solution to a specific situation.

Introduction

KPN Telecom has successfully applied the IPW model since 1992. In doing so, IPW has contributed greatly to the improvement of KPN Datacenter's IT service. During this period, it became apparent that an increasing number of questions required different answers. A section of the questions came out of the experience with IPW, which led to the development of new insights. Other questions were the result of new possibilities due to improved technology. Further technological developments, changing requirements and demands of the customers in particular, led to more questions.

In order to provide an adequate answer to these questions, a project was started within KPN Datacenter, applying the existing knowledge and experience to the development of a new model. This model was to include all activities from product development through to delivery.
The development of the model took place in close collaboration with Bureau Hoving & Van Bon.
This article discusses the nature of the identified bottlenecks, the approach towards the establishment of the description of the model, the paradigms and their value to the end model and the end model itself.

Bottlenecks

The bottlenecks discussed are partly based on experiences during the six years in which IPW has been applied and are partly those bottlenecks that are most likely to manifest at the moment the service is to be professionalised further. These bottlenecks also come to light, maybe clearer then ever, when implementing new services based on technological innovations such as Client/Server and Web applications, that require platform-transcending IT management. The mentioned bottlenecks have their origin, partly, in the fact that the described process model was not applied consistently, and partly in the fact that certain parts of the process model are difficult to apply. Even more important, however, is the progressive insight that is the result of six years experience with a process-based working method. This insight leads to demands that are difficult to establish within the classic process model.
Furthermore, there have been two relevant external developments. Firstly, the number of buyers requiring a higher level of service is growing. The role of IT support within their company objectives is so crucial that they require a guaranteed service. The second external development is the availability of ever improving service management tools, making models that were formerly only theoretical now applicable.
The value of IPW is not questioned by the above. This classic process model has been successfully applied to many services. However, the fact that an increasing number of buyers are demanding a higher standard of service and the fact that the Datacenter wants to offer a higher quality of service, results in the following inventory of bottlenecks.

Bottleneck 1. Difficult integration of services

End-to-end IT service to the customer is the result of a large number of integrated sub-services. Examples of this are sub-services keeping the central system operational, or the network or the workstation. Sub-services may also include hardware and software maintenance. Other applications interactively communicating by means of interfaces and adding new functionality are other types of sub-services.
These sub-services are provided by various internal or external organisations. System management is often provided internally and the same applies to LAN and workstation management. WAN management and especially hardware maintenance are often brought in from outside. Maintenance of custom applications is generally provided by the developer, either from within or from outside the organisation.
The quality of the end product, the service that is provided to the customer, depends on the quality of these various sub-services. To be able to provide service to the standard required by the customer, the 'purchasing' of all sub-services needs to be attuned to the requirements of the end product and needs to be monitored throughout the lifecycle of the service.
Offering an integrated service requires a large degree of fine-tuning between the suppliers involved.
To ensure that the end product is excellent, exceptional effort must be applied to the integration of sub-services.

Bottleneck 2. Quality improvement collapses under operational pressure

ITIL designates a number of quality improvement processes of which Problem Management is one of the most important. Within ITIL, the objective of Problem Management Process is two-fold.
Its first objective is to reduce the impact of incidents- an operational task.
Its second objective is to find out the cause of incidents to prevent (re)occurence – a task aimed at structural quality improvement.
As both objectives fall under one process description (even under IPW) and also under one process control, the objective of quality improvement is pushed into the background under pressure of operational activities. The current

disruption of the service quickly gains a higher priority than investigation for the sake of quality improvement.
However, solving incidents without structurally improving quality is like 'mopping the floor while the sink is still flooding over'.
The absence of a structure in which a pro-active, quality improving objective has a chance of success means that the permanent quality improvement has been neglected.

