The Institutionalisation of Environmental Management at Hewlett-Packard Ltd.

Engineering Doctorate Thesis by Portfolio

Volume II

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Introduction

Part Four

Progress Reports

Introduction

Previous parts of this Portfolio have described the research project at Hewlett-Packard in a manner which reflects the conclusions of a four year research project. Throughout the four years a series of seven, 6-month progress reports were submitted. Together, the reports, show the progression of research ideas over time. They are presented in reverse chronological order in order to portray the most recent thinking first. In order to understand the findings of this research work it is not necessary for the reader to read this Part of the Portfolio.

Perhaps more importantly, the reports do show the rigorous structure of the Engineering Doctorate "progress review" programme. Throughout the project the researcher was encouraged to identify the critical aspects of the research such as;

- the contribution to existing literature,
- the methodological design and concerns,
- the practical results and findings,
- the definition of "institutionalisation", and
- the wider implications

in order to ensure that the project was on-track. The progress review programme followed in this case also added to the validity of the insider-based research strategy.

The reports do contain information and plans which did not eventually feature in the research as described in Volume I. This is inevitable in such a study and although nothing significant has been omitted from Volume I, following every research avenue described in these reports would have added unnecessary complexity to an already detailed case-study.

42 Month Report

Part Four - Progress Reports

Forty Two Months

Overview

This report is the penultimate progress report for an Engineering Doctorate Programme in Environmental Technology. The doctorate, run by Brunel/ Surrey Universities, is being carried out by Zoe Jackson at Hewlett-Packard Ltd (HP).

The first section of this report takes the content and plans of the previous six month report and describes progress in two main areas. Specifically in the last six month report, three hypotheses were described. Since then, following more detailed analysis, these have been superseded by a much better understanding of the overall research contribution and concepts. This is shown diagramatically and explained in more detail.

A detailed plan for the contents of the portfolio also emerged in the last six months, this is explained in the second section of this report. Linkages to the aforementioned research contribution and concepts are also described. The remainder of this report is then structured according to the portfolio sections and a situation statement for each described. Plans for the next period of research are provided in the final section.

Part Four - Progress Reports

Forty Two Months

Section One -

Progress since the previous six month report.

In order to provide some continuity, the first section of this report describes progress toward plans described in the previous six month report.

1.1) Development of Research Hypotheses.

Section one of the previous six month report outlined three research hypotheses. These were defined as:

Hypothesis A. *The Institutionalisation of environmental management requires organisational change over time.*

Hypothesis B. *Environmental management may be institutionalised only if environmental responsibility is acknowledged at personal, functional and organisational levels.*

Hypothesis C. *At Hewlett-Packard Ltd, institutionalisation of environmental management can be achieved using the company's Quality Maturity tools and systems.*

After further consideration, it became evident that these hypotheses were useful but (when answered) would not accurately describe the research contribution. On several occasions it had been noted that the research methodology used in the project at Hewlett-Packard was a source of significant contribution to knowledge but, in the hypotheses, the methodology had been de-emphasised. In an effort to address this imbalance and describe the intention of the research in more accurate terms, the core concepts of the research and linkages between them were identified. Section 2 of this report describes these core concepts in more detail.

1.2) Planning the Portfolio Contents.

A rough portfolio plan was included as an Appendix to the last six month report. This plan was due to be ratified in a progress meeting in December 1997. However, prior to that progress meeting, a much more detailed plan for the portfolio was developed which has since been approved and is now used as a framework for all research activity.

The new portfolio framework is described in Section 3 of this report. This description shows how the layout of the portfolio takes the reader through the research project in a logical order whilst managing to portray the organic, iterative nature of this research project. The remainder of the report is then structured in line with the portfolio plan, describing the current situation and future plans for each section.

Section Two -

Core Research Concepts

As aforementioned, recent research documentation has centred around three research hypotheses. Over the last six month period these have developed into "core research concepts". The following sections describe the background to these concepts in general terms. Although the general contents of related literature is referred to in these descriptions no direct reference is made to specific authors or journals. This more detailed explanation can be found in the literature review section of the portfolio.

2.1) Core Concept No. 1 - Organisational research suffers from an increasing gap between theory and practice.

The first core concept of this research is related to the nature of historical and current organisational research. Literature shows[1] that research directed at understanding organisations has more frequently been carried out from an "outsider's" perspective. The majority of organisational researchers have treated the organisation as an objective entity which can be measured and analysed in a manner similar to physical objects. The resulting literature has been somewhat clinical and dry; interpretations are generalised for mass audiences, but bear no semblance to the specific context in which managers operate. This has frustrated practitioners within organisations, who find difficulty relating their knowledge of organisations to the accounts provided in popular literature.

There have been examples of research which has been conducted from the "inside" of organisations, many of which fall under the banner of action research. Action researchers accept the inevitable fact that the researcher will influence the organisation under review and, in fact, capitalise on this to create and stimulate organisational learning and change. As a result, these researchers do not, and could not, treat the organisation as an entity which can be objectively measured. In this type of research, theory is developed along side practice and hence it is argued that the findings are more relevant both to the organisation under study and others in similar operating contexts. Despite these advantages, action research is not a commonly used methodology in organisational research today. Lack of funding is one possible explanation for this, action research projects are expensive for all parties, both in actual costs and time. It is also possible that organisations may not want to have their innermost secrets shared with a researcher no matter how 'integrated' the researcher is.

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[1] For more detailed information on the literature supporting these research concepts please see the literature section of the portfolio.

As a result, it is recognised that there is a separation of theory and practice in organisational theory and related disciplines.

CONTRIBUTION - The research at Hewlett-Packard aims to determine the advantages and disadvantages of an action research project in a modern business environment and hence contribute to the debate surrounding the separation of organisational theory and practice.

2.2) Core Concept No. 2 - There exist different and incompatible approaches for achieving sustained corporate attention to environmental management.

Since this research is about the institutionalisation of environmental management, the second core concept is related to the intent and tone of other research relating to environmental management or environmental issues with organisations. Environmental management is a relatively new discipline within organisations and consequently in the literatures also. There is a broad range of literature which could fall under the auspices of environmental management ranging from "environmental" articles in a broad range of management and scientific journals, to dedicated environmental management publications. Within this range there appear to be some common themes.

Firstly, as aforementioned with other research disciplines, environmental management researchers have tended conduct their research from an outsider's perspective. There are very few empirical researchers looking at the topic of environmental management, let alone any in depth participative research projects.

Secondly, the messages in the literature on environmental management tend to fall in one of two camps. The first is that in order for a company to become more 'environmentally responsible' people in the organisation should adopt green values and apply them to their work activities. In that way, the 'environment' becomes a part of the company culture or way of doing things. The second type of message in the environmental management literature is more structural. It is frequently recommended that a firm should integrate environmental management into their business strategy or processes. The intention of these two approaches are the same; that is to establish a sustained commitment to environmental management but the process appears to be different. These are invariably extreme positions, some authors recognise that a dual approach is most suited with efforts in both areas. It is this split of approaches to environmental management which represents the second research concept for the project at HP.

CONTRIBUTION: - This research questions the previous models of environmental management change provided in the literature and gives a more comprehensive indication of the levels of organisational change required for the institutionalisation of environmental management.

2.3) Core Concept No. 3 - It is increasingly recognised that effective organisational change needs to be stimulated rather than forced.

The third research concept is related to the mechanisms which create and sustain change within organisations. Literature on how to achieve organisational change is often based on, so called, top-down programs where a select few people decide that the organisation needs to change for one reason or another. Often, people resist forced change eventually demonstrating resigned compliance behaviour. In order to be successful though, change requires understanding before it can be embraced.

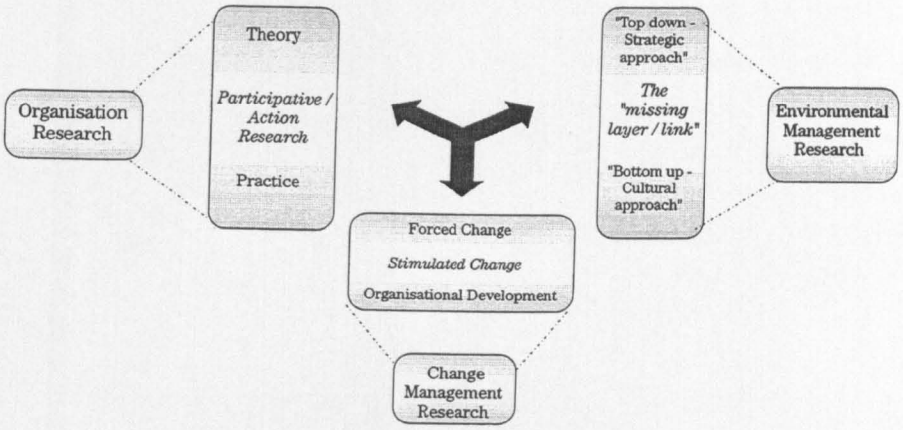
Some authors recognise this and suggest that change can be stimulated. In this way employees understand the motivation for the change through experience and actually change voluntarily. This type of change is reported to be more long lasting but inevitably more difficult to achieve. The process of stimulating rather than forcing change is the final concept affecting this research.

CONTRIBUTION: - This research uncovers some practical insights from stimulating an organisational change program, contributing to this increasingly applied technique for successful organisational change.

Core Concepts - Summary

The research at Hewlett-Packard contributes to all three of the concept areas described above. For each concept there is an associated research question which aims to contribute to the research debate in that area. It is the intention of the research at Hewlett-Packard to answer these research questions, it is in these areas where the contribution to knowledge of the research lies. By studying the organisation from the inside and applying action research methods - the project contributes to the understanding of organisations. In particular, in a way which addresses the gap between theory and practice. By taking part in the development of the company's environmental management programs - the project contributes to the growing understanding of environmental management in organisations. Finally by assisting in the implementation of an environmental change program - the project contributes to the understanding of stimulating, as opposed to forcing, organisational change (since this is the approach taken with the project). The core concepts are represented in Figure 1.

Figure 1. Research Contribution - Core Concepts



Section Three -

The Research Portfolio

In order to document the findings and process of this research in an appropriate way, and to guide activities over the last period of the research, a portfolio plan has been developed. This section describes the portfolio plan and the rationale behind the chosen structure. Previously, elements which "should be included in the research portfolio" have been listed but there has been no overall structure or plan for how these separate elements link together. This portfolio plan aims to link all the elements of the research at Hewlett-Packard into a comprehensive structure.

