

Return Merchandise Authorisation Stakeholders and Customer Requirements Management - High Technology Products

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Abstract

Asian based enterprises providing high technology mass market products to the developed countries are competing in a marketplace where customers are demanding the highest standards of service. To develop successful product service capabilities - including technological change, product differentiation, timing, contingency planning, marketing and financial considerations, these companies need to fully identify the market stakeholders and quantitatively prioritise their requirements. This paper describes a methodology to identify the different types of stakeholders in the high technology product market and manage their requirements. The methodology provides a basis for sustainable competition that exploits global market opportunities and enables ultra-fast-to-market products to be supported at a level that meets customer demands. The case study application is in mass market electronic products; the potential application is wide.

Keywords: Requirements Management; Return Merchandise Authorization; Maintenance Service; Consumer Products

1 Introduction

Customer satisfaction is a prime goal for any sustainable business organization. A quality product and good customer service are elements in satisfying customers. Worldwide production continues to shift between the established centres in Europe and North America and the newly emergent production platform of Asia. In the mid-1970s the changes in manufacturing industry dynamics operating across the global marketplaces of North America, Europe, Japan and some other Far East nations were widely recognised. The rise of India and China as manufacturing centres is a recent phenomenon. There are many wild predictions about the potential impact on established Western manufacturing business models, but we can already look to other nations to assess the potential impact in the longer term, (Sackett *et al*, 2005). Leading edge companies producing high technology products in the Far East have moved beyond the base physical product and are also providing technological services, product planning and support to customers. This, linked with rising customer expectation and market acceptance hurdles, has had a major impact on the classic maintenance service model in which the

mass market industries normally recognise little or no relation of service to the high technology product marketing strategy. In our case study enterprise the Original Equipment Manufacturer with no market presence under their own label, mass manufacturing high end consumer electronic models centrally in the Far East, are servicing the product in high labour cost, local to market, remote from the Company's headquarters locations and in support of other firms' brand names and customers. The Company has grown to a turnover approaching 2 billion Euros in 8 years. The maintenance service must fulfil customer satisfaction in high technology and short life-cycle product, demanding consumer electronics markets. Maintenance service has increasingly become a proactive, complex, and perpetuating process that can support more revenue generating opportunities than the direct sale of the products themselves. A challenge for the mass market high technology product sector is the provision of a global and customised service network. Requirements Management techniques have been established in software engineering and new product development applications (Chen *et al*, 2004). The authors propose that Requirements Management techniques be modified and used to identify the stakeholders and prioritise the potentially conflicting needs in this emerging environment of maintenance service for high technology global products.

In this paper the authors identify a research gap in the application of requirements management by:

- Identifying the stakeholders for global return merchandise service of the high end electronics consumer product market, and
- demonstrating the potential application of a requirements driven system in a maintenance service domain.

The practical application and development of this requirements management derived system interface with a company's internal reporting system is described. This provides a single document customer reporting system.

The specific and specialised product maintenance requirements of a rapidly growing and highly successful manufacturer trading in a global market are detailed through a case study. The means to implement a requirements management based service system are illustrated. The discussion highlights the key findings and the scope for application of the research to associated sectors with similar service characteristics. It is anticipated that this application area will grow substantially.

2 Stakeholders and Customers requirements

The word 'requirement' is applied loosely in both the engineering and wider communities. Usage normally addresses requirements in the context of a physical product, and requirements are used to derive product development – not use, particularly in large projects, and disregarding requirements for after sales services. A requirement is:

“A statement identifying a capability, physical characteristic, or quality factor that bounds a product or process need for which a solution will be pursued.” (IEEE Std 1220-1994), and “Characteristics that identify the accomplishment levels needed to achieve specific objectives for a given set of conditions”, (EIA/IS-632). Non-functional requirements: specify an aspect of the system other than capacity to do things. Examples include those relating to performance, accessibility, usability, branding and visual style. Functional requirements: specify what the system must be able to do, in terms that are meaningful to its users (Hooks, 1994).

Requirement classification enables the product team to assess the difficulties associated with changing a requirement. By definition, if it is a primary requirement a Contract Change, or perhaps a new market

analysis, will be required. If it is a derived requirement, the decision to change (as long as the change is within the scope of the "parent" primary requirement) rests with programme management.

Patterns and templates for the requirements definitions are targeted to new product development and software engineering (Robertson *et al*, 1999, and Gilb, 2005). The output elements of the service requirements are not product specifications but instead the process and quality issues. Maintenance service output is a series of activities, processes and targets, not a physical item. The service requirements do include some physical items such as repair materials, equipments and tools but customer concerns are items such as quantity, availability and cost. Here, the product specification is fixed, unchangeable; also it belongs to the customer. The time-to-market for the service delivery is much shorter than the product development time. A new product development team deal with one product, but a service project deals with many products and each product service has different requirements. The classic requirements definitions do not fully embrace the volatile and highly customer driven process of a mass market, high technology product Maintenance and Service Environment.

