

QUALITY SCOTLAND FOUNDATION

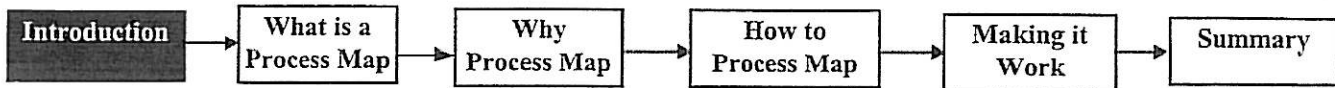


PROCESS MAPPING

This chapter has been produced by a Working Party drawn from a number of Quality Scotland member organisations. The members of the Working Party were:

Babcock Rosyth Defence Ltd
Benefits Agency
Det Norske Veritas
Glaxo Wellcome
Inland Revenue, Accounts Office Cumbernauld
Inland Revenue, Accounts Office Cumbernauld
ScottishTelecom
ScottishTelecom
The Accounts Commission for Scotland
Quality Scotland Foundation
Quality Scotland Foundation

Michelle Fraser
Bill Darroch
Andy Bolsover
Tom Colford
Ann Brown
Drew Burrows
Charles McCrossan (Chair)
Linda MacNeill
Mik Wisniewski
Nigel Millar
Angela Kelly (seconded from
Accounts Office Cumbernauld)



1 Introduction

What are the aims of this Chapter?

Whatever type of organisation you work for - large or small, private sector or public sector, manufacturing or service - the pressure to improve performance and customer service is always present. Along with this, there seems to be an increase in quality related techniques and initiatives that managers are expected to be familiar with.

And here we are about to introduce another technique - process mapping.

Process mapping is an essential first step towards process and business improvement. This chapter aims to provide an introduction to process mapping and can be used as both a reference and a learning document for those about to become involved in a process mapping project.

This Chapter:

- explains process mapping in simple, practical terms;
- describes the business benefits of process mapping;
- provides guidelines on techniques and actual practice;
- explains the importance of focusing on customer requirements; and
- gives an overview of the key elements of successful process mapping.

Process Mapping helps to identify:

- activities that must be carried out to deliver customer requirements;
- interfaces between functions, teams and departments (processes normally operate across a number of functions within an organisation); and
- opportunities for improvements in processes.

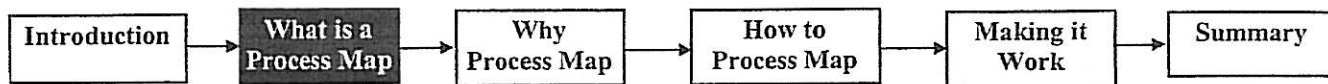
This chapter focuses on the practicalities of process mapping to help you and your organisation improve performance. It is not an academic, theoretical topic but one aimed at helping an organisation and its people do better. You can apply process mapping from the corporate level all the way down to the shop-floor level. And it works!

A review of key business processes produced a cost saving of around £0.5 million over two years from an annual turnover of around £30 million

Thomas Cork SML (a leading supplier of non-food products to supermarkets and retailers in the UK and Ireland).

By the end of this chapter you will see how you can apply process mapping to your own organisation to help improve performance.

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2 What is a Process Map?

2.1 Definition of a process

The technical description is that a process is an activity, or set of activities, which converts inputs into outputs to meet agreed customer requirements. Not very helpful is it? The diagram at Fig. 1 shows this concept.

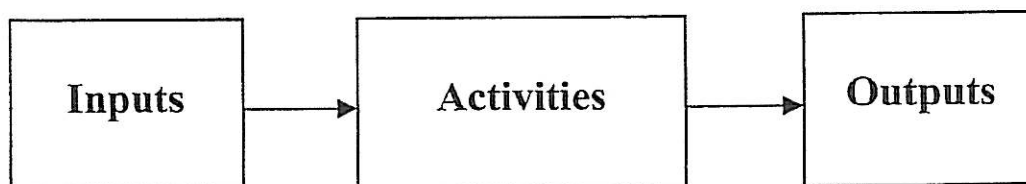


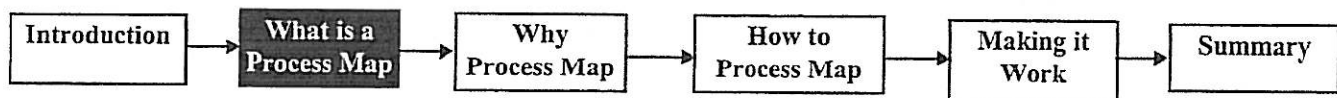
Fig. 1 A simple Process Chart

A simple example of a process might be as follows: You stagger out of bed one morning and head into the kitchen to make your regular wake-up cup of coffee. In order to do this there are a number of inter-related activities you will need to do. These activities will need certain inputs for you to produce some sort of output.



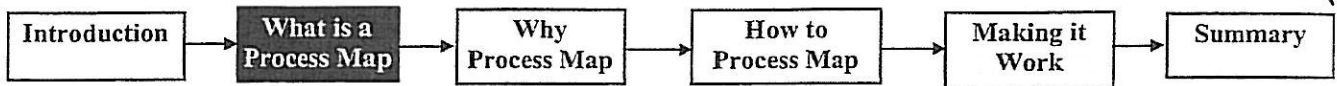
Write down the key activities for making a cup of coffee.
List the main inputs you think you would need.
List the main outputs that you would produce.

Main inputs	Key activities	Main outputs



To deliver the final output - a cup of coffee - you will need certain inputs, for example coffee, milk and sugar - you will also need resources, a kettle, cup, spoon, gas or electricity and water. To convert these various inputs into the desired output you will have to complete a process that involves a number of inter-related activities: filling the kettle; heating the water; and getting the milk from the fridge etc. So you might have:

Main inputs	Key activities	Main outputs
Cup Spoon Coffee Milk Sugar Water Kettle Power (electricity/gas)	Fill kettle Heat water Get a cup Put coffee into cup Put milk into cup Put sugar into cup Fill cup with hot water	A cup of coffee



2.2 How do we break a process down?

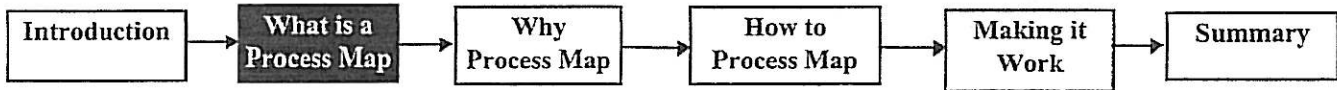
In one area of activity - making PVC paste for plastic coatings the company found that significant changes in the quality of the mix were occurring when production operators changed shifts. Further investigation of the processes revealed that the operators were not at fault - the operating instructions they were given were not clear and led to confusion. Improving this part of the process led to savings of over £2,000 per week.

***British Vita -
International producer of polymers and fibres***

To help us understand, and start to improve processes, it is helpful to break a particular process down into its identifiable elements. We do this by constructing a map of the process. By working through the following stages you will see that process mapping is not difficult; it consists of straightforward diagrams and the application of some logical thinking.

The following methods are the most common techniques used to breakdown and define a process. These are:

- Process Flowcharts;
- Process Definition Charts; and
- Process Maps.