3.1) Portfolio Plan

Significant difficulty was encountered in developing this plan, specifically in deciding the order in which to construct the elements of the portfolio. Since the research at HP employs action research, many of the findings were part of an iterative research process - the outcome of which could not have been planned at the outset of the research. Literature was continually reviewed, and the review process refined, throughout the duration of the research not just at the beginning. The research methodology was also refined over time as learning occurred in the research process. The question of how to relate all of these ever changing facets of the research process into a logical readable document was very challenging. The structure outlined below represents one attempt to overcome these challenges and to structure the research documentation, although others at this stage are still under consideration so as best to capture and present the emphasis of the research findings.

The portfolio is to be divided into three main sections. The first of these is currently referred to as the "Pre-Action Analysis". Essentially, this section describes the project, prior to the commencement of the research. Included in this section is an outline of the background of the project, how it came into being and the research brief as stated at the outset. This section also describes the "players" involved in the project, namely the researcher, the client organisation and also the emphasis of the Engineering Doctorate program of which this research is a part. A review of relevant literature is also included in this section as well as a description of and rationale behind the chosen research methodology. Finally, this section of the portfolio outlines the hypotheses and contribution to knowledge that the research makes. Although this section is physically located at the beginning of the portfolio it will be emphasised that most of its content was developed throughout the research process. It is simply for the ease of reading that these items are placed at the beginning of the research documentation.

Part Four - Progress Reports

Forty Two Months

The second section of the portfolio represents the core of the research (currently called the "Action Research" section). In this section the author describes the period of time spent at the sponsoring organisation, the actions taken by the researcher in conjunction with the organisation and the data collected over the research period. Initial and final conditions are described and then the events between those two conditions are reviewed in more detail.

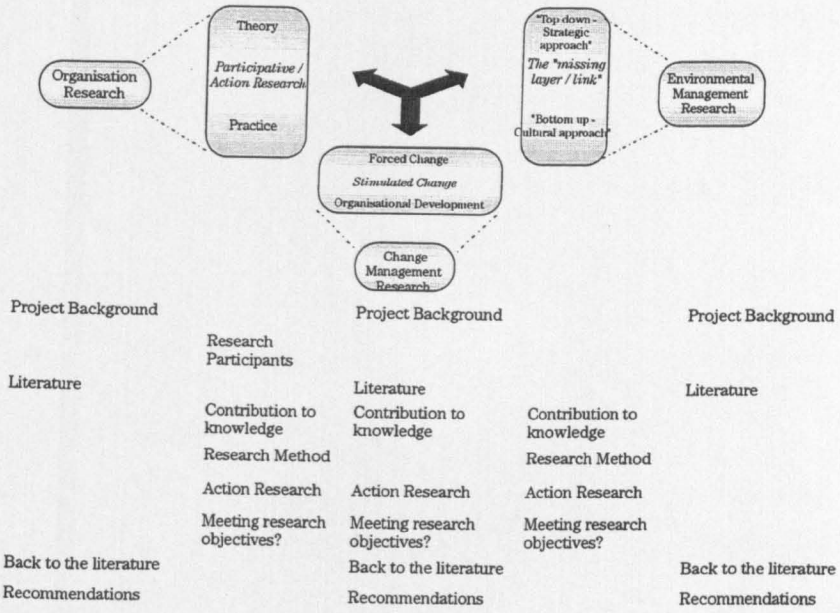
At this stage the structure for this stage of the portfolio is still under development and is due to be ratified at a supervisors progress meeting in March 1998.

It is possible that this section of the portfolio will also include all of the six month progress reports as an account of the research process over the four year period. Academic modules (related to the Engineering Doctorate program) and associated coursework are also referred to in this section, as it is impossible to ignore the influence which studying them may have had on the development of the project (equally it is just as impossible to conclusively say how they did influence it!).

The final section of the portfolio (currently referred to as the Post-Action Analysis) could evaluate both the research methods and data in relation to the literature reviewed and the research objectives outlined in the first section. Firstly, this section might analyse whether the project objectives have been achieved for the participating organisation, Hewlett-Packard Ltd. and secondly, discuss whether the project objectives have been met for the researcher. The research methods (and methodologies) would be analysed in turn and the literature is revisited in light of the research findings. The final section of the thesis looks toward the future making recommendations in terms of both the research methodologies employed to study organisations, and the theory and practice of environmental management in industry.

The research concepts described in the previous section of this report are consistent with the above portfolio structure. This can be shown in Figure 2. It should be noted that a proportion of the documentation required for this portfolio has already been written, but that the structure is outlined here for the first time in its basic format.

Figure 2. Linkages between research concepts and portfolio structure



An electronic binder system has now been set up to manage the research portfolio. All of the sections have been set up and labelled appropriately. All previous documentation relating to the portfolio sections has been copied into the binder and any new ideas are entered directly into the portfolio sections. This process ensures that all of the research documentation is now in one place, ready to be synthesised for submission.

3.2) Portfolio Progress Summary

3.2.1) Section One: Pre-Action Analysis.

The first section of the portfolio is the most completed thus far. Previous documentation exists for the Project Background, Literature Review and Research Methodology sections.

One objective for this section, from the previous six month report, was to "***Increase the amount of literature reviewed in relation to the research methodology.***"

> "Firstly, investigate the extent to which Action Research has been used to gain understanding of a change process in an industrial environment. Secondly, determine the advantages and disadvantages of this type of research for both the company and the researcher. Finally, identify common research methods used in Action Research and the process for analysing data obtained from them".

The amount of literature reviewed in this area has increased significantly since the last six month report, in line with this objective. The results of this review process are incorporated into two sections of the portfolio, the Literature Review and the Research Methodology.

Within the Literature Review section, a commentary is provided on the history of Action Research and some of the advantages in using this methodology. Within the Research Methodology section, a more detailed description of the practical implications of this method is provided. Other elements within this section are on track. In an effort to manage the remaining project time, this section has a planned completion date of the end of March. The other two sections will be completed later in the year (see next two sections of this report for more details).

3.2.2) Section Two: Action Research

The second section of the portfolio represents the core of the research activities. As aforementioned, this section is the most challenging to organise. A preliminary layout for this section is due to be ratified in March 1998, although as the research data is revisited it is possible that this layout will adapt to suit the research findings and the most effective method to present them. There are several key concepts which the eventual layout will encompass, these are described below.

3.2.2a) Initial and Final Conditions.

In order to provide a discrete "window" of analysis, this section will include a brief description of the *initial* and then *final* conditions at the company. The conditions will be described in terms of Hewlett-Packard's Quality Maturity System. Previous six month reports have described this system in relation to EHS:-

> "Developing the measurement framework started by defining the various levels of maturity that were possible for EHS. These were taken to be scores "1" to "5" according to the company's QMS system. Hewlett-Packard's QMS system measures the organisational effectiveness of an entity. An entity is "scored" from "1" to "5" for five axes of quality maturity (these are described in more detail in the two year dissertation). In each of these five axes, the entity is reviewed according to their "approach", "results" and "deployment". In other words the entity must be good in their approach to business, they must produce measurable results and their strategies must be deployed throughout the organisation. An EHS analogy would be; the entity would have to have a strong approach to EHS, produce noticeable EHS improvements and deploy EHS activities throughout their organisation"

3.2.2b) Change Content

Having established the boundaries of the changes at Hewlett-Packard with the initial and final conditions, it will be necessary to represent the main body of changes which occurred at the company over the research period. This will be referred to as change "content". This will be described in relation to *EHS maturity* (from the aforementioned QMS scoring system) with reference to the specific environmental management issue and the organisational level to which they relate. The *environmental management issue* and *organisational level* classifications are described below.

Environmental Management Issues.

It is possible to categorise all environmental activities at the company as one of four environmental management "Issues"; Product Stewardship, Waste Management, Resource Conservation and Pollution Prevention. The names or labels for these issues are taken from the company's Ten-Step plan. This plan represents the principal change strategy for this research project (See dissertation) and hence the issue labels are considered to be appropriate.

The categorisation of activities into these issue areas is fairly arbitrary, but provides a more manageable way of analysing the change data. Since the labelling of issues is recognised to be fairly arbitrary, in that some activities could quite easily be considered to fall under two or more categories, it is impossible to isolate a set of activities within one of the categories as being somehow unique. It is possible that some of the activities will be related or dependent on one another. This is recognised and is an important factor which requires highlighting in the design of this portfolio section.

Organisational Level

In addition to the "environmental management issue" discussed above, a second method so far has been used to classify the changes at Hewlett-Packard. Each change activity can also be categorised according to the level at which it occurs in the organisation. This research has defined three principle levels at which change occurs labelled personal, functional and organisational;

- When change occurs at a *Personal* level, the values of the individual toward the natural environment change irrespective of there role within the organisation. This change could be attributed to both internal or external influencing factors.
- Change occurring at the *Functional* level arises when a business sub-group, department or function acknowledges environmental management as being related to that group's normal activities.
- Change at the *Organisational* level is represented by company wide activities or initiatives which relate to environmental management.

As with the "environmental management issue" classification, the choice of "organisational level" for change in the company is somewhat arbitrary. Depending on the individual or business group involved, an activity may fall under all three categories, either at any one time or perhaps sequentially. It is difficult to separate activities definitively into these three areas, they are inevitably linked, but such classification provides a useful way of analysing the research. Analysing the data in this way also assists with the testing of one of the research concepts, namely the appropriateness of the different approaches to environmental management change evident in the literature (discussed briefly earlier).

3.2.2c) Change Context

One of the recognised advantages of Action Research is that it is situational or contextual. In other words, observed changes are recognised to be dependant on contextual factors. It has always been an intention of this research to monitor the context of changes in addition to their ***content***. Data collection methods throughout the research have included recording several contextual factors over time.

- *Company Context* - Company context includes; company direction or strategy, financial status and human resource changes. These are non-environmental management related, but might influence the development of environmental programs.
- *EHS context* - This includes developments within the Environment, Health and Safety (EHS) organisation, both within the United Kingdom and beyond. Specifically, examples of EHS context include; corporate EHS priorities, EHS human resource changes and non-issue-specific EHS awareness programs.
- *External Environmental Context* - This includes general environmental management developments and trends within the Information Technology sector and industry more generally.
- *Research Context* - Perhaps one of the most important contextual factors with this research is the development, academically and industrially, of the researcher. Over time, the influence, direction and participation of the researcher varied, which may have influenced the outcome of the research activities.

It is impossible to consider the change process at Hewlett-Packard without reference to these contextual factors. The layout of this section of the portfolio will therefore incorporate some kind of contextual analyses in addition to accounts of the change content.