Bottleneck 3. The difficult relationship between service agreement and delivery
With the implementation of a process-based approach, it was hoped that contracts (SLA's) would primarily include a service description, coupled with a number of parameters concerning availability, response time, set-up times etc. However, in practice, the service provider often finds it easier to simply charge a couple of easily allocated costs, either with or without commercial surcharge. The customer, on the other hand, still appears to be looking for the safety of a recognisable costing structure based on matters such as hardware (type of computer, amount of Megabytes, network capacity), software and hours of support, instead of recognisable performance units in terms of operational processes. The resulting bottleneck is that both parties still come to an agreement but that this agreement does not describe the actual needs of the customer, namely the required IT service and the associated support. The supplier, on the other hand, is left with the problem that he might deliver what was contractually agreed upon, but that the customer is still not satisfied.
The cause of this problem is two-fold. The customer is not IT conscious enough to properly evaluate a service and therefore, tries to find safety in the description of the resources to be deployed (hardware, software and humanware). Not only does the supplier find it difficult to determine the cost of the service, but even more to steer the organisation towards service parameters.
The absence of SLA's with clear, controllable and measurable service parameters serves to worsen the classic discontent of IT buyers.

Bottleneck 4. Limited additional value of configuration management
Often, an ITIL 'implementation' will start at an early stage, setting up and fleshing out a Configuration Management Database, the CMDB. According to the developers, this CMDB should serve many purposes such as configuration management, asset management, resource management, cost management, etc. and should support practically all processes. This creates a database full of detailed information that contains many inter-relationships. Maintaining such a database is often very time-consuming, making it almost impossible to verify data. The problem is aggravated further by the fact that those who are responsible for the detailed maintenance of changes, i.e. system managers, operators and/or change support staff, do not see the full benefit of their efforts in their daily work. Proper maintenance of a CMDB, therefore, requires a great deal of discipline and effort. The returns are further diminished as, in the case of many of the larger actions, the CMDB often does not contain the information required, making further stock-taking necessary.
The CMDB offers limited support for activities, while its maintenance requires a disproportionately large amount of effort.

Bottleneck 5. Questionable added value of process
Process descriptions establish the sequence of activities. Often, this is not the shortest route from A to B. A number of activities described in the processes, such as checks, authorisations and registrations, form part of the process itself, to ensure quality and are not aimed at the establishing of the main objective of the process. Certain other activities are necessary for facilitating other processes. The importance and the execution of these processes are not always

obvious to the persons who actually do the work. This problem occurs especially if the objective of the process, the description and the total picture of the full model, are not clear enough.
The absence of clarity regarding the position of activities within the process and the absence of the understanding of the importance of those activities within the framework of the total service causes lack of motivation.

Bottleneck 6. Slowing down effect of over-documentation
Descriptions of processes, procedures and work instructions are not generally fun to read, especially for those who are required to execute them. The same goes for descriptions of processes and process models.
Descriptions often tend to list all of the variants and exceptions occurring within a process in one go, often giving a detailed exchange of information. If the processes, procedures and working instructions are also recorded in a single, all-encompassing document this results in a document that is very inaccessible, both in use and maintenance.
Many people, especially beginners, are overwhelmed with the amount of rules and regulations that seem to push the actual work into the background.
Brief, simple and clear descriptions of the working method, summaries of the main points, are usually absent.

Bottleneck 7. Process and procedures only cover part of the activities
The original IPW description focuses on a number of operationally positioned processes. The strategic and tactical processes are acknowledged but have not been designed with the operational processes in mind. This causes a breakdown in communication at the borderlines of the processes, leading to errors and delays. This gap is also the cause of the lack of grip on and the understanding of management in relation to the operational activities.
The lack of coherence between operational processes on the one hand, and tactical and strategic processes on the other hand, causes too large a gap within the organisation.

Bottleneck 8. Customisation is difficult
It is the aim of every manager to continuously improve. Until recently, an availability of 99% was a veritable achievement.
Due to continuous improvements to the quality of hardware and software, and certainly also in the standard of managers, the realisation of better performance by components of the technological infrastructure is proving more and more achievable. The infrastructure, on the other hand, is becoming increasingly complex and service levels are becoming more specialised. Performance is crucial to some applications, whereas to other applications, it is data integrity and recovery up to the last second, or simply availability.
For some services, the standard level of the service is too high for the nature of the business it supports. For example, not all discs need to be doubled, the failure of one of the ten workstations may not need to be resolved within 8 hours, or the loss of one day of production may be less costly than the costs of prevention.
If the service level is properly attuned to the business, it suffices to simply deliver what is requested. The same applies here: 'You can have too much of a good thing!'
Unlimited service leads to unnecessarily high costs, possibly endangering the competitive position.