2.3 Process Flowcharts

"Draw a flowchart of what you are doing . Until you do, you do not fully understand what you are doing. You just have a job."

Dr. W.E. Deming

A **Process Flowchart** is used to show the sequence of activities within the process. A flowchart covering the activities in our coffee example is shown in Fig. 2. This flowchart shows the activities required to make the coffee.

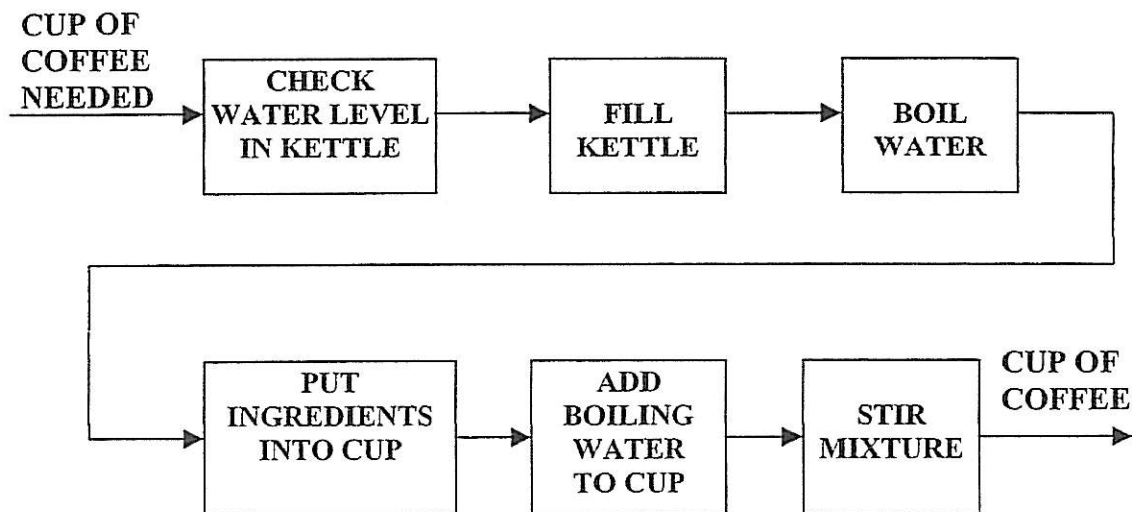
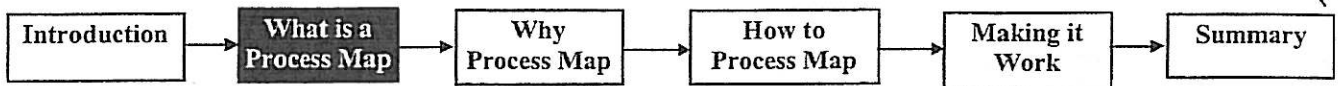


Fig. 2 Process Flowchart for coffee example



2.4 The Process Definition Chart

A process definition chart is shown in Fig. 3 and is an expansion of the simple Process Chart shown in Fig. 1.

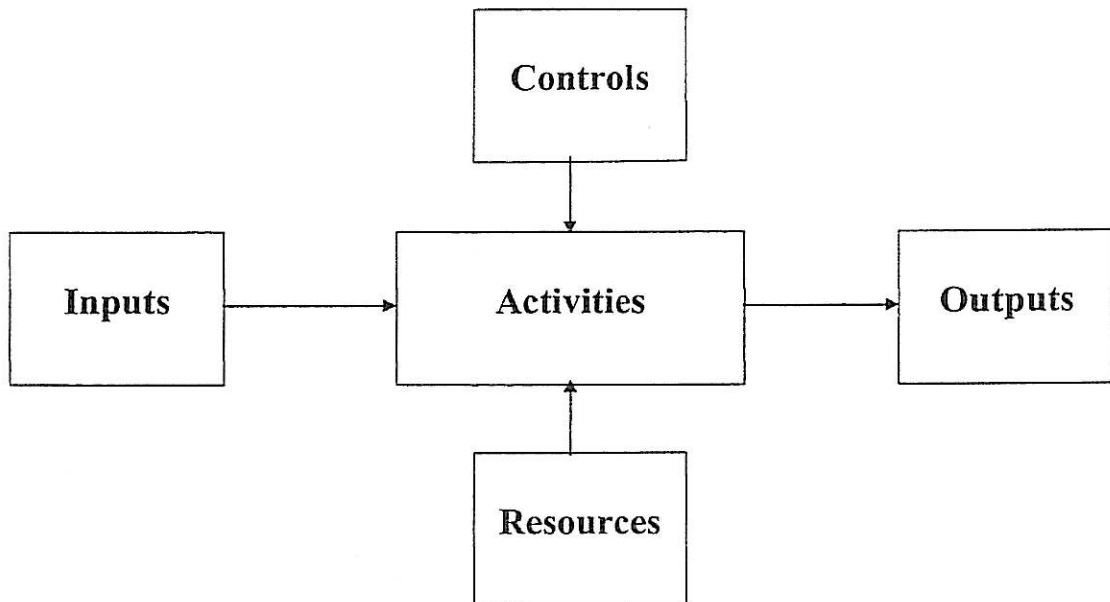


Fig. 3 A Process Definition Chart

This chart shows activities, inputs, outputs, controls and resources.

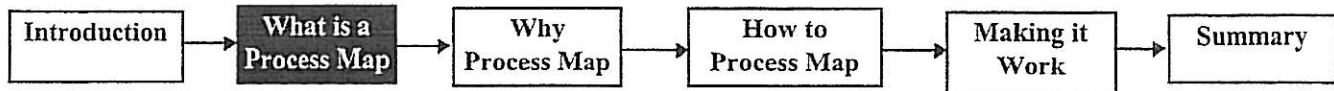
Activities are functions or tasks that make up a named process. They occur over time and have recognisable results.

Inputs are the things that are transformed or used up by the process to create the outputs. Inputs include materials.

Outputs are the results of the activities transforming the inputs. These should normally be designed to meet customer requirements.

Controls define, regulate and influence the process but are not transformed by it. Internal controls include procedures, budgets, and timescales. External controls include legislation, standards and other professional guidelines or the availability of a resource.

Resources are used to produce the outputs, but differ from inputs as they are not transformed or used up during the process. Resources will include equipment and people. Notice that in Fig. 1 we did not distinguish between inputs and resources.



Return to the coffee-making example.
Use the template in Fig. 4 to complete the process definition chart.