The three concepts described above - initial and final conditions, change content and change context - will be incorporated into the layout of the second section of the portfolio. As previously stated, the actual layout is due to be ratified at a progress meeting in March 1998.

In an effort to manage the remaining project time, this section has a planned completion date of the end of June 1998. Data analysis will start at the beginning of April 1998. The other two sections of the portfolio will be completed at different times of the year (see other two sections of this report for more details).

3.2.3) Section Three: Post Action Analysis

The final section of the portfolio currently referred to as "Post-Action Analysis" is intended to summarise the findings of the research both academically and industrially, to reflect on the research findings in light of the literature and suggest future research avenues in this area.

Part Four - Progress Reports

Forty Two Months

This section is the least completed to date, although the layout is well defined. It is unlikely that work will start on this section until the beginning of August 1998, once the data has been reviewed in more detail. One element of this section, namely the reflection on the research methods used, can potentially be completed earlier than the rest. It is possible that this section will be formulated by the end of June 1998, although this depends on progress in other areas of the portfolio.

Section Four -

Current Plans for the Next Period

Current research activities, apart from designing and constructing the research portfolio, have included developing a preliminary set of research findings in order to focus the data analysis. These findings are linked to the core research concepts described earlier. A series of meetings with research supervisors to clarify these findings is planned for early March 1998. The results of these sessions will be condensed and presented at the progress meeting on March 17th. It is important to note that these findings are being developed, primarily by the researcher, who has an in depth knowledge of the research data. The findings are not a random selection of potential insights, rather they represent a series of actual learnings which the data should support. Once these preliminary findings have been identified, the data will be reviewed and supporting evidence identified with them in mind. The preliminary findings are only intended to act as a guide for the data review process, rather than reviewing the data in its entirety which would be far too time consuming given the amount of available data. It is possible that, in reviewing the data, secondary findings or alternative approaches may become evident. These may be more or less valuable than the original findings, these will be considered as the data is reviewed. The majority of the data review process will occur between April and July 1998 although it possible that additional evidence will be sought towards the end of the project as new data comes to light. Other short term plans already mentioned in this report include the completion of the first section of the portfolio in draft form by the end of April.

Additional Progress Information

Since the last six month report there has been one formal progress review and another is planned for just after the completion of this report. All of the Engineering Doctorate modules have now been completed, all (one pending) related assignments have received a pass mark, most have been awarded a grade B- or above. The researcher presented a paper at the Business Strategy and the Environment Annual Conference in September last year which was well attended and gained positive feedback from peers. A follow up paper to be submitted to the associated journal is planned.

Part Four - Progress Reports

Forty Two Months

Summary

The last six months has been very constructive in terms of organising the research documentation. This has been possible because of an increased understanding of the research contribution and key questions. Which in turn was as a result of improved literature review processes. For every research activity it is now possible to identify the position of the activity within the core concepts of the research and hence where the associated documentation will be located in the portfolio. The electronic management of the portfolio also makes continued documentation more manageable. The remaining project time will be spent analysing the research data and completing the research portfolio.

36 Month Report

Part Four - Progress Reports

Thirty Six Months

Abstract

The following report describes the sixth period of six months research (three years) carried out for the Engineering Doctorate Programme in Environmental Technology. The doctorate, run by Brunel/ Surrey Universities, is being carried out by Zoe Jackson at Hewlett-Packard Ltd (HP). This report describes progress made in the research doctorate one year on from the two-year dissertation stage.

The report starts with a brief description of the recommendations made by Dr Tim Jackson (external examiner) after the two-year dissertation. These recommendations provide the main structure of the report with some additional description of research terms and concepts. Following this, there is a description of the progress review meetings carried out during the last six month period and finally, future plans for research activities are outlined.

Part Four - Progress Reports

Thirty Six Months

Section One.

Progress since the two-year dissertation

This section describes progress towards objectives which were identified at the two-year stage during the research mid-way viva-voce.

At the twenty four month stage of this engineering doctorate, a dissertation was submitted and an oral examination conducted. The external examiner was Dr Tim Jackson from the University of Surrey. Dr Jackson recommended that the project continue, but made several recommendations that, if followed, would improve the research project and ensure that it would achieve doctorate status. These were that the project and its associated documentation should:

1. Follow the academic rigour of a PhD
2. Articulate research metrics, milestones and reviews with final and four year visions (if different).
3. Provide descriptions of Initial Conditions, Comparators and Control sites
4. Include contrasting opinions and benchmarks in the literature review
5. Use the parallel of Quality Management more.
6. Use more thorough corroborations
7. Use more informed and justified personal opinion
8. Increase detached objectivity of HP as a case study

The main structure of the this progress report is based on the above recommendations, describing efforts and progress in all areas. Developments in defining the central concepts of the project are presented below first by way of an introduction.

The central concept in this research is the "Institutionalisation of Environmental Management". The working definition of this concept, and three related hypotheses, which guide the research are presented here as context for the remainder of the report. These excerpts are taken from the literature review.

Defining Environmental Management.

Jaques (in Kim, 1993) has noted that most words in the field of organizational development - even "manager", "plan", and "work" - are ill defined. Such words have "so many meanings that they have value only as vague slogans". It is the author's opinion that this is currently the case with "environmental management". According to Croner's (1997): *"Environmental Management is probably best considered as taking environmental factors into account in all management decisions, from product design to ultimate waste disposal, through and including product life cycle"* and a Green company is one which: *"totally integrates environmental considerations into all its policies, plans and practices choosing the most environmentally sensitive options en route".*

The definition used for this research encompasses two concepts. The first is the management of an organisation's impact on the natural environment. The second is the management of any impacts which environmental issues (perceived or otherwise) have on an organisation. The former would include the management of emissions to land, air and water and the second the management of stakeholder concerns regarding those emissions. These are two very different sides to the environmental management coin. One relates to engineering control and the other to management theory. The two may be linked, but they require different skills. The definition used for this research is based on this dual approach. Environmental management is: "*the management of real or perceived environmental impacts and their subsequent business impact*".

Defining "Institutionalisation"

There are several definitions of the word institutionalisation in the dictionary (Collins, 2nd Edition). The first is to "place in an institution". The second is "to subject someone (or something) to institutional life, often causing apathy and dependence on routine". The third, which is more appropriate for this research is to "make or become an institution". The word institution is also defined in many ways, in particular it is described as an established custom, law or principle. Thus "institutionalisation" literally means "*to make or become an established custom law or principle*".

From an organisational point of view, institutionalisation is defined in the context of institutional theory. Institutional theorists are interested in a "rule-like, social fact quality of an organised pattern of action" and "an embedding in formal structure" (Zucker, 1987:44) or in other words the process by which items become institutionalised and the role of institutions in society (Scott, 1987) (both in Devereaux-Jennings and Zanderbergen, 1995). Institutionalisation is described here as *a process whereby an item becomes embedded into formal structure or accepted practice.*

The term institutionalisation is also defined quite specifically in an article called "The Articulation and Institutionalisation of Democracy in Poland" (Cirtautas and Mokrzycki, 1993). The authors define institutionalisation as "*the creation of formally sanctioned organisations and procedures that orient social behaviour according to recognisable, stable and consistent patterns*". The three above statements broadly describe institutionalisation in the same way. Combining them, the conceptual definition chosen for this research is that: Institutionalisation is a *process whereby items become embedded or established in formal routines and social behaviour.*

Defining the "Institutionalisation of Environmental Management"

Combining both the above definitions, the institutionalisation of environmental management at Hewlett-Packard Ltd can be described as:

"A process whereby the management of environmental impacts (and their subsequent business impact) becomes embedded into Hewlett-Packard Ltd's formal routines and organisational behaviour".

The three hypotheses which are used to guide research into the (just defined) institutionalisation of environmental management, are:

Hypothesis A. *The Institutionalisation of environmental management requires organisational change over time.*

Hypothesis B. *Environmental management may be institutionalised only if environmental responsibility is acknowledged at personal, functional and organisational levels.*

Thirty Six Months

Hypothesis C. *At Hewlett-Packard Ltd, institutionalisation of environmental management can be achieved using the company's Quality Maturity tools and systems.*

1.1 Progress towards Literature Review

The most significant comment made at the two-year stage was that the project needed a separate document of literature analysis (See also the thirty month report). Over the last six months, progress has been made in this area. The contribution to knowledge that this project makes has been described in relation to the reviewed literature. A summary of the most up to date version of this report is provided here. A complete list of references used for the literature review so far is included in the appendix (not all authors are referred to in the passage below).

There has been a growth in academic research on the role which companies play in the natural environment and, conversely, the role that the natural environment plays in company strategy and practice. Research in the second category touches of many aspects of management such as organisation theory (Shrivastava, 1994; Halme, 1996; Starik, 1995; Devereaux Jennings and Zanderbergen, 1995) culture change (Rothenberg et al., 1992; Klinkers and Nelisson, 1995; Ruiz-Quintanilla et al., 1996) and strategic management (Byrne and Kavanagh, 1996; Starik et al, 1996; Azzone and Bertele, 1994; Hutchinson, 1996).

Many authors have set the agenda in terms of the more operational end of environmental management research. They have summarised the positive case studies of corporate environmental management programs and attempted to deduce some kind of "recipe for success" (see Welford, 1992; Hutchinson). At the other end of the spectrum authors such as Shrivastava, op cit.; Halme, op cit.; Devereaux Jennings and Zanderbergen, op cit.; Starik, op cit.; and Bansal have started to tackle the theoretical side of corporate environmental management. There are two distinct types of environmental management research emerging. The first type continuously re-frames the issues surrounding the environmental responsibility of firms, giving guidance on what companies should (now) be thinking about. The second type analyses the theoretical basis of environmental management in organisations. Both of these areas is deficient because neither fully describes *how* an organisation can become more environmentally responsible in practical terms over time. The most probable reason for this is the research methodologies used to date in environmental management research. What empirical research has been carried out has been based largely on the results of interviews and documentary analysis or a combination of both.

This research project examines what has been termed the "institutionalisation of environmental management" at Hewlett-Packard Ltd. This is defined as "A process whereby the management of environmental impacts (and their subsequent business impact) becomes embedded into Hewlett-Packard LTD's formal routines and organisational behaviour". Breaking this down, the research is a study of a single organisation as its environmental management programs develop and become part of normal business practice. The institutionalisation of environmental management will involve an organisational change process (from a state where environmental management is not institutionalised, to one where it is (or nearly is)). A hypothesis of this research is that such a change is not likely to be a radical overhaul of practices but a gradual, emergent change process stimulated by change agents and external conditions.