Bottleneck 9. Projects/Taskforces/ Escalations
The complexity and dynamics of the ICT management requires proper fine-tuning of all those involved. A good process model and clearly worked out procedures, work instructions and good supporting tools are suitable aids.
Due to time pressure or size, the performance of certain actions is sometimes kept outside of the

process control. These activities are then organised in the form of Task Forces, projects or escalations. Placing activities in these organisational forms is often a good and necessary means to ensure a practical implementation. These activities are placed outside the process because the way in which the regular process is described and executed does not instil sufficient trust concerning the establishing of the desired objective. However, the necessary registrations are often not performed, resulting in incorrect or incomplete data for future processes. The result is two-fold. Firstly, the risk of disruption to the progression of the project, as well as to the quality assurance of the future production, increases due to the fact that the facilitating processes are not properly activated. The second risk is that the project or the task force's claim to resources makes those essential resources unavailable to other IT services. This bottleneck arises especially if the project or task force is automatically given a priority that is higher than that of the execution of the process.
Under pressure, the agreed working method is (too) often deviated from, causing the activation of two conflicting control mechanisms and causing damage to the quality of service.

Bottleneck 10. Steering towards processes
Maintaining process-based working methods requires just as much innovation as their implementation. Process-based working methods also require process-based management. The way in which objectives are introduced into the organisation is still predominantly from the top down. Organisations arranging their operational activities through processes fail to utilise the full added value. The choice for process-based working methods should be followed by the choice for process-based control and also process-based rewards.
Control and award systems 'from the top down' have the effect of placing the interest of the department before the process-based establishment of the service.

Approach

In developing the model, a highly structured approach was used. The model is approached step by step by establishing a number of building blocks (paradigms). Since the model is limited to the theoretical fundamentals it, therefore, offers a set of tools instead of a definitive solution for the specific situation. The use of the model easily facilitates the creation of a varying number of organisational elaborations.
The development of the model is based on a number of limiting conditions constituting the minimum requirements for the model.
The model must:

- be acceptable and simple;
- be recognisable and practicable;
- be maintainable;
- be process-based, service-oriented and customer-oriented;
- be traceable and reproduceable;
- describe variants according to their nature, not per case;
- make a clear contribution to controlling the increasing complexity of the IT service.

The ISM model was deliberately limited to those processes directly leading to the provision of a service. As a result of this, a number of organisational, financial and facilitary processes, essential to the company, have not been included in the model.
The model was deliberately not developed in detail. By describing the main processes and putting them foremost, a well organised, clear and well-implemented model has been created.
A model that works is better than 'the right model'.

Paradigms; the model's building blocks

An organisation can be viewed in many ways and dimensions. Each dimension in itself provides information important to the layout of the

organisation. The description of the main service dimensions provides the paradigms forming the building blocks of the ISM model.
Each paradigm describes a dimension of the IT service management or part of the service. The paradigms employed are individually recognisable and have as such been adopted and accepted within the IT management field.
To be able to use the various paradigms for the development of one integrated model, each paradigm should be described in view of this purpose, in this case, the creation, provision and continuation of an integrated IT service. This results in a consistent elaboration, complementary to an organisation that strives for the same goals.

The delivery paradigm

Elaboration of the delivery paradigm
The client is supplied with a service. This service is continuous in nature, consisting of the provision of an information system and its support (Figure 1). A good service necessitates an effective and coherent management of the interaction between customer and supplier.

The impact of the delivery paradigm on the ISM model
The ISM processes have been selected in such a way that there is a continuous relationship to the delivery of the information system and its interactions. Each interaction with the customer is directly linked with a specific process within the supplier domain.