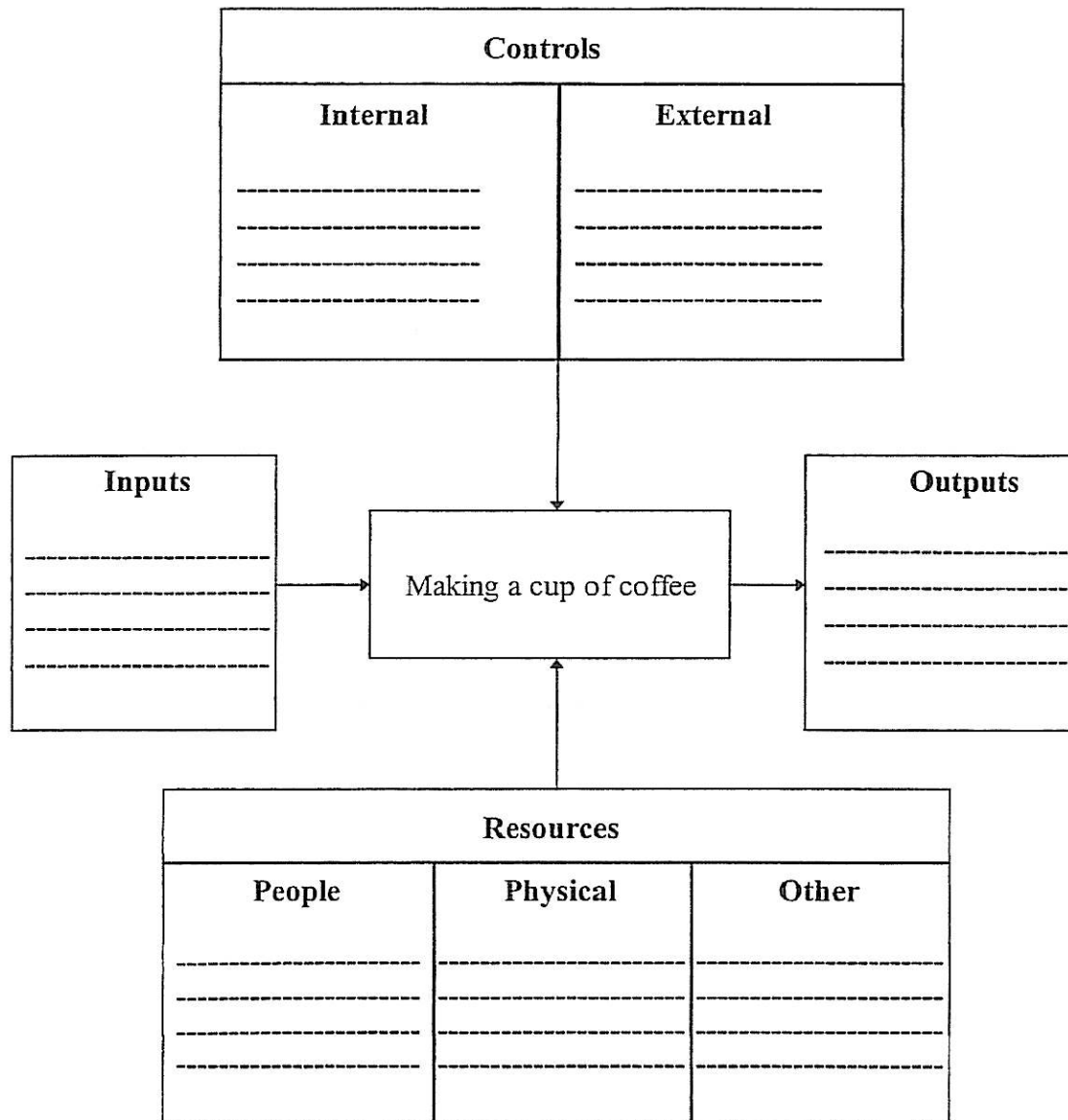
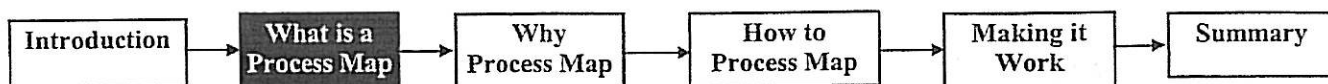


Fig. 4 Process Definition Chart Template

The process is triggered by the customer's need for a cup of coffee (you can be your own customer in this case). The output is easy to define - a cup of coffee.

The key inputs are coffee, milk, sugar and water. These inputs will be transformed (or used up or altered in some way) as a result of the process.

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Resources include someone to complete the process and physical resources such as a cup, spoon and kettle.

Controls include having a water and power supply, the housekeeping budget and a specification of the customer's requirements, for example, how much milk and sugar.

Your finished process definition chart may look something like this:

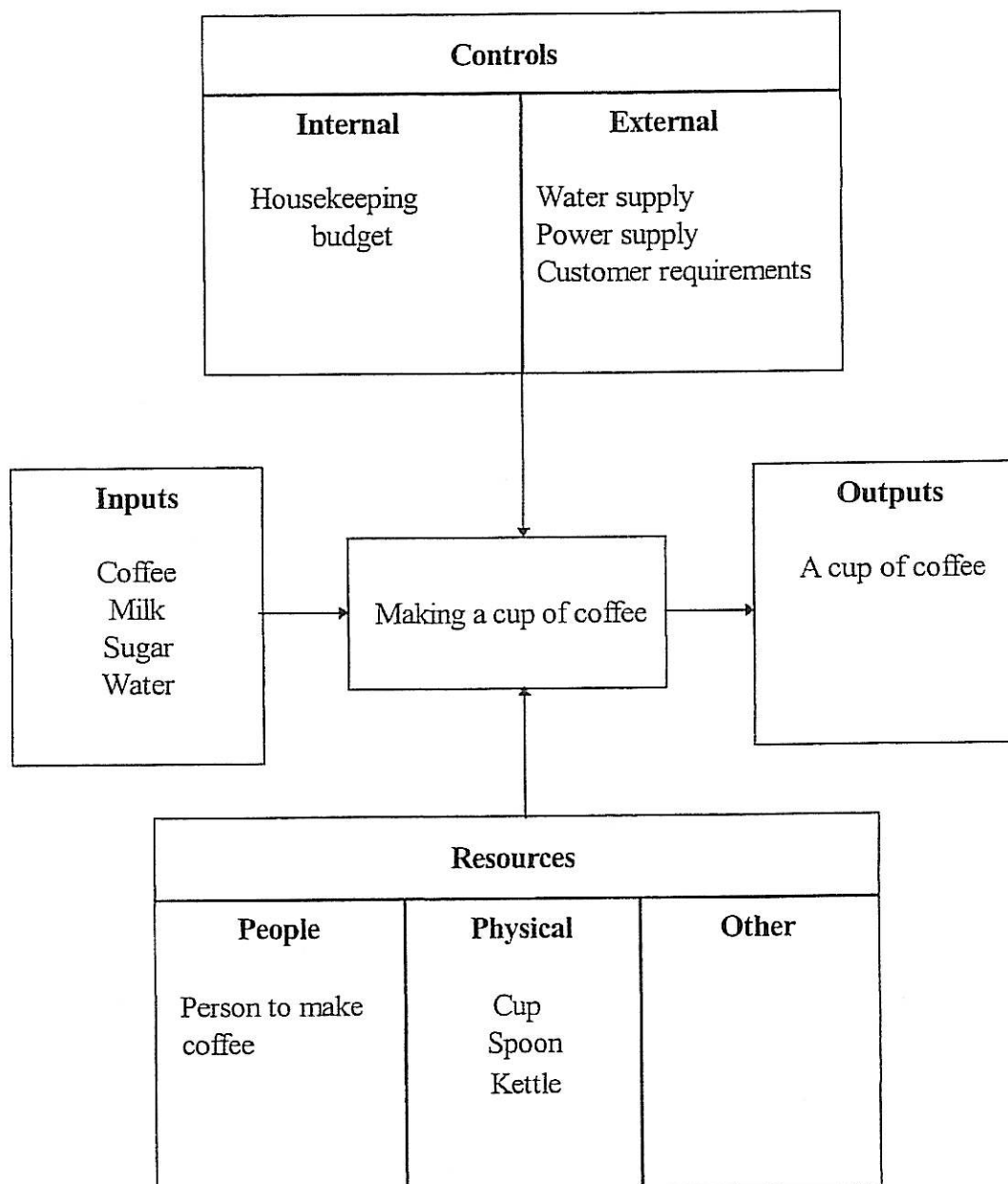
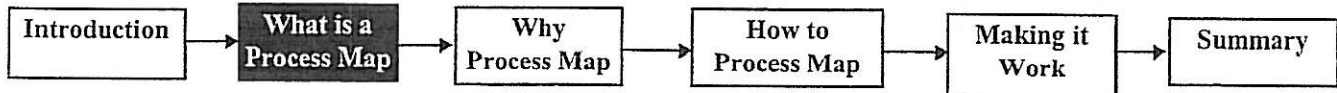