Thirty Six Months

This research will show that the institutionalisation of environmental management will have been achieved if environmental responsibility becomes part of the organisation's business strategy and if it is seen as part of the company culture or the way things get done. This requires change in three levels at the company the personal values of employees; the functional responsibilities of individuals and groups and the policies and actions of the organisation as a whole.

This approach will contribute to empirical research in the field of environmental management which is severely lacking. The project will go further than simply making suggestions as to why a company should develop an environmentally responsible culture or integrate environmental management into its business strategy, it will examine how such a process occurs in its natural setting.

The strategy of this research project is to institutionalise environmental management at Hewlett-Packard Ltd by using the company's Quality Management methodology. This will examine the question of whether tools designed for business purposes can be readily applied to environmental management, or whether the environment is an issue which requires a fundamentally different approach. Contribution will be made to both the fields of Total Quality Management and Environmental Management as the project will generate insight into their respective acceptance and deployment throughout an organisation. Hewlett-Packard's own Quality Maturity System for measuring organisational maturity will be examined to determine whether it can be applied and used to measure the environmental maturity of an organisation.

In order to test the hypotheses of this project, Action Research has been chosen as the research design. The researcher takes an active part in, and observes, the institutionalisation of environmental management over a four year period. Several research methodologies are employed to collect a range of data types. The data is analysed continuously with regard to the hypotheses and theory is generated in an iterative process, utilising both action and research techniques.

The project at Hewlett-Packard provides an opportunity to contribute to gaps in management research especially that which relates to issues pertaining to the natural environment. Contribution can be made both methodologically and analytically, although the two are closely linked. The methodological contribution arises from the researcher's role as active participant in an organisational change process. As a direct result of this participation, the project will also contribute to the literatures on the formulation and implementation of cultural and strategic change programs, particularly in relation to the emerging topic of environmental management.

The literature review process will continue for the remaining research time to ensure that the project makes a contribution to knowledge. Specific plans for the next six month period in this area are:

Increase the amount of literature reviewed in relation to the research methodology.

Firstly, investigate the extent to which Action Research has been used to gain understanding of a change process in an industrial environment. Secondly, determine the advantages and disadvantages of this type of research for both the company and the researcher. Finally, identify common research methods used in Action Research and the process for analysing data obtained from them.

This leads on to the next topic which Dr Jackson made recommendations for, the research methodology.

1.2) Research Methodology.

For this project, the research methodology plays an important part in the contribution to knowledge, so it is necessary to review the available literatures for not only its content, but also for the way that previous "change management" research has been carried out.

Since the researcher is based at the company's premises, the essence of the research methodology used in this project is based on *participation* . A complete report describing the research methodology will be available in the research portfolio, the following excerpt is taken from the current (at the time of writing) version of that report . The excerpt refers to three hypotheses (described at the start of this report) which developed over the last six months.

Detailed organisational inquiry of a single organisation falls under the description of case study research. '*Case study research consists of a detailed investigation, often with data collected over a period of time, of one or more organisations, with a view to providing an analysis of the context and processes involved in the phenomena under study*' (Hartley, 1994).

This statement by Hartley *(ibid.)* can be broken down for discussion. The first point to note, is that case study research consists of a *detailed investigation, often with data collected over time.* This type of "longitudinal" approach necessary in order to test all of the hypotheses but particularly the first. It would be difficult to determine whether an organisational change had taken place without having measurements over time.

The second aspect of Hartley's description of case study research is that it can provide *an analysis of the context and processes involved in the phenomena under study.* A case study would provide an analysis of the process of institutionalisation, which would help test the third hypothesis of the research. Hartley *(ibid.)* also suggests that case study research is suited to probe areas of original and emergent areas of theory. As has been discussed in the literature review, a theoretical understanding of environmental management in organisations has not been described. There has been a tendency towards prescriptive rather than descriptive research. The concept of the "case study" is not without its problems though. As with other qualitative research, case studies have been accused of lacking in rigour and reliability, not addressing the issue of generalisability so fundamental to scientific research. Hartley (ibid.) also emphasises the value of theory in case studies:

"*Although case studies may begin with only rudimentary theory or primitive framework they need to develop theoretical frameworks by the end which inform and enrich the data and provide not only a sense of the uniqueness of the case but also what is of more general relevance and interest.... without a theoretical framework, a case study may produce fascinating details about life in a particular organisation but without any wider significance*".

Inquiry from the Inside

One way of categorising organisational inquiry is described by Roger Evered and Meryl Reis Louis (1981). These authors identify principally two "paradigms" of organisational inquiry. These are "inquiry from the

outside" and "inquiry from the inside". Inquiry from the outside is characterised by the researcher's detachment from the organisational setting under study.

In contrast, inquiry from the inside carries with it the assumption that the researcher can best come to know the reality of an organization by *being there* - by becoming immersed in the stream of events and activities, by becoming part of the phenomena of study.

In order to test the aforementioned hypotheses, inquiry from the inside is chosen a research method. This is partly due to the opportunity for "inside" research offered by the organisation under study and partly due to the lack of such research in organisational inquiry as a whole. This type of research method has both advantages and disadvantages. It is accused of being tainted by the "fallacy of subjectivism" (Russell, 1945) in that the findings could be distorted and contaminated by the values and the purposes of the researcher, it may appear to be so fuzzy that its findings often have dubious precision, rigour or credibility (Evered and Reis Louis, 1981). In order that this subjectivism is avoided several strategies are employed: The researcher spends time removed from the organisation in order to step back from the research and analyse the emerging data, regular supervision from external supervisors is provided to ensure that the researcher has not "gone native" and third party researchers (external to the organisation) are used to corroborate data.

These strategies should ensure that the research does not suffer from the problems associated with "inquiry from the inside". Provided these issues are addressed, inquiry from the inside can offer a rich appreciation of organisational context, where meaning is developed from the point of the view of organisational participant. As with case study research, this type of research is particularly useful for developing new research insights. This occurs as features are noticed and identified through an interpretative, iterative process whereby data and categories emerge simultaneously with successive experience. By being in the organisation whilst Hewlett-Packard attempt to institutionalise environmental management, all three of the hypotheses can be tested and an understanding of the institutionalisation process achieved.

Researchers who conduct inquiry from the inside have chosen to apply forms of *Action Research* to sharpen their methodological and theoretical tools. In Action Research, the researcher is involved, in conjunction with members of an organisation, in dealing with a problem that is recognised as such by both parties. The researcher feeds information about advisable lines of action back to the organisation and observes the impact of the implementation of the advised lines of action on the organisation. In a sense, the researcher becomes part of the field of investigation. It is the nature of the relationship between the researcher and his or her subjects that constitutes the prime reason for conceptualising action research as a distinct design. Action Research has also been described as *"intensive, longitudinal involvements with particular individuals and groups within particular organisations, with the intention of understanding how these people experience, give meaning to, act and interact with respect to particular situations" Jones* (1987).

The important concept in the definitions of Action Research is the concept of *involvement.* In this type of project researchers are active in the organisational processes under study. Action research brings to the forefront the key issue of the link between theory and practice, and the need to ground and test ideas for practice within that most exacting of testing grounds - organisational life as it is actually experienced and enacted by its members. Adapting the definition of Action Research for this research project would read:

In this Action Research project, the researcher is involved, in conjunction with members of Hewlett-Packard Ltd, in the institutionalisation of environmental management. The researcher feeds information about advisable lines of action back to Hewlett-Packard Ltd and observes the impact of the implementation of the advised lines of action on the company.

The research methods used to collect data are also described in the complete report, but are not described here. This is because the most significant developments in this area over the last six months have been in conceptualising the overall research methodology rather than specific details.

1.3) Metrics milestones and reviews

At the mid-way viva Dr Jackson noted that consistent metrics across the four years of the research need to be articulated in more detail. This would be to ensure that comparable measurements are taken throughout the research project in order to assess if any changes have occurred.

A second issue relating to this, that was brought up, was the notion of initial conditions. A clearer statement of the initial conditions of the project in terms of the metrics being used to determine change is therefore required.

Since this recommendation was made, significant work has been carried out on refining the metrics used to assess organisational change (see the thirty month report). Focus in the last six months specifically has been in the area of research methodology, rather than of metrics. The following summary represents the work in this area to date.

> Developing the measurement framework started by defining the various levels of maturity that were possible for EHS. These were taken to be scores "1" to "5" according to the company's QMS system. Hewlett-Packard's QMS system measures the organisational effectiveness of an entity. An entity is "scored" from "1" to "5" for five axes of quality maturity (these are described in more detail in the two year dissertation). In each of these five axes, the entity is reviewed according to their "approach", "results" and "deployment". In other words the entity must be good in their approach to business, they must produce measurable results and their strategies must be deployed throughout the organisation. An EHS analogy would be; the entity would have to have a strong approach to EHS, produce noticeable EHS improvements and deploy EHS activities throughout their organisation.
>
> Typical conditions that would indicate each level of maturity ("1" to "5") were then identified. The type of evidence for these conditions was then deduced leading to a choice of research methodology. The reverse process will be used to determine the EHS maturity of the organisation. In other words; A suite of data collection techniques will be used to collect evidence of EHS maturity (see research methods in portfolio), this evidence will then be translated into broad conditions which will in turn translate into an overall indication of the maturity of the organisation.

It should be noted that over the research period data has been collected continuously using a range of techniques. This data will be analysed once the measurement framework has been finalised. An initial review of longitudinal data is scheduled for March 1998, this activity will determine the validity of the framework providing an opportunity to adapt as required for the final analysis.

1.4) Coroborations.

A further comment made by Dr Tim Jackson was that research data required corroboration. An important aspect of any data collection exercise is the need for the corroboration or confirmation of data by other sources of evidence. One approach that has been used in this project is the use of external researchers to validate the data in question. Two projects in

particular have been followed, both of which are described in brief detail in the thirty month report. Neither of these projects were completed in this period, hence the thirty month report represents the most up to date information.

There are other avenues to be followed for data corroboration that have not been investigated yet in this project. One might be to ask internal staff at HP to comment on the changes which they perceive as having occurred, particularly staff with whom the researcher has had no prior contact. Opportunities for corroborating the data will be examined in more detail when the measurement framework has been finalised. (see previous section)

1.5) Objectivity and Personal Opinion.

At the mid-way stage it was felt that the research documentation required more justified personal opinion and objectivity from HP as a case study. Changes in the time-tabling of research activities over the last six months have addressed this issue by physically removing the research engineer from the company for significant periods of time. At least fifty percent of the researcher's time is spent away from the company premises working at university or at home. Supervisors have been tracking and encouraging progress in this area, no further problems have been identified although this is continually reviewed.