The stakeholder management literature can be traced back to the seminal work of Freeman (1984), who articulated a 'stakeholder model' to replace the 'managerial model' of the firm. He distinguishes two senses of the Stakeholders:

The 'narrow definition' includes those groups who are vital to the survival and success of the corporation. The 'wide definition' includes any group or individual who can affect or is affected by the corporation (Freeman, 1997).

The development of stakeholder theories of the corporation has revived debates about the ambit of corporate responsibilities (Cragg, 1996); different perspectives provide different views of stakeholders (Cragg, 2002). It also shows the different groups of stakeholders as Customers, Employees, Shareholders, Security, regulators and government officials, Communities. The authors propose the Competitors can also be a stakeholder as their business strategy always affects the company. Customer needs will be the core requirements, to satisfy customers we must understand how to find out what they need – the requirements. From the view of requirements management, the requirements from the external customer will be the most critical. Yoji Akao (1990) distinguished three classes of customer wants:

- I. "What customers say they want". Customer demands are frequently translated into specifications without exploring their meaning in regard to how the product or service will be used. Neglecting to explore how the customer intends to use the product or service can lead to poor or improper design.
- II. "The customer's expected quality consists of expectations the customer does not verbalize because they assume them to be evident: such as the product must be safe". Extensive interviews may not elicit these expectations. Customers will be dissatisfied if the product or service does not meet these assumed expectations. If the expectations are built into the product, customers will hardly notice.
- III. "Exciting quality consists of attributes of the product or service contributed by the supplier". The customer may not expect these characteristics; they recognize them as improvements and like them.

3 Maintenance Service

Maintenance service models can be split by value / volume in a simplistic tri-segmentation:

- High value - Low volume
Those products are normally high acquisition cost, long life-cycle, high technology and high performance; the service maintenance costs may subsequently exceed the purchase price. For example, a commercial aero engine may cost 8 million Euros, yet over the typical 20 years plus lifecycle the overhaul costs will be more than the list price. This is in addition to the on schedule and unscheduled maintenance service. The product will be fully functional throughout its serviceable life. The high capital value and cost of failure requires well organized maintenance service by certified organisations.
- High value – High volume
Examples include high technology products, such as Personal Computer, Laptop, Personal Data Assistant and high function mobile phone. Market value is time sensitive. The products exhibit high value to weight ratios. Service life-cycle may be months or years; production lifecycle can be weeks or months. Second owners may have different service expectations. Service provision may be short duration and then ad hoc.
- Low value – High volume
This kind of product is low margin and market share is price sensitive. Typical mid range examples include standard domestic white goods. Product life-cycle may be 10+ years, production life may be 6 months. At the lower end or after a brief warranted service life the product may not have any service offered.

The buyer may be able to select the maintenance service model. The manufacture may list different maintenance packages to satisfy the customer requirements. Outside the High value – Low volume sector, even if no contract is offered there is always the warranty period during which the provider (Liden *et al*, 2003) will need to assure the product. Failure symptoms, once accepted as not caused by the customer, will need to be accommodated, probably at no charge. The product provider will need a maintenance service model to fulfil the customer's legal entitlement. The maintenance process is currently viewed as quite simple. The sense is that the repaired product will be close to the performance of the original manufacture standard. It will not be a better or different product. The market perception is that a repaired product is not 'as good as new'. Repaired product may be sold as 'graded' 'refurbished', indicating possible sub standard operation or life.

3.1 High technology products maintenance service

As high technology products become complex, the role of supporting services needed to exploit product function is increasingly important. To achieve the performance to specification customers are entering into service contracts with the Original Equipment Manufacturers or independent service providers. Aspects such as what services to deliver, who is to deliver them, how they are to be delivered and received, and at what performance level, need to be considered in the negotiation process and agreed upon by both the provider and the client. Thomas (1975) distinguished between equipment-based and people-based services. Examples of equipment-based services include airlines and vending machines, examples of people-based service are appliance repair and management consultants. For the maintenance models, different types of product have a different maintenance model. van de Water (2000) identified the maintenance service as broadly of two types, non built-in maintenance and built-in maintenance; for each type we can further classify Preventive based and Failure based maintenance. Even so it is hard to find universal models applicable across different maintenance service environments.