The infrastructure paradigm

Elaboration of the infrastructure paradigm
ISM focuses on the delivery and maintenance of an integrated service. The infrastructure paradigm delivers an image of the infrastructure used for this purpose: what it comprises and which part of the infrastructure is important to the implementation and control of the service, always related to the level of the IT service. According to

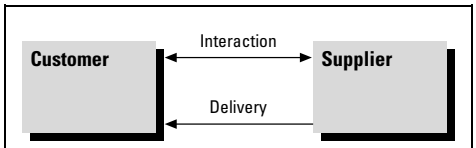

Figure 1 The delivery paradigm

the delivery paradigm, a service consists of an Information System with the associated interaction support. According to the infrastructure paradigm, each Information System can be split into a large number of components, as shown in the Information System tree below (Figure 2).
This Information System tree shows the components constituting an Information System.
An Information System consists of an infrastructure of 'human resources' and an infrastructure of Information Technology (IT). Other dimensions such as procedures and documentation are always applicable to this and other components of the Information System tree.
The Information Technology is again made up of the Technical Infrastructure, the Application Infrastructure and the Technical Facilities Infrastructure.
The Technical Infrastructure consists of Hardware, System Software and Communication Facilities. Depending on the architecture, the Application Infrastructure may consist of Application Software and Databases. Technical Facilities include buildings, computer floors and energy facilities.

The impact of the infrastructure paradigm on the ISM model
The scope of the ISM model covers the Information System and thereby all its components. This means that, for all processes, one or more components of the infrastructures constitute an object that the process is working on. So the 'incident recovery' process processes *all* incidents, regardless of the component or domain of the Information System infrastructure they are applicable to. Therefore, no distinction is made between the equipment related incidents and the application software

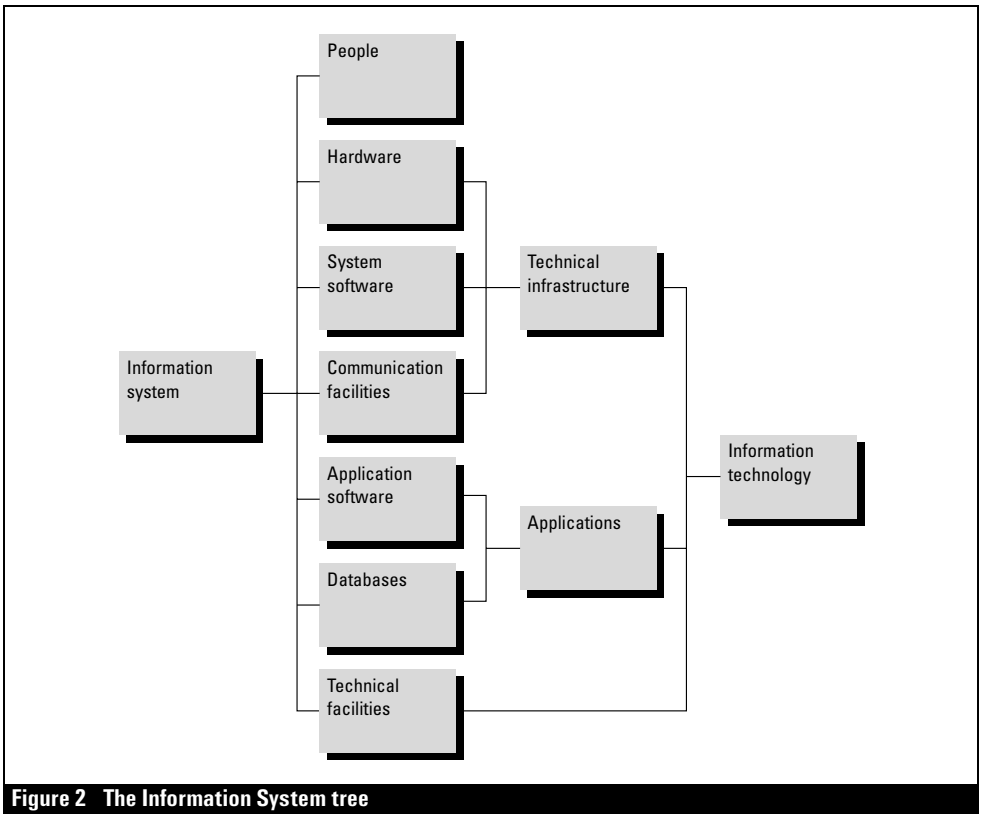

Figure 2 The Information System tree

related incidents. The same applies to the change process.