Fig. 5 A completed Process Definition Chart

This has redefined some of the inputs in the initial table on page 4 as controls and resources. We have also added additional items.



2.5 The Process Map

A Process Map combines the Process Flowchart and the Process Definition Chart and gives a picture of how people organise and perform their work. It helps them understand and clarify the sequence of activities within a process and identifies inputs, outputs, controls and resources associated with the process - all on one diagram.

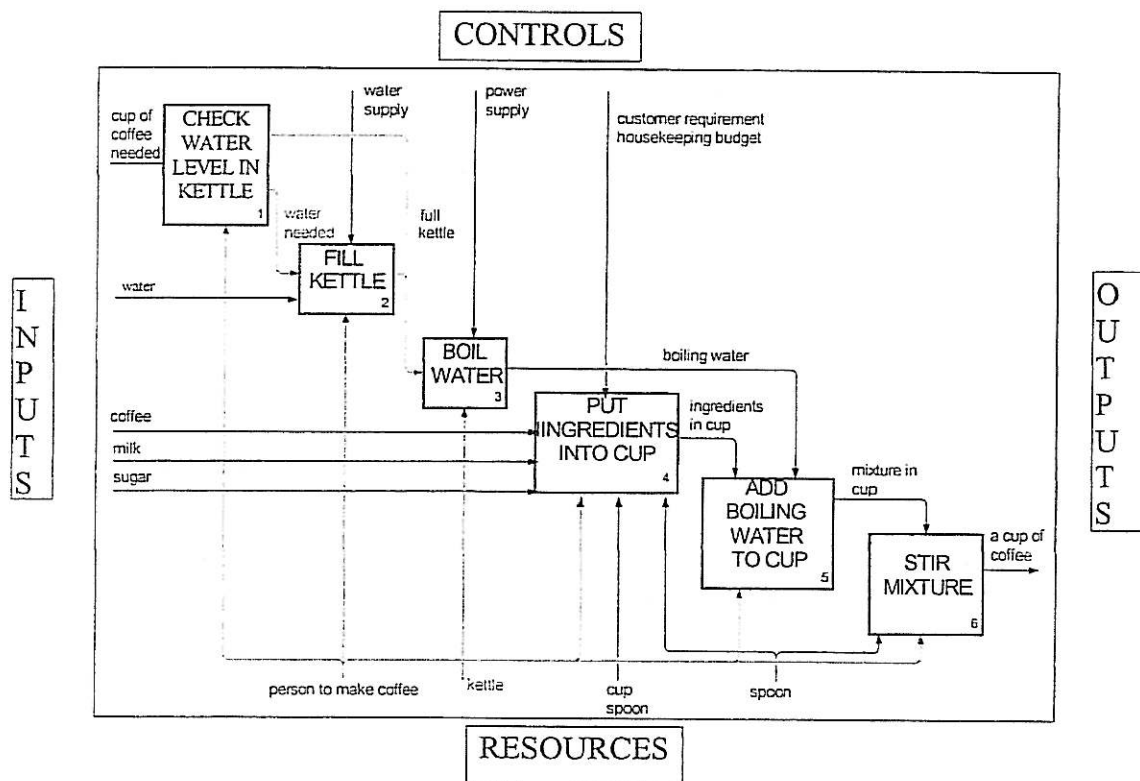
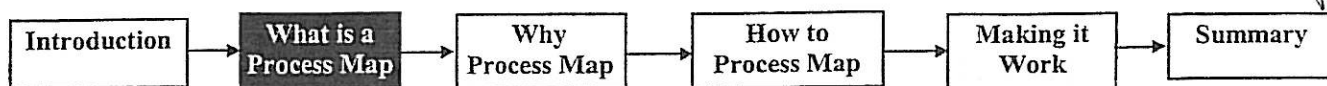


Fig. 6 A Process Map for the coffee making example

This map shows the 'whole picture' in one diagram, that is, all the information you have gathered on the process. You will see that the outputs from activities 3 and 4 become controls on activity 5. Similarly 5 on 6. In the first case the ingredients should be in the cup before the water is added, and the water should be boiled before adding to the cup. In the latter case there would be little point in stirring the cup if the mixture had not been added.

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2.6 Process Mapping in the work environment

Every organisation delivers its final product or service to its customers through a set of inter-related processes.

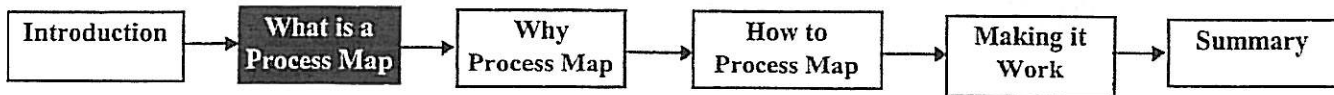
A manufacturing company, for example, will have processes to make sure:

- supplies of products and materials are available;
- a workforce is available;
- products are researched and designed;
- products are marketed and sold;
- products are manufactured;
- finished products are distributed;
- income is collected; and
- suppliers are paid.

Similarly a school will have processes that make sure:

- a workforce is available;
- resources and facilities for teaching are available;
- children receive tuition; and
- homework, and exams are marked.

Any one of these processes will need inputs and produce outputs. And any one process will consist of a set of inter-related activities. Any process will need resources and be subject to controls. Everyone in an organisation is involved in at least one process.



For your own organisation, list the main processes you are involved in.

.....

.....

.....

.....

If you work in a Personnel Department your list may include:

- recruitment;
- appraisal;
- staff regrading; and
- dealing with employee queries.

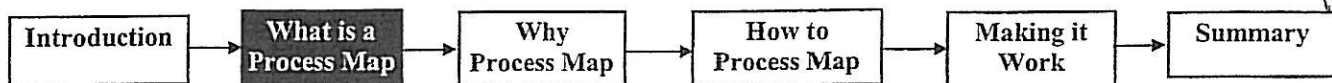
Someone in Finance might have written:

- making sure invoices are paid; and
- producing monthly summary financial reports.