3.2 Requirements of a maintenance system – case study environment

The case study company provides ‘Personal Digital Assistant’ phone and ‘Smartphone’ Maintenance Service through a centre in the United Kingdom. They can service up to a few thousand units per month from this location. The customers include all major telecom operators some with up to a dozen types of products. They represent many million end users. The major challenges in the global maintenance service centre are Turn-Around-Time and Repeat-Return-Rate. These are the indicators of the service delivery performance. The high technology product market does not normally allowed end users to repair the product themselves – this would invalidate the warranty. To fulfil these requirements the sub-requirements can be classified as:

- Customer interface: (a) for end user, when a customer walks into an Authorized Service Centre, the product is examined for defects. The fault is classified into 3 categories. Level 1 and Level 2 faults can be repaired by the Authorised Service Centre itself but the product with Level 3 fault has to be sent to the Authorized Repair Centre. Each fault is assigned a fault coded which determines the nature of the repair and the materials needed for repair. (b) For the retailer, a service programme manager must be assigned for each retailer as the Return Material Authorization process is complex.
- Delivery: customers may use different delivery companies. The management system must consider delivery requirements in the contract.
- Environmental: anti-static and dust free are requirements. For mobile phone maintenance the available radio signal strength is a requirement.
- Logistics: the forecast requirements need to be defined by the material planner and suppliers which is normally a multi-destination air-land transportation supply chain for global maintenance service (Li *et al*, 2005). The Enterprise Resource Planning system may be able to help, but will probably not provide the precision needed.
- Safety: safety requirements for the products but also for the staff including the moving lines, equipment, the limitation of the height and weight, etc.
- Quality: customers expect the product to be as it comes out from original manufacture, or better. The quality is measured by the repeat return rate but continuous improvement and high frequency upgrading in the product provide opportunities for customers to question quality.
- Warehouse: the hardware and software requirements for the warehouse management need to meet the customer requirement that their products will not mix with other competitor or faulty products.
- Technical: requirements for the repair technique and instructions for the repair engineer on each product, the customer will need technical support as the products are complex. (For these products the no fault found rate is around 30%).
- Equipment: new product introduction must also include new repair equipment requirements and the technician skills requirements.
- Information system: the basic system includes the Enterprise Resource Planning and the Return Merchandise Authorisation system. ERP system to control the material and goods in/out. RMA system to keep the maintenance repair record and generate the reports.
- Regulation: the different global locations each have different regulations. These may also come from the customer requirements, such as ISO9000:2000, the customer will normally prefer to deal with an ISO certificated company.
- Financial: through the repair reports, the maintenance service centre can claim the cost from the Original Equipment Manufacturer, Customer or End User. The incorrect financial reports will cause transfer delay which may cause a financial crisis in a small medium maintenance service centre.

4 Data Collection

To identify the stakeholders in the high technology electronic maintenance service industry, the authors investigated the operations of 4 separate global companies. In-depth personal interviews comprised of open-ended questions were conducted in each firm. The executives were selected from operations, senior management, and customer relations because each of these areas could have an impact on requirements in the maintenance service company. The respondents held titles such as general manager, department leader, service programme manager, customer service relation, senior engineer and technical support. Ten executives were interviewed about a broad range of service requirements issues (e.g. what they perceived the requirements are and how they manage the requirements).

A Requirements Engineering process is a structured set of activities which are followed to derive, validate and maintain a systems requirements document. The process activities consist of four main activities that are performed repeatedly in an iterative fashion. These are, (Tseng *et al*, 1997):

- **Requirements elicitation:** eliciting customer needs and acquiring the voice of the customers.
- **Requirements analysis:** the process of interpreting customer needs and deriving explicit Requirements that can be understood and interpreted by people and/or computer programs.
- **Requirements tracking:** involves continuous interchange and negotiation within a project team regarding conflicting and changing objectives.
- **Requirements verification:** embodies the procedures for determining whether or not a product or process complies with a designated set of Requirements.

These steps are not all-inclusive. Many companies have additional steps and requirements. But generally the basic steps are similar across industries. The key differences are not in the names of the similar steps, but in the order, length, repetition of, reviews, and information exchanges between the steps.

To means to adopt requirements technology is not clearly described in the literature and successful implementations are hard to find. One needs to choose a process that fits the lifecycle requirements of the system, tailor that standard to fit the system's specific requirements, and then apply it. A more precise definition is the process defined by INCOSE RWG (Requirements Working Group), Figure 1. The rational steps: Capture, Analyze, Specify, Verify & Validate, and Manage the Requirements, should be followed in sequence.

[Insert Figure 1 about here]

4.1 Model of a high tech product maintenance service centre

The Return Merchandise Authorisation maintenance service centre is typically organised into departments, Figure 2: Repair Centre, Logistics, Service Programme Manager, Maintenance Information System, Administration and Finance.