By nature, the infrastructure paradigm provides important guidelines for the service-oriented populating of the CMDB.

By showing the information system per service, a meaningful specification of the various necessary resources is created. This is important for both the preparation of a new service and for its continuous delivery.

The organisation paradigm

Elaboration of the organisation paradigm

The organisation paradigm starts with the view that each organisation can be seen as a system of co-operating infrastructures (Figure 3):

- people – who
- process – what
- products – how and with what

The impact of the organisation paradigm on the ISM model

Of course, the design of an ISM model focuses on a process-based approach: it is first determined which processes need to be executed within an organisation. Next, the optimum combination of people and products infrastructure is determined. Environmental factors (culture, financial position, etc.) play an important role in the latter.

ISM always discriminates between these

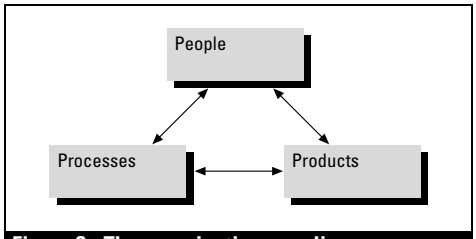

Figure 3 The organisation paradigm

infrastructures. A process model is defined which consciously excludes all influences of the people, the organisation infrastructure. As an implementation is greatly determined by the environmental factors and by subjective issues such as the preference of the current manager or by culture, this document remains limited to the indication of several implementation variants. Requirements concerning the products infrastructure to be employed may also be derived from the process infrastructure The nature and character of the products depend on many environmental factors and are, therefore, not developed further.

The control paradigm

Elaboration of the control paradigm
Within each organisation, a number of control levels can be distinguished. The control paradigm assumes that three control levels can be distinguished within each organisation (Figure 4):

- The *strategic level* that mainly determines the long-term information policy and that provides a global vision and direction for the organisation.
- The *tactical level* that translates the vision and policy, as defined at the strategic level, into a medium-term specification of the infrastructure facilities.
- The *operational level*. This level transforms the infrastructure specifications into the information systems being used.

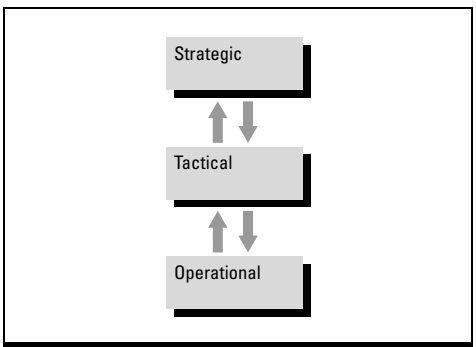

Figure 4 The control paradigm

The impact of the control paradigm on the ISM model
On the one hand, applying the control paradigm leads to the typification of the recognised processes according to one of three levels as indicated. The ISM processes are always chosen in such a way that they will fit univocally into one control level. For example, the Problem Management process is characterised as a tactical process: it determines which improvements must be made to the infrastructure to facilitate the required service quality, or in the case of internal improvements, to efficiency. This process, therefore, does not include operational activities regarding the infrastructure. This is contrary to the relevant ITIL definition. In ISM, the reactive activities contributed by ITIL for the Problem Management process always fall under the Incident Handling process, regardless of the incidents in question.

The integration paradigm

Elaboration of the integration paradigm
The integration paradigm ensures the delivery of the service, as seen from the point of view of the supplier. The customer is not concerned with this division of the components and it is, therefore, hidden: the customer only 'sees' the 'total supplier'. The supplier is responsible for managing the interface(s) with the sub-supplier(s).
The supplier, hereby, assumes the role of system integrator for the sub-suppliers of components constituting the integrated service (Figure 5).
The domain of the supplier can consist of one or more sub-domains. The integrated service to be delivered is then divided into components of the various sub-suppliers.