1.6) Quality parallel

It has been proposed in previous six month reports that there is a parallel between the development of quality management programs in industry and, more recently, environmental management programs. At the mid-way stage Dr Jackson recommended that this would be a good avenue to pursue in more detail. The thirty month report described two opportunities that could be followed in this area. The first would be to identify any parallels with Environmental and Quality Management in the literatures. This may provide useful insights into the mechanisms of organisational change required to implement such management systems. There is existing literature on the links (or otherwise) between environmental management and quality management that could also be reviewed; for instance see Environmental Quality Management, The Total Quality Review, The Journal for Quality and Participation or Business Strategy and the Environment Journals. These literatures have been preliminary reviewed but still require further detailed examination.

The second opportunity worth pursuing on this subject was described in the thirty month report. Evaluating the Quality Management System at Hewlett-Packard in more detail; raising questions about whether quality management is institutionalised at the company, and if so what factors helped that to occur. There are staff who were employed at HP before the advent of quality management (that are still employed today) who could provide a useful analysis of

the problems encountered in implementing quality management and hence perhaps environmental management.

Employee insights into quality management (at Hewlett-Packard) have not been investigated yet. The parallels between quality and environmental management are important to this research, since the tools being used to implement change evolve from quality management tools at the company. It is the very fact that these tools are so accepted that suggest that quality is indeed institutionalised at Hewlett-Packard. If this is the case, a review of how quality came to be institutionalised would add value to the research on the "institutionalisation of environmental management". This exercise was scheduled for after September 1997. It is now anticipated that this will take place in February 1998.

Section Two.

Supervisor/Researcher Progress Meetings

There has been another progress meeting with the research supervisors since the last six month report. This section describes the content and any important points arising.

A progress review meeting (9th September 1997) was scheduled to discuss the most recent literature review documentation and research methodology. Generally positive comments were provided about the momentum and direction of the literature review, but it was felt that sustained effort was required for the next period of three months to ensure a thorough analysis. Areas of improvement that were identified included: explaining the rationale behind disciplines not included in the literature review, defining terms (particularly institutionalisation) and making the contribution to knowledge explicit. These comments have been taken on board and were incorporated into later versions.

It was also recommended that the methodology document should be linked to the literature review since the two are closely linked. The supervisors recommended that a bridging document outlining the main points of both could be written.

Also at this meeting, some project milestones were identified including the Viva Voce, Submission and Cessation of data collection. A detailed time plan for the research is provided in the appendix of this report.

Section Three

Future Plans

The next twelve months of research will accelerate and consolidate the results so far into their final conclusions. The remaining time will be organised in such a manner as to ensure the completion of the research project. This section describes the planned activities for the next twelve months.

A plan for the remainder of the research time has been developed based on the required activities in order to complete the portfolio. The portfolio plan is included here for reference. A preliminary list of activities based on this plan has been identified for the year ahead. Three symbols are used here to denote different types of activity. Those with the symbol "✎" are written documents, those with the symbol "🕮" are reading or investigation and finally those with the symbol "✍" , involve thought or ideas generation.

- EngD Modules and Coursework *(module attendance and coursework completion)* ✎✍🕮
- Literature Review *(description and discussion of related literature to project)* ✎✍🕮
- Methodology Description *(description / discussion of chosen research methodology)* ✎✍🕮
- Review Data sources (*initial review and categorisation of sources of data*) 🕮
- Preliminary theory development *(first attempt at building a theory from data)* ✍
- Methodology discussion report *(detailed discussion of conducting chosen research methodology)* ✎✍
- EngD progress reports ✎✍
- Final data collection *(identification and completion of supporting data sets)* 🕮
- Review complete data *(Analyse relevant collected data along side preliminary theory)* 🕮✍
- Formulate final theory *(re-visit and adapt preliminary theory)* ✍
- Confirm theory with data *(confirm final theory with collected data)* ✍
- Data description report (*describes data set to be used in thesis*) ✎
- Document data analysis *(describe process of data analysis)* ✎
- Compile Dissertation *(pull together all reports and documentation for submission)* ✎✍🕮

These are presented here in roughly chronological order. This list of activities is subject to review and will be confirmed or adapted after discussion with the project supervisors in December 1997.

30 Month Report

Part Four - Progress Reports

Thirty Months

Abstract

The following report describes the fifth period of six months research carried out for the Engineering Doctorate Programme in Environmental Technology. The doctorate, run by Brunel/ Surrey Universities, is being carried out by Zoe Jackson at Hewlett-Packard Ltd (HP)

This report describes progress made in the research doctorate since the two-year dissertation stage.

The report starts with a brief description of the recommendations made by Dr Tim Jackson (external examiner) after the two-year dissertation. These recommendations provide the structure of the remaining report.

Following this, there is a description of the progress review meetings carried out during the last six month period and finally, future plans for research activities are outlined.

Part Four - Progress Reports

Thirty Months

Section One.

Progress since the two-year dissertation

This section describes progress towards objectives which were identified at the two-year stage during the research mid-way viva-voce.

At the twenty four month stage of this engineering doctorate, a dissertation was submitted and an oral examination conducted. The external examiner was Dr Tim Jackson from the University of Surrey. The purpose of the examination was to determine the progress of this project according to engineering doctorate criteria. Dr Jackson recommended that the project continue, but made several recommendations that, if followed, would improve the research project and ensure that it would achieve doctorate status. In particular he suggested that two distinct documents be submitted to the engineering doctorate portfolio. These were a literature review, positioning the research in a wider academic context and a statement of research methodology. Other comments that were distilled from the examination were that:

The project and its associated documentation should

1. Follow the academic rigour of a PhD
2. Articulate research metrics, milestones and reviews with final and four year visions (if different).
3. Provide descriptions of Initial Conditions, Comparators and Control sites
4. Include contrasting opinions and benchmarks in the literature review
5. Use the parallel of Quality Management more.
6. Use more thorough corroborations
7. Use more informed and justified personal opinion
8. Increase detached objectivity of HP as a case study

The structure of the first section of this progress report is based on the above recommendations, describing efforts and progress in all areas. Some of the recommendations are fairly specific, for instance the use of Quality Management as a similar concept, whereas others are much more general, for instance the adoption of "PhD rigour". Consequently the length of discussion for each element differs.

Throughout the project so far, a significant proportion of the research time has been spent at the sponsoring company's premises. This has suited the type of research being carried out and thus far has not caused any difficulties. However, the academic analysis of the research data and its wider context has been more difficult to carry out in a busy company setting, particularly when the researcher is involved in the daily activities of the company.

This issue is currently being addressed by changing the time that is spent at the sponsoring company. Previously, approximately 90% of the research time was spent at the company and although a significant proportion of this time was spent on research activities, the busy working environment made focused academic thought more difficult. From now on a minimum of 40% of the available time will be spent (physically) removed from the organisation with a further period to be spent at the organisation on academic related activities only.

The distinction between academic and industrial related activities is somewhat false because the practical activity at the company is in fact all related to the research project. The distinction needs to be made though between practical research and theoretical development. The activities that are currently engaged in on a practical research basis are summarised in Table 1. included in Appendix B. The main tasks are listed along with a description and a summary of the activities involved. The table is provided to highlight the main areas of intervention with the organisation and the type of activity which they involve. These areas have recently been reduced to enable a greater emphasis on the more theoretical side of the research. Table 2 (also in Appendix B) presents the more "academic" activities that are involved in conducting an engineering doctorate. For the next period in particular, the most important activities are those relating to the literature review and thesis construction. The aforementioned split of time should allow for a greater level of academic focus and enable the completion of the literature review and thesis statements by the next six month report entry due in September 1997.

1.1 Progress towards Literature Review

The most significant comment[1] made at the two-year stage was that the project needed a separate document of literature analysis. The literature review process has been carried out over the entire research period to date. Books and articles relating to a range of subjects have been reviewed for their contribution or otherwise to the research at HP. As an example, a list of journals that have reviewed throughout the project are included below.

Journal Title	No. of articles.
Academy of Management Journal	1
Academy of Management Review	4
Accounting, Organisations and Society	2

[1] This was seen as significant by the external examiner and both the industrial and academic supervisors. See (in particular) a letter contained in Appendix A.

Part Four - Progress Reports

Thirty Months

Administrative Science Quarterly	1
British Journal of Management	2
Business Strategy and the Environment	14
Chemistry and Industry	1
Computing	1
Critical Perspectives on Accounting	1
Environment	1
Environment and Behaviour	1
Environmental Quality Management	5
The Environmentalist	1
Greener Management International	4
Harvard Business Review	5
International Journal of Environmental Studies	1
International Marketing Review	1
Journal of Anthropological Research	1
Journal of European BusinessEducation	1
Journal of General Management	1
Journal of Management Studies	1
Journal for Quality and Participation	3
Long Range Planning	4
Management Services	2
Management Today	1
Managing Ambiguity and Change	1
Omega, International Journal of Management Science	1
Resurgence	2

Risk Analysis	3
SAM Advanced Management Journal	1
Science	1
Sloan Management Review	1
Social Research	1
The Systems Thinker	2
Technological Forecasting and Social Change	1
Tomorrow	1
The Total Quality Review	1

As can be seen these can be classified into the following areas;

- Management and Management science
  - Change Management
  - Strategic planning
  - Quality Management
  - Organisational Learning
  - Management accounting
- Industrial / Corporate Environmental Management
- Environmental
  - Psychology
  - Behaviour
  - Change
- Research Methodologies

Other sources of literature such as books, the internet and professional journals have been reviewed in similar areas.

Having reviewed these literatures it is now possible to construct a separate document outlining the contribution of the research in relation to previous academic work. This will be submitted to the portfolio by 1st August 1997. A detailed plan for reviewing remaining literatures to assist the construction of this document can be found in Section 3 of this report.

1.2) Research Methodology.

The second main topic, outlined by Dr Jackson, for development in this period, is the research framework and methodology. For this project, the research methodology plays an important part in the contribution to knowledge, so it is necessary to review the available

literatures for not only its content, but also for the way that previous management change research has been carried out.

The essence of the research methodology used in this project is based on participation since the researcher is based at the company's premises. The mid-way dissertation outlined the research method being applied in the project. The following text is and excerpt from that report.