Someone working in a hospital reception area might have written:

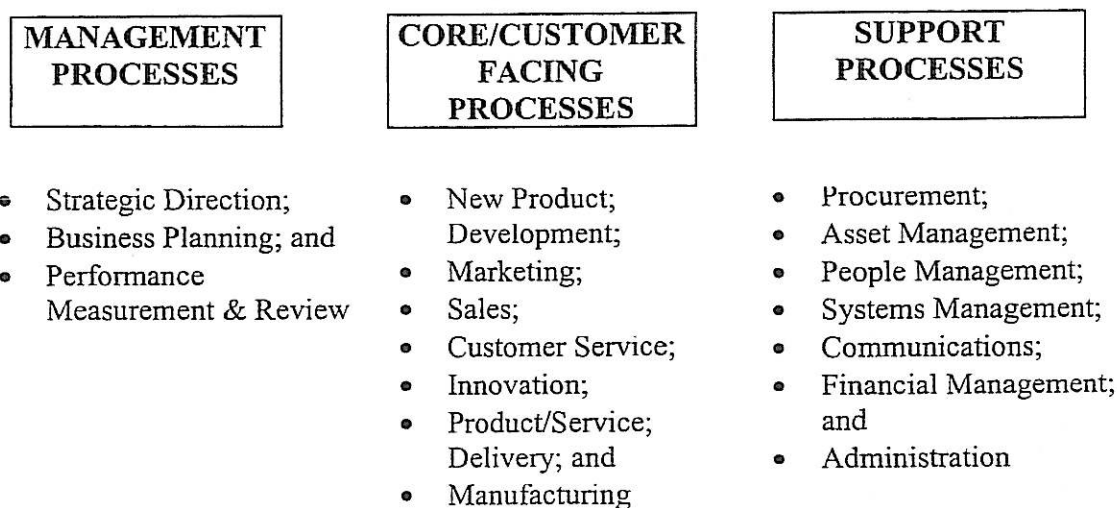
- registering the patient on arrival;
- informing the appropriate ward the patient has arrived; and
- dealing with any queries or questions.

Every company or organisation has processes. They may not be documented or mapped, but there are processes in place that make the organisation function. Often these processes have been in place for some time and the validity of each step involved never questioned.



2.7 The Process Atlas

All organisations have key processes that make up its **Process Atlas**. While organisations vary widely in size and culture they nearly all have similar top-level processes, even though the individual activities in each process may differ from one organisation to another. These can be split into groups as in the following example:



These processes cover most, if not all, of what organisations do and the detailed Process Maps describe how they go about it.

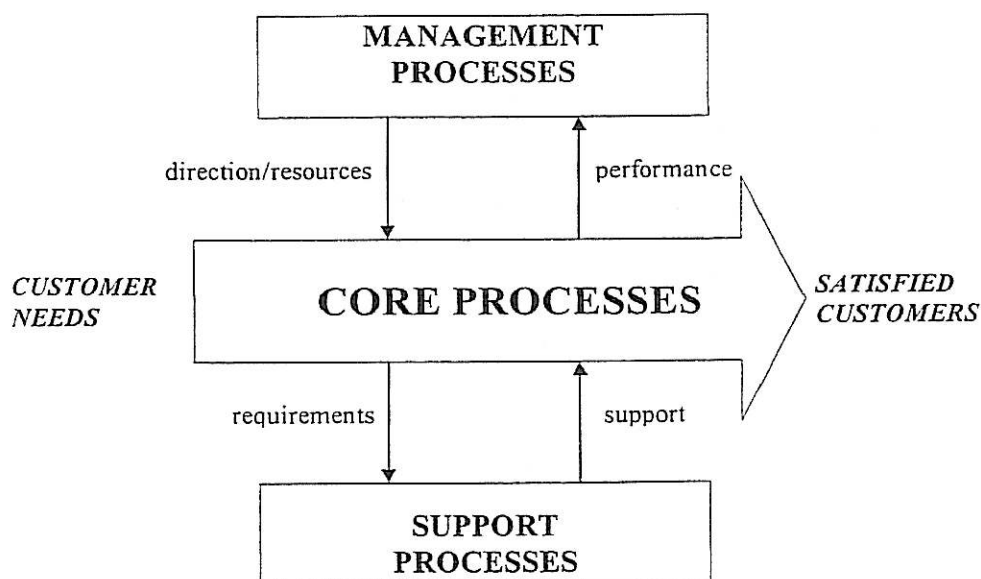
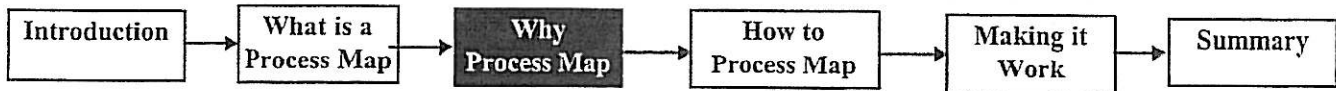


Fig. 7 An example of a Process Atlas



3 Why Process Map?

3.1 Benefits

In a competitive environment, be it public or private, companies need to be aware of how they deliver customer service. They also need to know where their resources are tied up. People involved need to look beyond their own area and see how their part affects the whole process. It is not unusual for those involved in a process, individuals and departments as a whole, to be unaware of how their role affects the overall process. Processes may be ill defined, inefficient and not wholly understood by those involved.

Activities are sometimes added to a process as a contingency when something goes wrong. These ad-hoc changes are rarely reviewed at a later stage to see if they add real value. Process mapping, and the effective maintenance of the map, helps to avoid out-of-date procedures, checklists, etc., remaining in force.

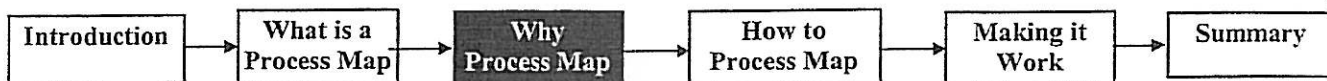
Process mapping will help your organisation :

- make sure that business processes are designed to meet customer requirements;
- review existing procedures and processes;
- identify unnecessary steps in processes;
- manage resources by identifying where time and resources are tied up;
- identify the internal and external customer/supplier chains;
- identify weak links in the customer/supplier chain;
- encourage improvements in the overall process rather than individual functions;
- become more competitive;
- re-engineer ineffective and inefficient processes;
- see how individual roles affect the process and understand the whole process; and
- as a first step towards benchmarking.

Once processes are properly understood, you can explore ways to improve them.

Process improvement might consider:

- is each activity in the process as efficient as it could be, (speed of completion, accuracy, cost)?
- can the number of activities in the process be reduced?
- is each step of the process as efficient as those of our competitors?
- can the process be improved by sub-contracting or out-sourcing some of the activities?



3.2 Customer Focus

While mapping the process, we have to answer several questions about customers:

Who are the customers of the process?

Customers may be external or internal to the organisation.

What do the customers want from this process?

A critical part of process mapping is making sure you correctly identify key customer needs. This might involve market research for external customers or a face-to-face discussion with internal customers.

How well do the existing outputs from the process match the customers needs?

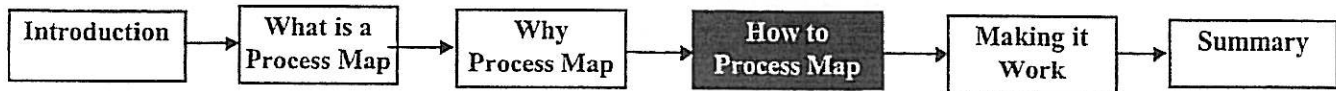
It is not uncommon for processes to be organised and managed in ways that suit the organisation rather than the customer. Make sure outputs match the needs of your customers.