The impact of the integration paradigm on the ISM model
Each sub-domain that is to be put into practice can be specified and split off as an independent domain. The requirements for the total service are translated into requirements applicable to the

delivery of the sub-services from the split domain. The ISM model has the customer specify their requirements for the total service in terms of behaviour, functionality and support. The requirements derived from these characteristics are translated into the sub-domain by the service integrator, without further requirements regarding the internal working method of the sub-supplier. Therefore, a sub-domain can be seen as a 'black box'. Communication between customer, supplier and sub-supplier are kept uniform, however, to facilitate the composite structure. It therefore, concerns agreements on the level of process interfaces and inter-process communication.

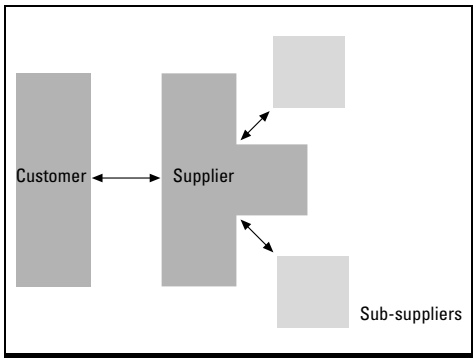

Figure 5 The integration paradigm

The generic model

The considerations and paradigms presented above lead to *the generic model* for Integrated Service Management® (Figure 6). For the IT service supplier to be able to deliver a composite service, it is essential to take the role of integrator if the service is to be split into components. The integrator manages the interfaces with the component suppliers.
This model does not necessitate agreements among the sub-suppliers themselves, as this is the responsibility of the integrator.
For complex services, the model may be 'repeated', the sub-supplier taking the role of integrator for the components under his/her responsibility.

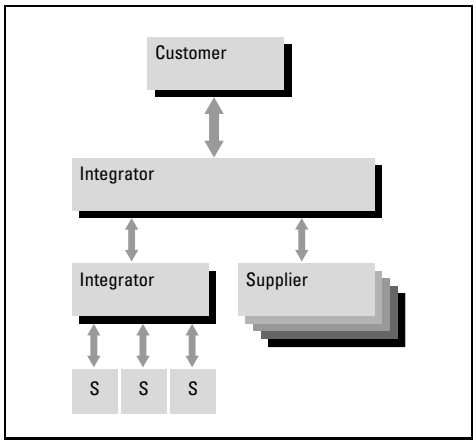

Figure 6 The generic model

Customer – supplier relations

If we combine the control paradigm and the delivery paradigm, we arrive at the conclusion that the customer – supplier relationships take place on three control levels as well. Each level knows its own specific customer – supplier interactions.
The interactions on each of these levels are characterised by two-way traffic and can be described as follows (Figure 7).

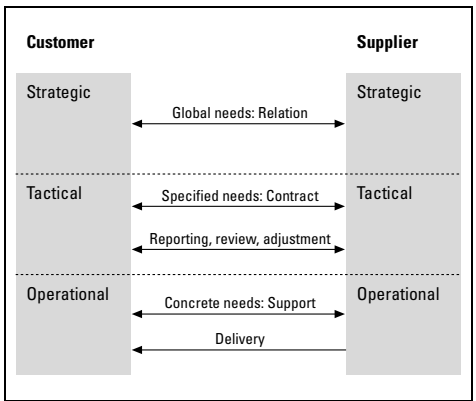

Figure 7 Combination of delivery paradigm and control paradigm

Strategic
The customer sets up an information plan, to facilitate the information of the customer domain. Based on this information plan, the supplier provides information about the (im)possibilities, the standards and the requirements used in his service policy. This is an iterative process, its objective being the fine-tuning of the information plan and the delivery options. Here, the object of attention is the *relationship* between customer and supplier.