> *'This research is a four year individual case study from which it is hoped that broader and general conclusions will evolve. Case study research is appropriate for this project as it allows for a "processual, contextual and generally longitudinal analysis of the various actions and meanings which take place in organisations"*
>
> *Case study research can include elements of other research designs both quantitative and qualitative. In this instance the role of the researcher is to facilitate change within the organisation and so methodologies associated with action research are appropriate.*
>
> *In action research, the researcher is involved, in conjunction with members of an organisation, in dealing with a problem that is recognised as such by both parties. The researcher feeds information about advisable lines of action back to the organisation and observes the impact of the implementation of the advised lines of action on the organisation. In a sense, the researcher becomes part of the field of investigation. It is the nature of the relationship between the researcher and his or her subjects that constitutes the prime reason for conceptualising action research as a distinct design.*
>
> *Taking this definition and adapting it for this research project would read:*
>
> *In this action research project, the researcher is involved, in conjunction with members of Hewlett-Packard Ltd, in dealing with the potential business impact of poor environmental management. The researcher feeds information about advisable lines of action back to Hewlett-Packard Ltd and observes the impact of the implementation of the advised lines of action on the company.'*

In the same dissertation several data collection methodologies were described that were in use in the project. These were Self Administered Questionnaires, Structured Interviews, Participant Observation, Unstructured Interviewing and Archival Information.

Having identified both the predominant research method and the associated data collection methodologies, it is now possible to outline the research strategy in a distinct document. This would link the research question to the methodologies, describing how the collected data would support or otherwise the proposed thesis that environmental management can be institutionalised at Hewlett-Packard Ltd. This document will be submitted to the portfolio by 1st September 1997.

1.3) Metrics milestones and reviews.

On a very similar note, at the mid-way viva Dr Jackson noted that consistent metrics across the four years of the research need to be articulated in more detail. This would be to ensure

that comparable measurements are taken throughout the research project in order to assess if any changes have occurred. A second issue relating to this, that was brought up, was the notion of initial conditions. A clearer statement of the initial conditions of the project in terms of the metrics being used to determine change is therefore required.

Since this recommendation, significant work has been carried out on refining the metrics used to assess organisational change. Previous six month reports have described that one possible method available would be to use the company's Quality Maturity System (QMS) as a measure of environmental management maturity. This is based on the assumption that if the Environment, Health and Safety organisation is mature (according to quality criteria) then the organisation is also *EHS mature.*

The validity of Hewlett-Packard's QMS system as a measure of organisational maturity requires examination before being proposed as a suitable methodology for this academic research. One *advantage* of using the QMS system in this way (although this does not necessarily make the approach any more valid) is that the system is recognised at the company as a tool for measuring business performance. The degree to which this methodology is accepted throughout the entire organisation also needs more detailed examination, but personal experience at the company over the last couple of years does suggest that the system is commonly utilised.

1.3.1 Linking QMS and Environmental Management

Hewlett-Packard's QMS system measures the organisational effectiveness of an entity. An entity is "scored" from "1" to "5" for five axes of quality maturity. These are described in more detail in the two year dissertation. In each of these five axes, the entity is reviewed according to their "approach", "results" and "deployment". In other words the entity must be good in their approach to business, they must produce measurable results and their strategies must be deployed throughout the organisation. An EHS analogy would be; the entity would have to have a strong approach to EHS, produce noticeable EHS improvements and deploy EHS activities throughout their organisation.

The deployment aspect of the QMS system in particular, make it an attractive method for measuring the process of institutionalisation. The QMS scoring method would also measure whether EHS is pro-active or re-active. The institutionalisation of environmental management does not depend on the re-active / pro-active balance; both re-active and pro-active environmental management could be deployed throughout an organisation. Further review of the relationship between "pro-active" environmental management and the institutionalisation

of environmental management is planned for review after the next Six month report in September 1997.

In order to determine metrics for measuring organisational maturity it was necessary describe what EHS maturity would actually look like in an organisation, according to the QMS scoring criteria. In order to do this the researcher translated the company's quality maturity scoring system into a document describing EHS maturity. This was achieved by taking the five axis of quality maturity and for each score (1 to 5) translating these into EHS maturity statements. Several iterations of this translation have occurred, the list below summarises an organisation that would only score "1" on the quality maturity score with reference to environment, health and safety:

1.3.1a Score of "1"

The organisation that would achieve a score of "1" on a quality maturity score with reference to environmental management would have the following characteristics.

- There is a dedicated Director / Manager responsible for environmental management
- There is an environmental policy available
- Minimal resources allocated to environmental programs
- There is a small number of staff with responsibility for environmental programs
- environment-related issues are dealt with in reaction to a range of stakeholder pressure
- The process of managing environmental impacts is understood by those staff with environmental responsibility only.
- There are few environmental champions in the company
- Improvements are made to environmental management on an ad-hoc basis.

The important concepts behind these statements are that the environmental management function is a reactive organisation with minimal financial and staff resources. The company does not acknowledge that environmental issues exists other than by those people who work directly for the environmental management function.

1.3.1b Score of "2"

In contrast to this, an organisation with a score of "2" might look something like:

- Those parts of the organisation with high environmental impact are aware of environmental issues and how they link to business processes.
- There is a somewhat pro-active approach to dealing with environmental issues

- The staff responsible for environmental programs understand the policy and associated objectives
- There is evidence of some environmental success stories.
- Environmental management processes are documented and understood
- Resources attributed to environmental programs are mainly aimed at compliance.
- Some staff have environmental metrics as part of their job descriptions / performance evaluation
- Non-HP-partners such as contractors, dealers and suppliers are recognised as having a contribution to environmental programs.

Similar lists can be constructed for scores up to "5" where the organisation would be recognised as being world-class at environmental management. At this time, only scores from "1" to "3" are completed. The remainder will be completed by 1st September 1997.

As an aside, distilling the essence of Hewlett-Packard's QMS system has resulted in a process for determining organisational maturity more generally. The EHS department (where the research is carried out) is currently working on some self assessment software to measure organisational maturity in relation to the company's corporate EHS audit criteria. This software can be applied to any measure of organisational maturity and may contribute to the measurement of environmental maturity for this research project in the future.

Each of the statements listed above can be inferred from tangible evidence in the organisation such as documentation or interviews. Some evidence can be sought from the *presence* of an item such as staff or a plan, other evidence can be sought from the *lack of presence* of an item such as the lack of documentation or awareness. For each score, a set of metrics is currently being developed that will form the basis of a suite of indicators. These metrics will be detailed in the research methodology document due to be submitted by 1st September 1997.

These indicators will require a range of research methodologies to be employed. For instance, the evidence that there is a policy for EHS can be determined relatively simply, compared to evidence that there is a wide range of understanding for that policy. The former requires only that the policy document is obtained by the researcher, the latter might require that a survey or set of interviews be conducted. There is a four stage process to this measurement strategy. This is shown in Fig. 1

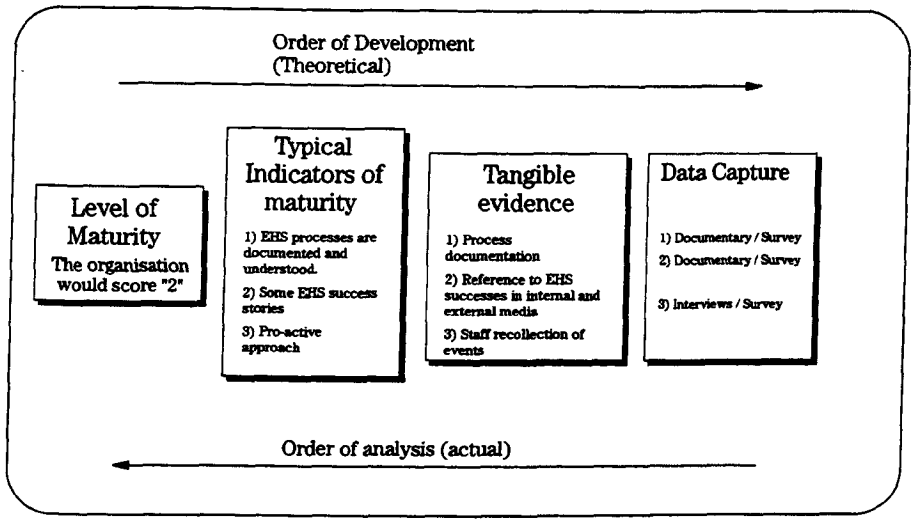


Fig. 1 Measurement Strategy Process.

Developing the measurement framework started by defining the various levels of maturity that were possible for EHS. These were taken to be scores "1" to "5" according to the company's QMS system. Typical conditions that would indicate each level of maturity were then identified. The type of evidence for these conditions was then identified leading to a choice of research methodology.

The reverse process will be used to determine the EHS maturity of the organisation. In other words; A suite of data collection techniques will be used to collect evidence of EHS maturity, this evidence will then be translated into broad conditions which will in turn translate into an overall indication of the maturity of the organisation.

It should be noted that over the research period data has been collected continuously using a range of techniques. This data will be analysed once the measurement framework has been finalised. This (the finalisation of the measurement framework) will be completed before 1st September 1997. An initial review of longitudinal data will determine the validity of the framework providing an opportunity to adapt as required for the final analysis.

1.4) Coroborations.

A further comment made by Dr Tim Jackson was that research data required corroboration. An important aspect of any data collection exercise is the need for the corroboration or confirmation of data by other sources of evidence. One approach that has been used in this project is the use of external researchers to validate the data in question. Two projects in particular have been followed, detailed below.

1.4.1) Internal organisational change research

A team of three researchers, including the research engineer at Hewlett-Packard, a second engineering doctorate student at Rank Xerox and an Assisstant Professor from Georgia State University have collaborated on a longitudinal project examining environmental change in the two large organisations (Hewlett-Packard and Rank Xerox). This project is coming to a close and an associated paper is now in draft format. Details of the project described below are taken from this draft paper.

' This research investigates the conditions under which organisational issues result in an organisational response. Using intensive longitudinal data from September 1995 to August 1996 within two major corporations, we witness the development of organizational issues pertaining to the natural environment as they trigger organizational responses. By analyzing this complete set of issues, we are able to identify those issues which prompt responses and those issues which remain merely as expressions of interest or concern. We find that the environmental issues which are the most likely to effect the scale, scope and momentum of organizational response are those for which there is a high level of congruence between individual concerns and organizational values. By applying theory from strategic issue management, managerial discretion, and organizational values a model of issue progression is developed to explain organizational change.

Understanding the logic of organizational change processes has long been the preoccupation of management theorists and practitioners. Numerous theories have been offered on the processes of organizational adaptation at all three levels of analysis: the organizational environment (institutional theory, resource dependency theory, and contingency theory), the macro organization level (learning and innovation), and the group or individual (discussions of power, motivation, and affect). Recent efforts have developed mid-range theory between the organization and the individual. These theories, however, assign primacy to the organizational or environmental forces providing the rudder in the change process, as individuals act and react to organizational and environmental processes. Whereas this project also directs attention to the interactions between the individual and organization in propelling the change process, it anchors the change process on individual and organizational attributes rather than the larger organizational environment.