How can we increase customer satisfaction with the outputs from this process?

This might involve changing the process or re-prioritising the way we allocate resources. It could also involve better communication with those responsible for the process to make sure they are aware of the customer needs.

What are our needs as customers of other processes?

The inputs to our processes may be outputs from processes carried out by other people in the business. We need to make sure our 'supplier' knows our needs.



4 How to Process Map

4.1 Process Levels

So far, this Chapter has explained the principles of process mapping with a very simple example. In this section we show how process mapping can be applied in a business context and how it can form the basis for process improvement.

Consider a typical business scenario:

Your organisation has decided to issue an information booklet about itself, its products and services and mailshot this to its customers. You might be doing this as a private sector company for marketing purposes, or as a local authority or NHS Trust hospital doing this for communication purposes.

You have decided to produce a process map to make sure the process is properly understood and planned. The first part of the process map you would probably want to produce is the flowchart, showing the key sequential activities in the process.

Before you do this, it is important to realise that you can apply process mapping at different levels. The level at which it is applied will affect the amount of detail we have on the map.

To begin with, you want the process map to be understood by top management. They are unlikely to be interested in all the fine detail, but would rather have an overview of the key activities involved in the process. You might then produce a flowchart like that in Fig. 8. This is normally referred to as a Level 1 flowchart.

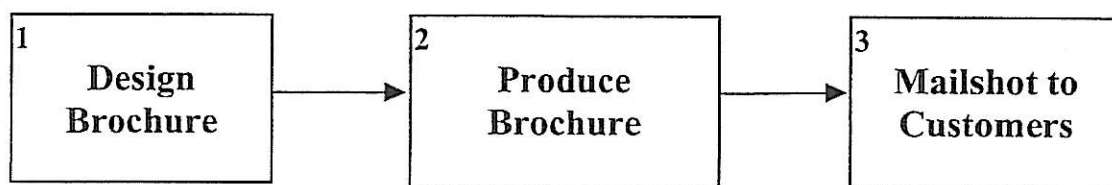
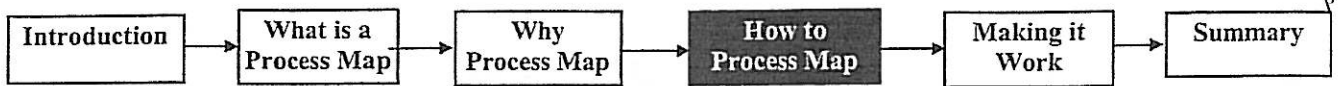


Fig. 8 Example of a Level 1 Flowchart

While this may be a useful summary for top management showing the key activities, it is not really helpful for the people in the organisation who actually do the work!



Each of the activities shown in Fig. 8 can be 'exploded' to show more detail. Fig. 9 shows this for *Design Brochure*. This is normally referred to as a Level 2 flowchart since it shows the next level of detail down from the Level 1 flowchart.

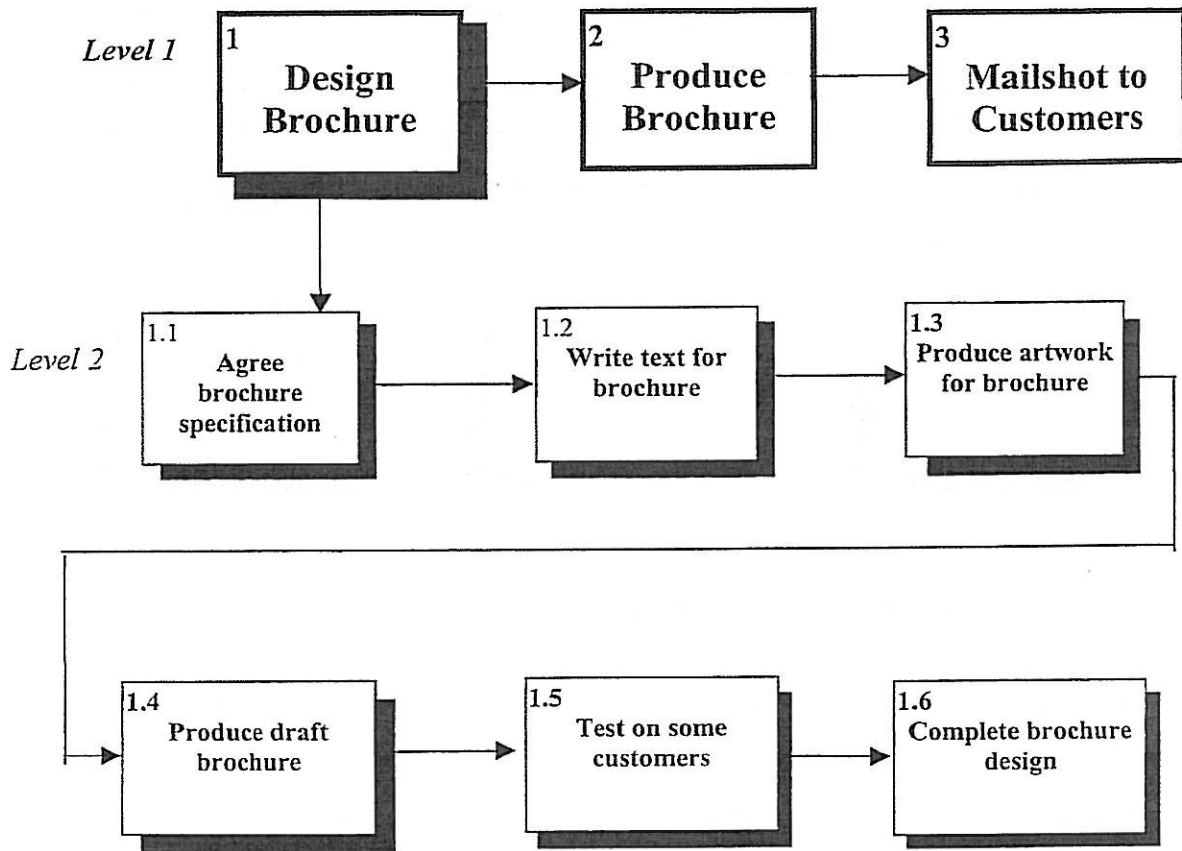
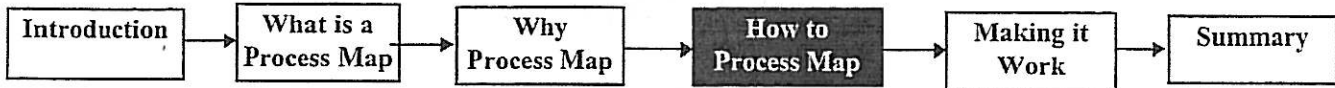


Fig. 9 Example of a Level 2 Flowchart - Design Brochure Stage of Process



When you have completed Activities 1 and 2, the information brochures will be available for distribution to customers.

Draw a Level 2 Flowchart for Activity 3 - *Mailshot to Customers*.



Your flowchart should look similar to Fig. 10 (there will be some differences depending on how you decided the mailshot would actually be organised).