[Insert Figure 2 about here]

Repair Centre

This Department is organised into: handset and motherboard repair centres. The handset repair centre carries out repair of incoming telephones. After diagnosing the handsets, defective parts are replaced by new parts in stock, the defective parts are then sent to the motherboard centre. The motherboard centre carries out the repair of parts coming from handset centre as well as defective parts coming directly from customers. This department is where the Company produces added value, repairing the handsets and defective parts. The Department has important relationships with most other departments.

Logistics

Incoming receiving, incoming check, warehousing, purchasing, material planner/controller, shipping personnel are all in this department. Logistics is also a key department in the daily activity of the Company and works closely with the other departments.

Service programme manager

Its function is to coordinate with the Taiwan Headquarter Service Programme Manager Department for all services projects development and ensure the transfer of repair knowledge and the repair service preparation goes smoothly. SPM works closed with the repair centre supporting and developing new projects, and with logistics providing forecasting information from customers.

The major customer focused processes identified are: Customer contact, receiving, repair, testing, packing, full package inspection and shipping.

4.2 Stakeholder requirements analysis method

A stakeholder analysis can identify and assess the importance of key people, groups of people, or institutions that may significantly influence the success of the activity or project. The authors modify this technique and use it to:

- Identify the stakeholders that will influence Company initiatives (positively or negatively).
- Capture the kind of requirements.
- Develop strategies to get the most effective support possible and reduce any obstacles to successfully fulfil stakeholders requirements.

This then develops a Stakeholder Requirements Analysis Matrix, Table I.

Once you have a list of all potential stakeholders consider the role the key requirements for each stakeholder must play for the project to be successful, and the likelihood that the stakeholder will play this role. The likelihood and impact of a stakeholder's negative response to the Company. Assign A for extremely important, B for fairly important, and C for not very important. Record these letters in the column entitled "Assessment of Impact." The final step is to consider the kinds of things that you could do to get stakeholder support and reduce opposition. Consider how you might approach each of the stakeholders. What kind of information will they need? How important is it to involve the stakeholder in the planning process? Are there other groups or individuals that might influence the stakeholder to support your initiative? Record your strategies for obtaining support or reducing obstacles to your project in the last column in the matrix.

5 Findings

Being a customer is about pleasure, happiness and satisfaction. In our case study the Requirement Derived Service Maintenance domain for high technology electronic product maintenance provides special needs. The Original Equipment Manufacturer has more than 50 Authorised Service Providers. The case study company is one of the Approved Service Providers owned by the manufacturer. The characteristic of their product is high technology, high value and high control needed to manage the quality and the technology. The technology needs continuing engineering change so the maintenance service environment is dynamic. The quality of maintenance is constantly challenged because the technology is unstable; there are frequent re-engineering tasks such as Operating System or firmware upgrades. This re-engineering needs to be done during the service maintenance. Such maintenance will not be included in the customer requirements but will be defined by the provider's requirements. The cost of service maintenance is an ongoing concern.

5.1 Stakeholders

The requirements should be classified by the stakeholders (Chen *et al*, 2005). In our case study the stakeholders can be distinguished as external and internal. The End-users, Customers, Co-operators, Reseller, Bank, Mother Company, Courier, Regulators, and the competitors are the external stakeholders. The Service Programme Manager, Customer Service Relation, Repair Centre, Warehouse and Finance departments are the internal stakeholders, see Figure 3. They all have different requirements for the maintenance service process.

[Insert Figure 3 about here]

5.2 Requirements management

Unlike product design, these maintenance requirements will be dynamic. The requirements in maintenance process will need to be audited continuously. For the high technology electronic product there is no scheduled maintenance programme; rather a refurbishment reengineering programme.

All stakeholder requirements will need to be combined and incorporated. The formats of requirements will be extensive and comprise many types of information format such as a phone call, an email, a document, a photo and the type of requirement could be a document, a process, equipment, an engineer or even a place/location. Customers have expectations about what they will receive from the maintenance service delivery. These expectations are beliefs about future events that, when compared with the perceived actual maintenance service delivered, influence satisfaction and assessments of overall service quality. To deal with the requirements for the maintenance service, the case study company launched a project led by the Service Programme Manager. The project team members comprised the entire set of internal customers who according the external customer requirements, generated the internal requirements.

For each category, there are lists of sub requirements. The requirements examples are shown in Table II. The project team defined the owner of the requirement item who will need to respond to this requirement, the date when it can be finished, and how it can be realised, Table III.