Much research attends to observed organizational changes, but little attention is afforded to stalled or failed attempts. Pettigrew's extensive longitudinal study of change in ICI from 1960 to 1983 relied on manager's recollections of changes of the culture, structure, technology, and strategy to benchmark the change process. As a result, Pettigrew was able to build important insights into change process, context, content of successful episodes, but not stalled efforts. Theory explaining failed change efforts have been informed largely by research on successful change or on the firm's resistance to change. Although speculating on unsuccessful change based on successful change provides important insights, a robust theory of organizational change is impeded by omitting stalled efforts. The factors which influence successful change may not be the same which inhibit change. Furthermore, resistance to change is not the same as stalled change. Resistance to change suggests that the organization has failed to change. Stalled efforts suggests that change may be moving slowly, almost imperceptibly, or that its time has not yet come. Few efforts have been made to build theory to explain organizational change informed by both successful and stalled attempts. In this research, we observe the development of the set of issues pertaining to the natural environment within two large organizations, Hewlett Packard (HP) and Rank Xerox (RX). Some of these issues initiate responses, whereas others remain dormant and receive little individual or collective attention. We observe how these issues are identified, and the process by which some lead to organizational responses. Through these observations, we develop a model which permits us to identify a path followed by these issues as they stall or trigger organizational responses. This path permits us to analyze the scale, scope, and momentum of organizational responses to these issues. This research builds on previous work on issue management, organizational discretion, and organizational values to illustrate the importance of organizational values and individual concerns in effecting organizational change.

The use of external researchers for data collection and interpretation in this project is useful for corroborating data obtained on the organisational change process at HP.

1.4.2) Identifying the business impacts of poor environmental management

A team of two researchers, including the research engineer at Hewlett-Packard and a second engineering doctorate research student have devised some research to identify stakeholder expectations of Hewlett-Packard relating to environmental management. This is in order to identify any gaps between HP's current environmental management performance and that which is expected from four main stakeholders; Employees, Customers, Regulators and the Financial Community. Although the focus of this research project touches a broad range of stakeholders, the information from employees can be used to corroborate assertions made by employees on environmental management preferences. This project has been subject to delays due to engineering doctorate commitments of both researchers but a full report will be submitted to the portfolio by the end of September 1997.

1.4.3) Further opportunities

There are other avenues to be followed for data corroboration that have not been investigated yet in this project. One might be to ask internal staff at HP to comment on the changes which they perceive as having occurred, particularly staff with whom the researcher has had no prior contact. Opportunities for corroborating the data will be examined in more detail when the measurement framework has been finalised. (see previous section)

1.5) Objectivity and Personal Opinion.

At the mid-way stage it was felt that the research documentation required more justified personal opinion and objectivity from HP as a case study. Recent changes in the time-tabling of research activities should address this issue by physically removing the research engineer from the company for significant periods of time. All the supervisors are tracking and encouraging progress in this area, resultant changes should be seen in subsequent reports submitted to the portfolio.

1.6) Quality parallel

It has been proposed in previous six month reports that there is a parallel between the development of quality management programs in industry and, more recently, environmental management programs. At the mid-way stage Dr Jackson recommended that this would be a good avenue to pursue in more detail. There are two opportunities that can be followed to do this.

1.6.1) Quality Management Literature

The first avenue that can be pursued to identify any parallels with environmental management relates to the literatures on Quality Management and its implementation in industry. This body of literature could provide useful insights into the mechanisms of organisational change required to implement such management systems. There is existing literature on the links (or otherwise) between environmental management and quality management that could also be reviewed; for instance see Environmental Quality Management, The Total Quality Review, The Journal for Quality and Participation or Business Strategy and the Environment Journals.

These literatures have been preliminary reviewed but requires further detailed examination. Thus, the quality management literature is recognised as a target subject area for future literature analysis. A full list of target areas for the literature review is provided in Section 3.

1.6.2) Quality Management Experience at HP

The second opportunity worth pursuing on this subject would be to evaluate the Quality Management System at Hewlett-Packard in more detail; raising questions about whether quality management is institutionalised at the company, and if so what factors helped that to occur. There are staff who were employed at HP before the advent of quality management (that are still employed today) who could provide a useful analysis of the problems encountered in implementing quality management and hence perhaps environmental management. Employee insights into quality management (at Hewlett-Packard) has not been investigated yet. The parallels between quality and environmental management are important to this research, since the tools being used to implement change evolve from quality management tools at the company. It is the very fact that these tools are so accepted that suggest that quality is indeed institutionalised at Hewlett-Packard. If this is the case, a review of how quality came to be institutionalised would add value to the research on the "institutionalisation of environmental management". This exercise is scheduled for after September 1997 to allow time for other crucial reports and will be completed by December 1997.

Thirty Months

Section Two.

General Progress Update.

There have been three progress meetings with the research supervisors since the last six month report. This section describes the content of these and any important points arising.

The first progress meeting was held shortly after the mid-way dissertation and consisted of a brainstorming exercise between the researcher and supervisors on the "Contribution to Knowledge" that the project makes. A diagram depicting the outcome of the brainstorm is included in the Appendix. In summary the four main areas that were considered to be the key areas of contribution were:

- Discourse on the concept of "Institutionalisation"
- Contribution to Literature
- Motivation of large organisations wrt environment
- Process and Methods of Institutionalisation

These four areas were used as the basis for a "lecture" from the researcher at a second progress review this period. A copy of the lecture slides are included in Appendix C

A series of questions were raised at this lecture which are being used to guide the research. A copy of the questions are also in the same Appendix.

The main objective arising out of the second progress review was for the researcher to document the presentation in a literature review format. It was at this stage that the aforementioned problems with constructing the literature review were identified.

A third progress review, discussed only the progress towards writing the literature review as this was seen to be the most urgent research activity.

Section Three

Future Plans

The next eighteen months of research will accelerate and consolidate the results so far into their final conclusions. It is crucial that the remaining time is organised in such a manner as to ensure the completion of the research project. As previously mentioned, some changes have occurred with the practical research arrangements. These changes are the first step in ensuring that the project goals are met. The rest of this section describes a project plan for the remaining research time. In order to construct this plan it is first necessary to summarise the research project.

3.1) Objectives of research

The purpose of this research is to provide an independent but informed analysis of Hewlett-Packard's strategy to institutionalise environmental management. Hewlett-Packard's vision, and hence the vision of this research project, is that "environmental management at HP's UKSR is fully institutionalised, and recognised as a business, customer and environment focused operation"

The current working definition of the "Institutionalisation of Environmental Management" would require that

- Environmental management is defined in such a way as to be suitable for the industry context,
- A company's philosophy or ethic encompasses environmental responsibility,
- Individuals in a company take an appropriate level of ownership for environmental management,
- Functional groups in a company acknowledge responsibility for aspects of environmental management,

In order to achieve this, the researcher is placed inside the company to carry out an "Action Research"[1] project. The objectives in terms of "Action" are to participate in a strategy to institutionalise environmental management plan by;

- providing high quality environmental data for business planning purposes
- providing pro-active guidance and consultancy on environmental matters.
- facilitating the deployment of proven, internal and external, "best practices", and to
- taking part in a range of related business activities

[1] Further information on "Action Research" is contained in the two-year dissertation

The "Research" objectives are, during Hewlett-Packard's strategy to institutionalise environmental management, determine:

- the factors which constitute "institutionalisation of environmental management"
- the process of organisational change which needs to occur in order that environmental management is institutionalised?
- the motivating factors behind environmental organisational change?
- the catalysts and inhibitors which affect the institutionalisation of environmental management?

This research will be carried out with reference to material and learnings from a wide range of sources such as academic institutions, government organisations, independent research agencies, industry benchmarking and global Hewlett-Packard operations.

3.2) Research Deliverables

There are a range of academic deliverables required for the successful completion of the project. These are presented in list format below.

- Literature Review document describing the research thesis and links to other academic work.
- Summary of Research Framework and Methodologies employed to achieved the research objectives.
- A statement of initial conditions upon which to compare organisational change.
- Validation of the approach to facilitate and measure organisational change
- An analysis of any changes during the research time in:
  - Definition of environmental management
  - Culture or ethics relating to environmental issues.
  - Individual response to environmental issues
  - Functional acknowledgement of environmental management
- Evidence of any influencing factors to change, such as
  - Business Unit Cultures
  - Gender
  - Position in company.. boss etc.
  - Personal goals
- General EngD program deliverables.

The submission of these deliverables depends on a project plan that can be tracked over the whole research project. In order to do this for the remaining research time, seven "research fundamentals" have been identified that can be tracked continuously. These are presented along with their metrics in Table 3.

Some of the "fundamentals" are more difficult to measure progress for. Others require far more effort than the metric would indicate. At the very minimum, tracking these metrics will record progress towards academic goals in terms of *time*. The judgement of research *quality* is dependent on continued review with supervisors and peers.

These research fundamentals will be reviewed with the industrial and academic supervisors and consequently tracked on a monthly basis.

Table 3. Research Fundamentals.

Research Fundamental	Performance Metrics
Literature Review	At least 4 hours reading per week Regular discussions with academic supervisors.
Fieldwork	More than 19.5 hours of participation per week
Fieldwork Log	More than 6 hours entry per week
Data Collection	Continuous collection of company documentation and mail messages. Periodic Interviews Regular Surveys
Data analysis and interpretation	At least quarterly
Submissions to journals / conferences	Plans in place for at least 2 published papers by July 1998
Conclusions	Regular portfolio updates. Final document July - Sept. 1998.
EngD deliverables	as required.

3.3) Literature review plan

The literature review has been identified as requiring sustained attention until September 1997. After the initial construction of a distinct literature review document, the literature review process will primarily focus on its continual improvement. In the short term (2 months) A separate strategy for completing the literature review document is required.

Earlier in this report, four areas of literature were listed as having formed the majority of previous literature analysis. These were broadly: General Management, Industrial / Corporate Environmental Management, Environment in general and Research Methodologies. These four areas have been reviewed to differing extents. The majority of reviewed articles fall under the Industrial / Corporate Environmental Management area. The basis of the literature review plan is to review each area in more detail in order to frame the practical research at the company in a wider academic context. A more detailed plan for each area is now described.

3.3.1) Management and Management Science

Objective:- *To further clarify the specific areas of management science that the research at HP does and does not contribute to.*

Current Position:- Reviewed articles relating to *(for example)*

Change and Quality Management Programs

McLagan, P; Nel, C (1995) *The dawning of a new age in the workplace.* Journal for Quality and Participation March 1995, 10-15.