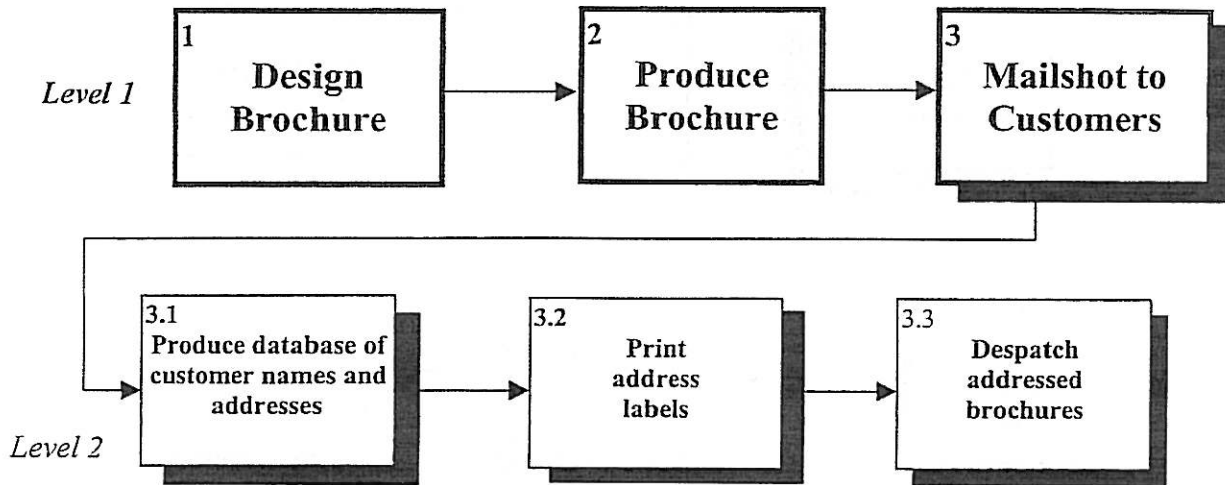


Fig. 10 Level 2 Flowchart for Mailshot to Customers

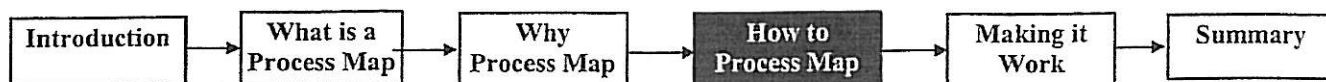
To complete the Level 2 flowchart you could repeat this for Activity 2 **Produce Brochure**.

To summarise, the Level 1 flowchart shows a few key activities for the whole process providing a process overview. A Level 2 flowchart breaks each of the Level 1 activities into more detail. You could produce a Level 3 flowchart (and Level 4, Level 5 etc.) in exactly the same way. Each further level would show more and more detailed activities in the process.

Exactly how many levels you include would depend very much on who was going to use the flowchart. The manager responsible for the **Design Brochure** stage of the process would find the Level 2 flowchart useful. The graphic designer who was part of that manager's design team and had been delegated to take responsibility for Step 1.3 **Produce artwork for brochure** would want a Level 3 flowchart which showed this activity in yet more detail. At the same time, the graphic designer would want a Level 3 flowchart only for the design part of the process.

In other words, you can tailor the process flowchart to the needs and responsibilities of the person who will be using it.

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4.2 Process Definition Charts

You will remember that the other diagram we used in process mapping was the process definition chart - inputs, outputs controls and resources.

You can develop a process definition chart for any of the activities at any level, although the detail of what goes into each process definition chart will vary. Fig. 11 shows the process definition chart for activity 3.2 in the Level 2 flowchart in Fig. 10.

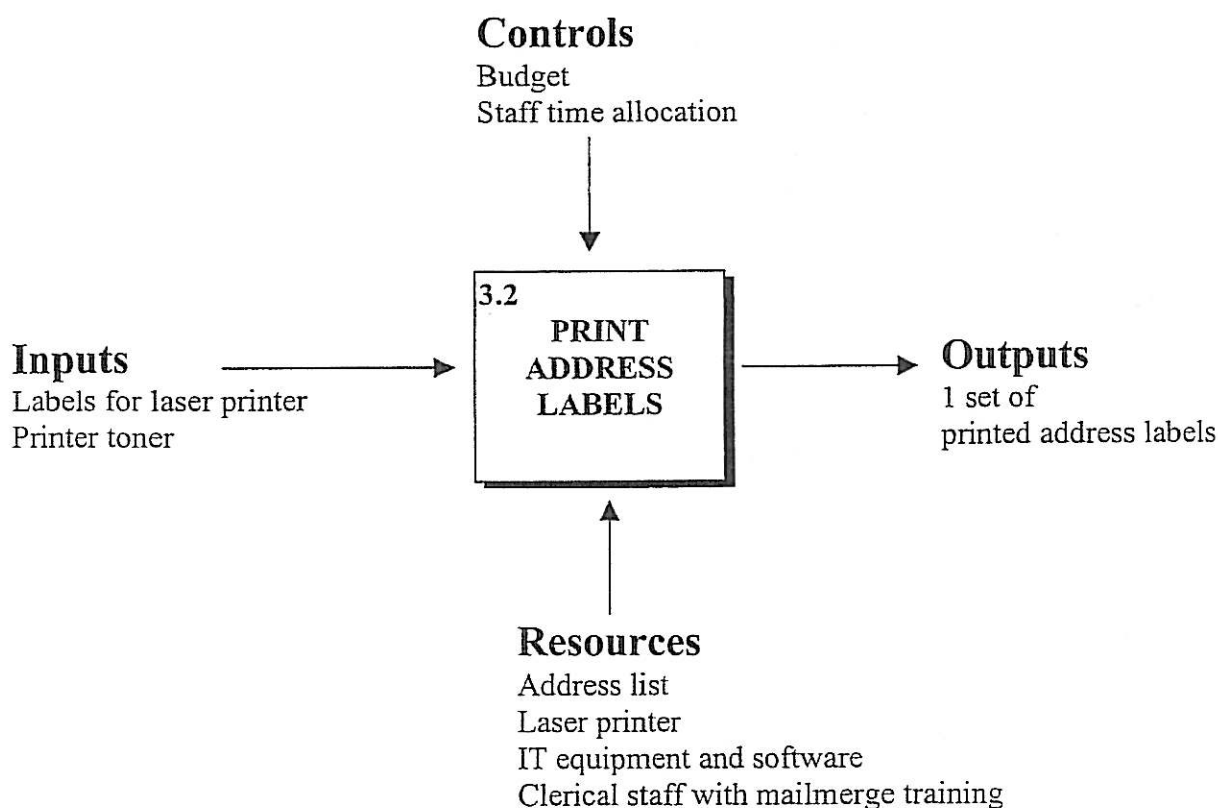
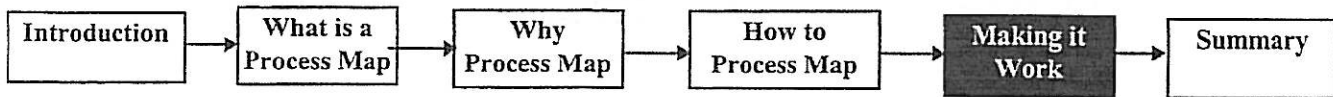


Fig. 11 Process Definition Chart for Activity 3.2 in Fig. 10

You can develop a process definition chart for each of the activities in the process. These charts will help you make sure:

- you have clearly understood and specified internal and external customer needs;
- you provide the necessary inputs and resources for each activity in the process; and
- the staff responsible for a particular activity know what is expected of them.