By using this kind of simple method, the project team can fulfil the requirements at the base level. The numbering helps to trace the requirements; the classification will limit the search area. This functionality can easily be managed by information system products familiar to most office users. The large number of requirements presents a challenge to management control. The changes will normally impact the whole process; the team need to analysis the impact of the requirements and propose a solution which needs to be comprehensive for internal and external customers.

5.3 Application and development

The authors developed system has been installed by the Company and combined with the weekly report. These have been combined with the weekly reports to reduce management time spent at meetings and deal with the various formats of the report documents provided by different customers. All customer accounts are now presented in the same format from different files created by the service account manager but maintained by all the project team member-internal stakeholders. The same format of report helps the reviewer and team familiar with the management system to jump between different customer management reports. This report and the management control table has become the standard, customer driven requirements management control table. The freeze, sorting, and filter functions of the EXCEL file are widely used to monitor the management reports. This combination can help the requirements communication between the service stakeholders. The stakeholders can easily add and manage the requirements through the authorised permit. All the maintenance service requirements have been classified in each sheet. Each sheet has a stakeholder

who checks and updates the status before the daily review meeting using the colouring system, red, yellow and green to show the urgency level (Figure 4 and 5). There is a specific owner responsible for each of the requirements. We have included the column “support by” to clarify the second owner for certain specific requirements.

[Insert Figure 4 about here]

[Insert Figure 5 about here]

6 Conclusion

The maintenance service environment across enterprise sectors is increasingly complex and differentiated. Service models now need to be adaptable. Many kinds of service and maintenance delivery models are now fully customised and regularly re-customised. The traditional maintenance service process has been specified and controlled by the manufacturer. Now service may be controlled by the Original Design Manufacturer, Authorised Service Providers, multiple Customers or users.

In some sectors maintenance service has been seen as a low priority. In high technology products good maintenance service models can provide significant business benefits by, for example, allowing reduced time-to-market in unstable technology applications and upgrading the product via service activities in the field. This service environment can provide re-furbished product to better than original performance specification or re start product life.

The requirements from stakeholders in high technology electronic product can be classified and ranked by the requirements analysis matrix, control and managed by the requirements control table. By this methodology it is possible to satisfy the stakeholder requirements and set up a customised requirements derived maintenance service process. The stakeholder and customer requirements can be managed and controlled by this requirements management technique and managed faster, more effectively and potentially cheaper. The requirements management based system can readily be combined with conventional management reporting systems to provide enhanced functionality of the rapidly developing maintenance service domain.

References

Chen, Y. C. K., Sackett, P. J., and Tang, S. J., Research in Requirements Management: The Emerging Maintenance and Service Sector Application, *2nd Conference of Crisis Management*, 2004, **1**, pp. C1-5. Taiwan, R.O.C., ISBN 0864123076.

Chen, Y.C.K. and Sackett, P.J., The Stakeholder and Customer Requirements Analysis in a High Technology Product Maintenance Service, Design methods, theory, evaluation, *Proceedings 3rd International Conference on Manufacturing Research*, ICMR 2005, 6-8 September 2005, Cranfield University, United Kingdom, ISBN 1861941226.

Cragg, W., Shareholders, Stakeholders and the Modern Corporation, *Policy Options* (December), pp. 15-20, 1996.

Cragg, W., Business Ethics and Stakeholder Theory, *Business Ethics Quarterly*, 2002, **12**(2), pp. 113-142.

Freeman, R.E., *Strategic Management: a Stakeholder Approach*, 1984 (Pitman-Ballinger, Boston).

Freeman, R.E., *A Stakeholder Theory of the Modern Corporation*, Thomas Bauchamp and Norman Bowie, *Ethical Theory and Business* (5th edition), pp. 66-76, 1997 (Prentice-Hall, Inc.).

Hooks, I.F., *Managing Requirements*, published in issues in NASA Program and Project Management, 1994. Available online at: <http://www.complianceautomation.com/papers/ManagingRequirements.pdf> (accessed 25 Feb 2005).

Li, K. P., Ganesan, V. K., and Sivakumar, A. I., Synchronized scheduling of assembly and multi-destination air-transportation in a consumer electronics supply chain. *International Journal of Production Research*, 2005, **43**(13), 2671-2685.

Liden, S.B. and Skalen, P., The Effect of Service Guarantees on Service Recovery. *International Journal of Service Industry Management*, 2003, **14**(1), 36-58.

Robertson, S. and Robertson, J., *Mastering the Requirements process*, 1999 (Addison –Wesley, Oxford).

Sackett, P.J., Chen, Y.C.K., and Rios, J., Fabless and Global. *Manufacturing Engineer*, Institution of Electrical Engineers, February / March 2005, **84**(1), pp. 40-43, ISSN 0956-9944.