Tactical
The customer sets up the specifications of the information system, be it new or to be amended. He also sets up the requirements linked with the delivery. The supplier quotes for the service, either new or to be amended, and/or maintenance takes place within the terms and conditions of existing SLAs (adjusting specifications, reporting). Here, the object of attention is always the *specification* of the information system and its support.

Operational
The customer uses the integrated service delivered by the supplier. The user generates complaints (incident reports), questions (information) and (standard) orders. The actions of the supplier consist of solving complaints, providing information and the results of orders. Here, the object of attention is always the assured *delivery* of the information system.

Processes within the model

After the paradigms have been established, the following step may be taken. This step consists of the specification of the interactions and the definition of the associated processes that are operative within the ISM model (Figure 8).
On a *strategic level*, the information plans of the customers, market research and innovation lead to service requirements (in the form of service plans and standards).
On a *tactical level*, the infrastructure requirements and delivery are formulated from this, together with the specifications of the customer. Adjustments are constantly made based on customer requirements and/or internal efficiency considerations.
On an *operational level*, the delivery is created, modified and, of course, continued.

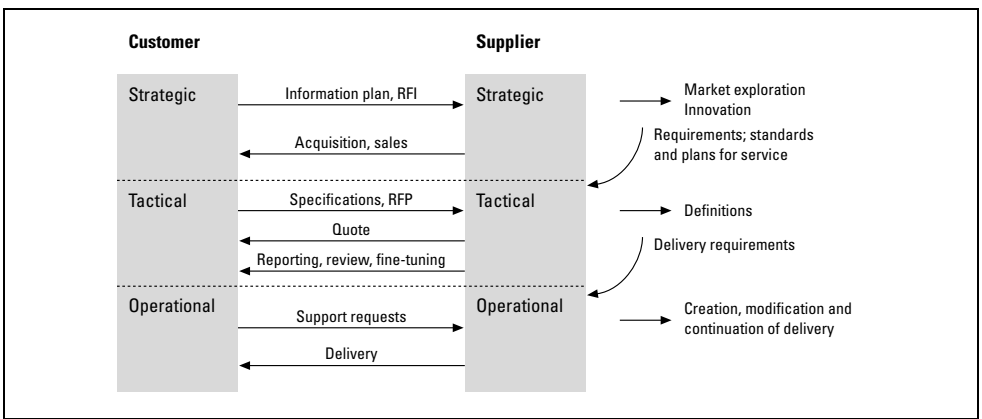

Figure 8 Elaboration of the most important interactions between customer and supplier

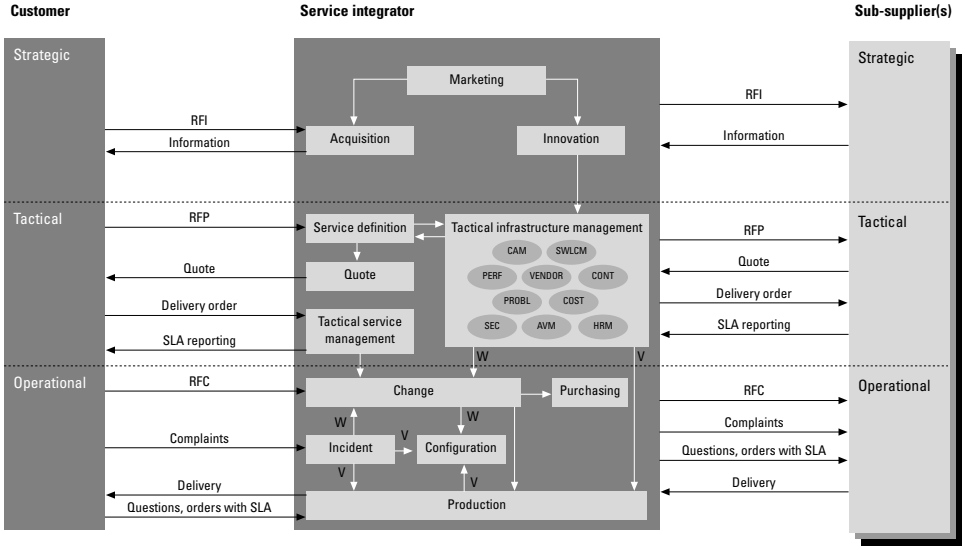

Figure 9 The Integrated Service Management model. This model only shows the process relationships and not the flow of information. Nor does it include any quality processes. Quality management is thought to be applicable to all elements and levels within this model