5 Making it work

5.1 Who will make it work ?

Roles and responsibilities need to be clearly defined for those involved in process mapping:

The Process Owner Sponsor is a member of the management team with the authority to change the process. Roles include:

- providing direction to the Process Team Leader;
- providing resources and initiating the process mapping project;
- removing initial obstacles to the project;
- acting as decision maker for the project;
- maintaining communication and co-ordinating cross functional issues;
- assessing the findings of the Process Mapping team; and
- leading the process improvement effort.

The Team Leader will manage the resources for the process mapping project and make sure all parties are kept informed. Roles include:

- managing the resources on a day-to-day basis;
- negotiating with the project sponsor for appropriate resources;
- overseeing meetings and the administration elements;
- understanding the cross-functional connections within the organisation and with other processes; and
- documenting the process map.

The Team Leader should be from an area of the organisation that has a major involvement in the process or, from the area most affected by improvements.

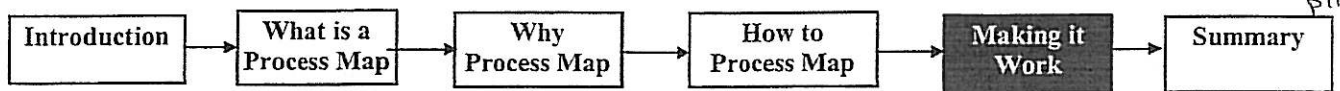
The Process Team should include:

- a member of each area affected by the process to be mapped;
- a specialist in the process;
- a line manager in the process;
- an internal supplier to the process; and
- a customer of the process.

Including people involved in the existing process will aid the identification of problems, the feedback of information and encourage acceptance of recommended changes.

The Team Facilitator/Consultant is someone who:

- understands process mapping and makes team members aware of concept and requirements;
- has good project management skills and focuses the team's efforts;
- provides support to the Team Leader; and
- creates an open, honest and relaxed atmosphere.



5.2 Key success factors

Organisations and companies that have successfully implemented Process Mapping stress the following :

Management commitment

Senior leaders often voice their commitment but many fail to appreciate the importance of their contribution. They need to communicate and continuously encourage the use of Process Mapping techniques throughout the organisation.

Effective communication

It is important from the outset to explain the reasons for introducing any new concept. It must be made clear that this is not the latest flavour of the month and there are sound business reasons for going down this road. It is important to let employees at all levels know that this is about improving processes to improve Customer Satisfaction, People Satisfaction and ultimately Business Results.

Systematic approach

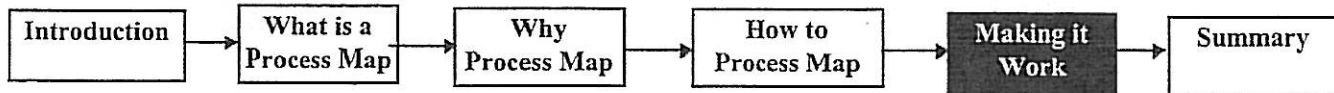
The introduction of the techniques needs to be planned, staged and timetabled. It is not advisable to rush off and begin to process map in every area of your organisation. Start small and use 'early adopters' or 'champions' of the techniques to lead the way.

Adequate training

The right people need the right training at the right time. There are three distinct groups who need trained: the Facilitators introducing the concept, the Operational Managers who will embrace the theory and those who will analyse the process.

Full understanding of terminology

It is crucial that any training awareness or instruction material is devoid of jargon. The terminology of process mapping can appear very confusing, but it does not matter which words are used, as long as everyone in the organisation understands them.



Allow adequate time and make sure suitable facilities are available

It is important that managers make and allow time for process mapping. If they make time now, it will pay dividends later. Good facilities will contribute to the effectiveness of the mapping exercise.

Make sure ownership is accepted and understood

It is not enough to involve only managers and process owners. Successful implementation must involve the people who carry out the process. These are the people who will come up with the ideas to improve the process and so it is essential that they 'buy in'.

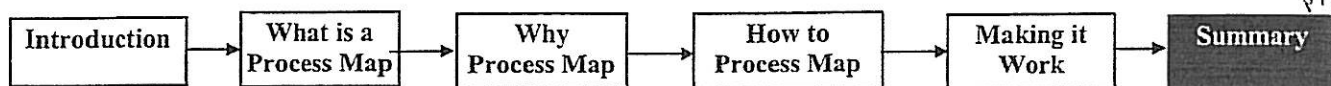
"Tell me and I will forget. Show me and I will remember. Involve me and I will understand"
(Anon)

Sustained commitment to change

Too many managers in their frustrated efforts to improve quality expect early favourable results and if these are not forthcoming, lose interest and revert to traditional short-term quick fix solutions. It is important to realise at all levels that although efforts may be painful, time consuming and difficult, managers must sustain the commitment to implement and change the processes.

Quick wins

Publicise and celebrate successes. The champions will want it to work and will communicate early positive results to the organisation. Share best practice and others will see the benefits.



6 Summary

Though processes are central to their businesses, most managers are unaware of them, never think about them, never measure them and never consider improving them.

*Michael Hammer and James Charvey
(Authors of Re-Engineering the Corporation)*

By now you should be able to see how you can apply process mapping in any organisation and the uses and benefits of process mapping. You can see that a process map can be used to:

- make sure staff at all levels in the organisation understand their role in the whole process;
- make sure that you understand all the key activities required to complete the process successfully.(i.e. *have you forgotten anything?*);
- make sure we have no unnecessary activities in the process (Q: *Why do we do that?*
A: *Because we've always done it*);
- allocate responsibilities for different activities of the process; and
- allocate timescales, schedules and costs for each activity in the process.

This chapter is based on the experience of members of the Working Party. It is intended to introduce the reader to process mapping using a simple, straightforward approach. The diagrams used in our examples are based on our experience and we recommend that you draw maps and charts in a manner that meets the needs of your organisation.

The tools and techniques of process mapping and process design are many and varied. We encourage you to explore these once you have grasped the principles explained in this chapter. Every organisation, and indeed every individual process specialist, has their own ideas about how to do this. We have tried to be non-prescriptive and simply open the door to the basic principles.

A workshop has been developed to complement this chapter. The workshop is aimed at members who wish to broaden their knowledge of Process Mapping and other techniques.

**Anyone interested should contact Membership Services at Quality Scotland:
Telephone 0131 556 2333 or Fax 0131 556 7111**

Happy Process Mapping!

Appendix

References for further information

- *Business Process Re-Engineering* by Johanson McHugh, Penbury, Wheeler.
- *Business Process Improvement, An Approach to Implementation* published by TQM International Ltd. ISBN 1 899566554
- *Business Process Improvement, Your Handbook* published by TQM International Ltd. ISBN 1 899566503
- *Process Mapping How to Re-engineer Your Business Processes* by V. Daniel Hunt, published by John Wiley 1996 ISBN 0471132810