Gilb, T., *Competitive Engineering*, 2005 (Elsevier Butterworth-Heinemann, Oxford).

Tseng, M.M. and Jiao, J., A Requirement Management Database System for Product Definition. *CIRP International Symposium on Advanced Design and Manufacturing in the Global Manufacturing Era*, 1997, **2**, pp. 654-660.

Thomas, D.R.E., Strategy is Different in Service Business. *Harvard Business Review*, 1975, **53**(4), 158-165.

van de Water, H., A maintenance model for quality management. *International Journal of Quality & Reliability Management*, 2000, **17**(7), 756-770.

Yoji Akao., *QFD: Quality Function Deployment - Integrating Customer Requirements into Product Design*, 1990 (Productivity Press Incorporated).

Tables

Table I: Stakeholder Requirement Analysis Matrix

Role of Stakeholder	Name of Stakeholder	Requirements classification	Coding and Descriptions	Assessment of Impact
1.Delivery	1.1DHL	1.1.1 Cost	1.1.1.1 count by times per month	A
			1.1.1.2...	B
		1.1.2 Insurance	1.1.2.1...	C
			1.1.2.2...	.
		1.1.3 Time	1.1.3.1...	.
			1.1.3.2...	.
	1.2AMTREK	1.2.1 Cost	1.2.1.1...	.
			1.2.1.2...	.
		1.2.2 Insurance	1.2.2.1...	.
			1.2.2.2...	.
		1.2.3 Time	1.2.3.1...	.
			1.2.3.2...	.

Table II: The requirements Control table

Number	Classification	Requirement Criterion
40.01	Self Inspection Proess	Is there a documented requirements for all operators to self inspect their own work?
40.02		Is self inspection evident during every step of the process to ensure the process step has been completed correctly?

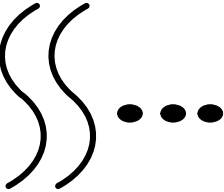
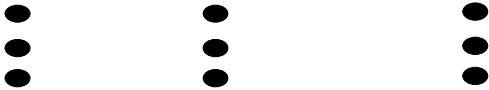


Table III: The requirements control table.

Owner	Finish date	Status	Notes and Comments
Yanger	05/12/04	Close	Create the Inspection procedure document and send a copy to the operators
Jocky	11/12/04	Open	Self Inspection training to all the operators



Figures list

- Figure 1: Requirement Engineering Process (INCOSE)
- Figure 2: Department relationships
- Figure 3: Stakeholders diagram
- Figure 4: Customized requirements management/Weekly report-1
- Figure 5: Customised requirements management/Weekly report-2