The *Integrated Service Management* process model

The previous paragraph established the paradigms, creating a generic model for the delivery of an integrated service. At this stage, the processes occurring on a strategic, tactical and operational level need to be completed. The model shows three levels as well (Figure 9).

Strategic processes

The *strategic* level includes the *Marketing*, *Innovation* and *Acquisition* processes. Marketing in the sense of researching the market, not only to sell the services to be delivered, but also to explore the market for developments. Especially developments that are relevant for further improvement of management tools for the services to be delivered. This specifically controls the Innovation process, as this may see the creation of measures that will improve the efficiency of IT management.
From the Acquisition process, the strategic contacts with the customer are maintained. Based on a Request For Information (RFI), the iterative interaction with the customer finally determines the shape and form of the service to be delivered, the information the customer needs and how it is to be achieved. As soon as the customer decides that the supplier might be able to meet the information needs, a Request For Proposal (RFP) is drawn up.

Tactical processes

On a *tactical* level, this RFP provides the input for the *Service Definition* process. This process needs to see the specified information requirements translated into infrastructure terms used to deliver the service. The specification of this infrastructure is based on the Information System Tree. After consultation with sub-suppliers, a quote will be issued, stating the specifications and costs of the service to be delivered. Again, an iterative interaction concerning these costs and specifications will take place between the customer and the supplier. This may finally lead

to a delivery order: the input for the *Tactical Service Management* process (group).
This delivery order shall be in the form of an agreement (contract) stating the terms and conditions and the specifications of the service to be delivered, i.e. the service level agreement (SLA).
The Tactical Service Management process is aimed at the achieving and continuation of the requested service. It might also lead to organisational adjustments, e.g. setting up a 7 × 24 hour support.
The tactical level also sees processes concerning the care of the infrastructure. The model has 10 processes, included within the *Tactical Infrastructure Management (TIM) process group*.
TIM is the total of all processes ensuring the layout of the infrastructure remains such that the integrated service is delivered in conformity with the agreements. The following processes are distinguished within TIM:

- Availability Management.
- Capacity Management.
- Contingency Management.
- Cost Management.
- Vendor Management.
- Performance Management.
- Security Management.
- Problem Management.
- Lifecycle Management.
- Human Resource Management.

Operational processes

The *operational* level sees the delivery of the service in conformity with the specifications as agreed with the customer. Of course, no information system is perfect and the ISM model also has the necessary processes in place to deal with disruptions and adjustments in a correct and adequate manner. To enable proper implementation of the ISM model, it is essential that one has a clear picture of the definition of *managed infrastructure*. This requires agreements being made within the whole of the organisation, to prevent confusion. The fact is that the ISM model only concerns this managed infrastructure.
The model can further distinguish between changes to copies and types. Objects for which the type (a characteristic feature of the object) changes, are processed using the *change process*. Changes relating to (identical) copies are not processed using the change process, but are processed in the production process and registered in the CMDB.
The *production* process executes all operational activities related to the service to be delivered. These activities can be triggered from the incident and change process and lead to adjustments to the daily planning in the production process. The customer domain will also produce questions and small orders, however, directly interfering with the production process. Examples of small orders include a one-time production of a database query and the addition of a user profile to an authorisation database. One final trigger (series) for the process production originates from the TIM processes (e.g. problem solving and innovation projects).

Process integration between domains

Interactions with sub-suppliers of the integrated service are controlled from the processes described in the ISM model. The model does not dictate any requirements to the working process or method within the sub-domains, apart from the fact that each of the identified ISM processes requires uniform input by sub-suppliers. This way, the interaction can be specified clearly and the agreements can be guaranteed by means of a quality system.