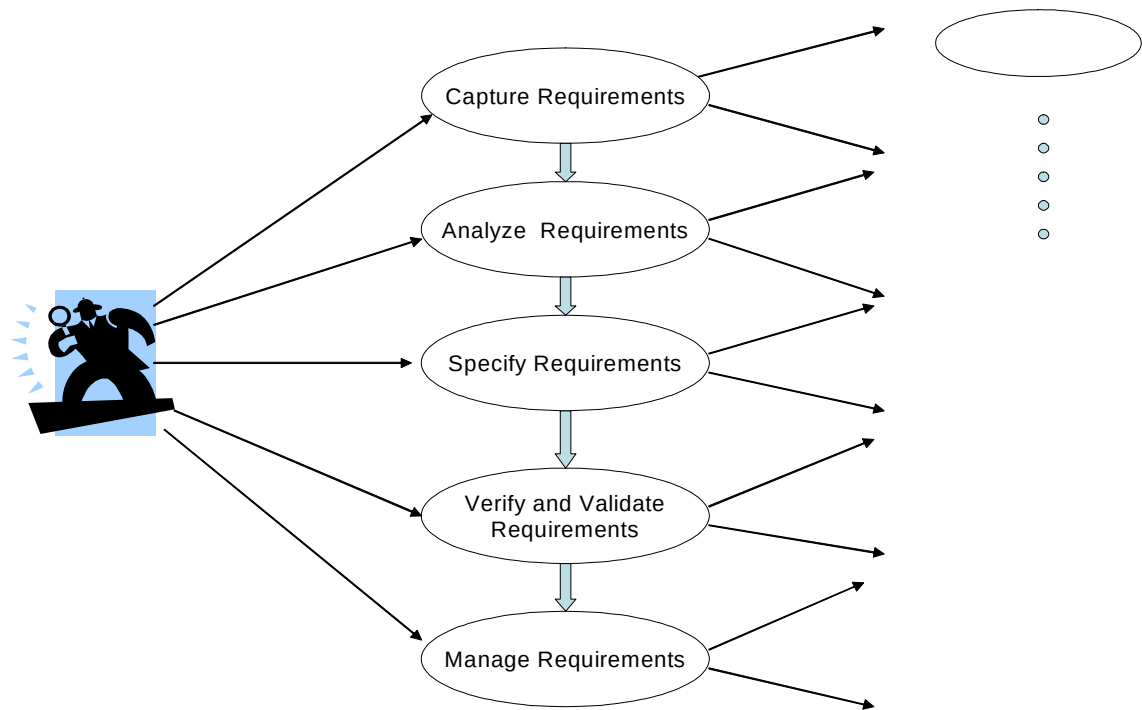


Figure 1: Requirement Engineering Process (INCOSE)

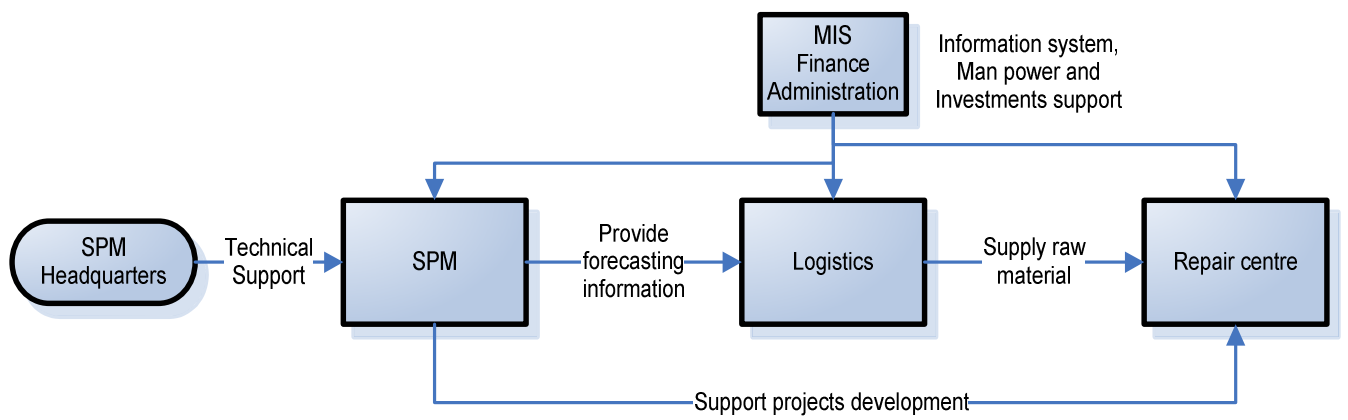


Figure 2: Department relationships

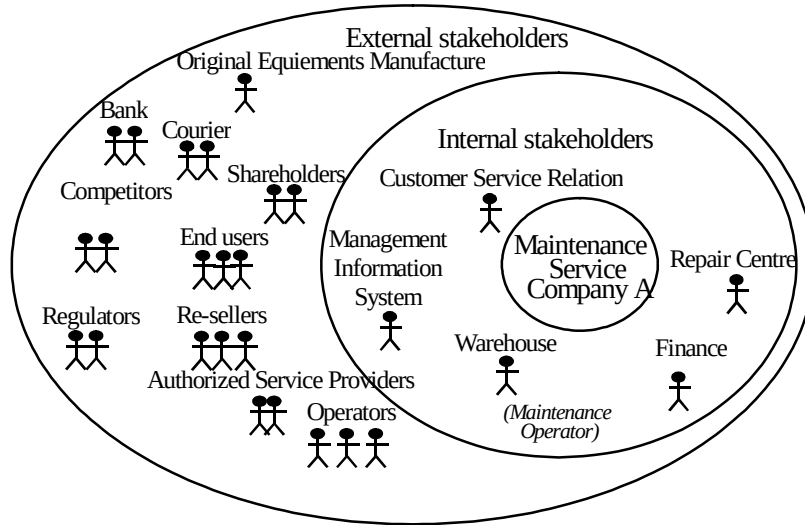


Figure 3: Stakeholders diagram

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	A	B	C	D	E	F	G	H	I	J	K	L
28		Hold Engineering										
29		Hold Material										
30												
31	Workable units	WIP										
32		Hold responses (ETECH)										
33		Total	0	0	0	0	0	0				
34												
35		Customer requirement	Daily	145	Weekly	725						
36	C500		14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	Total	TAT		
37	Typheon	Beginning balance	653	625	602	403	486	459		0.71		
38		Received units	70	95	0	220	70		455			
39		RMA adjustments								Output/requirement		
40		Shipped units	98	118	199	137	97		649	89.52%		
41		Ending balance	625	602	403	486	459	459				
42		Seedstock	1200	1200	1200	1200	1200	1200				
43		Balance	575	598	797	714	741	741				
44												
45	Details of Ending balance											
46		Awaiting scan-in										
47		Finished										
48	Waiting units	Cost Quote										
49		Hold (customer, exceptions, no event)	1	0								
50		Hold Engineering										
51		Hold Material										
52												
53	Workable units	WIP										
54		Hold responses (ETECH)										
55		Total	0	0	0	0	0	0				
56												
57		Customer requirement	Daily	32	Weekly	160						
58	M1000		14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	Total	TAT		

H < > H \ SAM \ Unit Production \ MB Production \ Logistics-Safety Stock \ Logistics-Weekly Critical Parts \ CSE \ Finance \ TAT Reports \ Repeat Return Remnrt /

Ready

Figure 4: Customized requirements management/Weekly report-1

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Type a question for help													
Times New Roman 12 B I U													
Reply with Changes... End Review...													
E6 50													
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	P/N	Description	Model	Customer	WHR 011	WIP Stock Level	Weekly Forecast	Consumption Rate	Consumption /Week	Safety Week	On the way Q'ty	Safety Week including On the Way	ETA
2	74H00487-01M	Bezel Pre-Assy,ORANGE,SPV C6	Faraday	OUK	0	0	200	100%	200	0	0	0	
3	74H00490-01M	Housing Pre-Assy,ORANGE,Rear	Faraday	OUK	0	0	200	100%	200	0	0	0	
4	99HBJ001-02	FRU,Main board,ORANGE,English	Faraday	OUK	0	0	200	35%	70	0	0	0	
5	74H00413-00M	Frame Pre-Assy,ARTIST	Artist	OUK + BP	0	100	170	90%	153	0	200	1	22-Nov-05
6	74H00483-00M	Keypad Pre-Assy,Numeric and fu	Faraday	OUK	50	0	200	100%	200	0	700	3	22-Nov-05
7	73H20029-09M	FPC Pre-Assy,KEYPAD,CAREER	Faraday	OUK	100	0	200	40%	80	1	0	1	
8	99HAD001-02	FRU,Main board,GSM/GPRS SM	Typhoon	OUK	83	231	825	35%	289	1	0	1	
9	99HY0044-01	FRU,MAIN BOARD UK,PHONE	Sundance	OUK	82	12	135	35%	47	1	0	1	
10	74H00269-13M	Key-Pad,Pre-Assy,English w/IE	BA	OUK + BP	350	230	325	100%	325	1	200	2	22-Nov-05
11	74H00415-01M	Cover Pre-Assy,Antenna,Orange,	Artist	OUK	200	90	150	100%	150	1	100	2	22-Nov-05
12	36H00356-00M	Antenna Pre-Assy,AMPHENOL,M	Faraday	OUK	300	0	200	100%	200	1	450	3	22-Nov-05
13	74H00478-00M	Keypad Pre-Assy,Soft key,Toma	Faraday	OUK	300	0	200	100%	200	1	450	3	22-Nov-05
14	74H00437-00M	Bezel Pre-Assy,HURRICANE-RO	Robbie	OUK	300	100	250	100%	250	1	800	4	22-Nov-05
15	51H00209-00	PCB ASSY,Switch Board,Blue An	BA	OUK + TM UK	230	166	365	40%	146	2	0	2	
16	72H00716-00M	Copper Foil,25*20mm,80013,CAT	BA	OUK + TM UK	0	1000	421	100%	421	2	0	2	
17	74H00376-00	HOUSING,PRE-ASSY,ALPINE	Alpine	OUK + BP	239	30	117	100%	117	2	0	2	
18	99HAW003-02	FRU,Main board,ORANGE(A2),E	Robbie	OUK	168	48	250	35%	88	2	0	2	
19	36H00225-00	Speaker, Sub-Assy, Typhoon	Typhoon	OUK	1060	665	825	70%	578	2	280	3	22-Nov-05
20	74H00242-00M	Frame,Housing,Pre-Assy,Pb-FREE	BA	OUK + BP	530	300	325	100%	325	2	350	3	22-Nov-05
21	74H00312-03	Rear panel,Assy,Orange, metall	Typhoon	OUK	1395	700	825	95%	784	2	850	3	22-Nov-05
22	74H00317-03	Front Panel, Pre-Assy, Orange,	Typhoon	OUK	1727	500	825	95%	784	2	670	3	22-Nov-05
23	74H00412-01M	Bezel Pre-Assy,Orange,Artist	Artist	OUK	200	150	150	100%	150	2	100	3	22-Nov-05

Figure 5: Customised requirements management/Weekly report-2



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