Atkinson, PE (1993): *How to Avoid TQ Failure.* Management Services, 20-24

Cegelka, J; Gull, A (1994): *Yes, people will really have to change.* Journal for Quality and Participation, 72-77.

Massey, J (1995): *Cultural Resolutions.* Computing, 30-31.

Change Management Generally

Kotter, JP (1995): *Leading Change: Why Transformation Efforts Fail.* HBR, 59-67.

Handy, C (1993): The Sigmoid Curve. In: The Empty Raincoat. (:),, 48-64.

Larkin, TJ; Larkin,S (1996): *Reaching and changing front line employees.* HBR, 95-98, 102.

Strategic Change

Gould, RM (1996): *Getting from Strategy to Action: Processes for Continuous Change.* Long Range Planning 29, 278 to 289.

Dutton, J (1988): *Understanding Strategic Agenda Building and its implications for managing change.* Managing Ambiguity and Change, 127-143.

Organisational Learning

Roth, G; Kleiner, A (1995): *Learning Histories: "Assessing" the Learning Organisation.* The Systems Thinker 6(4, May), 1-5.

Senge, P (1990): *The Fifth Discipline: Art and Practice of the learning organisation.* 1st ed. Doubleday, New York. 424 pages.

Kim, DH (1993): *The Link between individual and organisational learning.* Sloan Management Review, 37 to 50.

Thirty Months

Process:- Review current and other key texts, citation search on main authors, eliminate and justify areas which will not be followed, follow-up references as appropriate, identify gaps and main area of contribution.

3.3.2) Industrial / Corporate Environmental Management

Objective:- *To focus in on key authors in sub-areas of environmental management research and identify linkages to general management theory.*

Current Position:- Reviewed articles relating to *(for example)*

Environmental and Quality Management

Wells, RP (1995): *Why we need Value-Added Environmental Management.* EQM, 1-4.

Mitchell, JM; Brown, HJ (1994): Total Quality Environmental Management: Methodology and Examples of Work in progress. The Total Quality Review, 17-26.

Welford, R (1993): *Breaking the Link Between Quality and the Environment: Auditing for Sustainability and Life Cycle Assessment.* BSE 2, 25 to 33.

Cysewski, JB; Howell,RD (1996): *3M International Environmental Management System.* EQM, 25 to

Environmental Management and Business Strategy

Azzone, G; Bertelè (1994): Exploiting Green Strategies for Competetitive Advantage. Long Range Planning 27, 69-81.

Starik, M et al (1996): Growing an Environmental Management Strategy. BSE 5, 12 to 21.

Welford, R (1994): Cases in Environmental Management and Business Strategy. Pitman Publishing, London. 216 pages.

Rothenberg, S; Marcus, Dr A; Maxwell, Dr J (1992): Issues in the Implementation of Proactive Environmental Management Strategies. BSE 1, 1 to 10.

Environmental Management / Environment General

McKinsey and Company (1992): *Managing the environmental challenge. White Paper. Report for Hewlett-Packard GmbH.* November 1992.

Bansal, P (1995): Why firms go green. Doctoral Thesis - Chapter 4. Templeton College

Walley, N; Whitehead,B (1994): It's Not Easy Being Green. HBR May-June, 46-52.

Hart, SL; Ahuja, G (1996): *Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance.* BSE 5, 30 to 37.

Hass, JL (1996): *Environmental ('Green') Management Typologies: An evaluation, operationalization and empirical development.* BSE 5, 59 to 68

Hill, J (Ed.) (1992): *Towards Good Environmental Practice: A book of case studies.* Institute of Business Ethics, London. 91 pages.

Process:- Identify sub areas of current and other texts, citation search on main authors, eliminate and justify areas which will not be followed, follow-up references as appropriate, identify gaps and main area of contribution.

3.3.3) Research Methodologies

Objective:- *To identify opportunities and limitations of research methodologies used at HP and their application in other research.*

Current Position:- Reviewed articles relating to *(for example)*

Roth,G; Kleiner,A (1995): *Learning Histories: "Assessing" the Learning Organisation.* The Systems Thinker 6(4, May), 1-5.

Bryman,A (1995): *Research Methods and Organisation Studies.* Routledge, London. 283 pages

Kemmis,S; McTaggart,R (Eds.) (1988): *The Action Research Planner.* Third ed. Deakin University, Victoria. 153 pages.

Clark,AW (1976): *Experimenting with Organisational Life - The Action Research Approach.* Plenum Press, New York. 259 pages.

Waddington,D (1994): Participant Observation. In: *Qualitative Methods in Organizational Research.* (Eds: Cassel,C; Symon,G) SAGE publications, London

Hartley,JF (1994): Case Studies in Organizational Research. In: *Qualitative Methods in Organizational Research.* (Eds: Cassel,C; Symon,G) SAGE publications, London

Yin,RK (1981): *The Case Study Crisis: Some Answers.* ASQ 20, 58 to 65.

Eisenhardt,K (1989): *Building Theories from Case Study Research.* Academy of Management Review 14, 532 to 550.

Evered,R; Reis-Louis,M (1981): Alternative perspectives in the organizational sciences: 'inquiry from the inside' and 'inquity from the outside'. In: *The Management Research Handbook.* (Eds: Smith,CN; Dainty,P) Routledge, London, 300.

Van de Ven,AH (1990): *Review Essay: Four requirements for Processual Analysis.*, 330 to 341. (Incomplete Reference)

Process:- Identify main authors, citation search, eliminate and justify methodologies which will not be followed, follow-up references as appropriate, identify gaps and main types of methodology to be used.

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Section One

Hewlett-Packard

The first section in this report provides a brief background to the Hewlett-Packard Company and the UK subsidiary Hewlett-Packard Ltd. The setting for this research is the UK Sales Region of HP UK Ltd.

1.1) Hewlett-Packard Company

Hewlett-Packard Company (HP) is a leading global manufacturer of computing, communications and measurement products and services recognised for excellence in quality and support. HP has 103,000 employees and had revenue of $31 billion in its 1995 fiscal year.

1.1.1) Company Culture - The "HP Way"

The company has a strong culture known as the HP Way. The Evolution of the HP way began in the early days of HP. Bill Hewlett and Dave Packard combined their product ideas and unique management style and formed a working partnership[1]. The HP Way contains a set of organisational values, corporate objectives and strategies and practices.

a) Organisational Values

> HP's values are a set of deeply held beliefs that govern and guide our behaviour in meeting our objectives and in dealing with each other, our customers, shareholders and others[1].

These values are

- We have trust and respect for individuals
- We focus on a high level of achievement and contribution
- We conduct our business with uncompromising integrity
- We achieve common objectives through team-work
- We encourage flexibility and innovation

b) Corporate Objectives

> HP's corporate objectives are guiding principles for all decision making by HP people [1].

The objectives are

Profit, Customers, Fields of Interest, Growth, Our People, Management and Citizenship.

1.1.2) Quality Management at Hewlett-Packard.

> Hewlett-Packard's use of quality management methods stems from the belief that these methods are the means to achieve business success - and not a goal in themselves. They are the foundation on which people carry out their daily jobs[2].

As the quote implies 'Quality' features in all activities at HP. Hewlett-Packards definition of quality is 'Meeting and exceeding the needs of the customer'. This broad definition enables all employees to focus on the needs of both their internal and external customers. There are five areas of the Quality program;

- Strategic Focus.
  - This includes HP's customer feedback system, surveys and other methodology for understanding the needs of the customer base.
- Business Planning
  - Most entities operate a 3-5 year Ten-Step plan. This is a strategic planning process leading to an annual plan, breakthrough objectives, and business fundamentals.[1]
- Process Management
  - Managing business processes using data.
- Improvement Cycle
  - Managing improvement projects using the Deming Cycle of Plan, Do, Check, Act.
- Leadership and Participation.
  - Encouraging, active and widespread participation through culture, effective leadership, education, communication and recognition.

Each entity in the business has a Quality Maturity Review every two years. This assessment scores each of these five areas in terms of approach, results and deployment. The scores are averaged and an overall score between one to five is obtained. On this scale, a score of four is worthy of an external quality award. Most entities aim for a score of 3.5.

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[1] See Glossary of Terms for more details

1.1.3) Hewlett-Packard and the Environment

Information technology, looks set to be the worlds biggest industry by the early years of the 21st century. Until very recently, in the eye of the consumer, the industry was seen to be environmentally clean.

Recent examples of massive clean up operations in California's Silicon Valley have increased the pressure on the industry to be more "environmentally responsible" in its manufacturing. Along side this an awareness of the environmental implications of energy consumption have meant that the information technology industries are now under scrutiny to justify their products and services in an environmentally informed manner as well.

Some 75% of Hewlett-Packard's revenue comes from products developed in the last four years and this trend is continuing. With over twenty thousand products world-wide the environmental impact of such disposable technology must be significant.

These statements are indicative of the important role companies like Hewlett-Packard play in society today. Business and industry have an important function in the transition to more sustainable forms of development. The challenge facing these companies is no longer a competitive positioning one, but one of fundamental organisational change. Simply making "green" products is not sufficient to satisfy the environmental standards, lobby groups and legislators.

Within Hewlett-Packard, "Citizenship" has long been one of the seven corporate objectives (see 1.1.1b), as is "profit", and it is axiomatic within HP that all of the corporate objectives should figure where appropriate in a business process or decision. The concept of "green-ness" is already well absorbed into HP's ethos of citizenship. Indeed the original HP publication "Commitment to the Environment" derived most of its corporate legitimacy from the "Citizenship" objective.

The Hewlett-Packard environmental management objective is:

> "To provide products and services that are environmentally sound throughout their life cycle and to conduct our operations world-wide in an environmentally responsible manner."

To achieve this objective, HP's approach is to conduct its business world-wide in an environmental responsible manner.

> "That means our operations have been designed to meet or exceed all applicable local, national and international laws governing workplace safety and ecological protection."

Environmental Management at HP includes occupational health, industrial hygiene, safety management and ecological protection.

> Quotes taken from the Hewlett-Packard Environmental Management Policy[3].

Environment, Health and Safety (EHS) performance is measured using the corporate EHS Audit. A world-wide network of auditors visit sites to assess EHS programs and share best-practices. Audit results form part of the company Chief Executive Officer's business fundamentals.

1.2) Hewlett-Packard Ltd

Hewlett-Packard Ltd, the successful UK subsidiary of Hewlett-Packard has R&D, manufacturing and office based sites throughout the UK employing some 5000 people. The UK Sales region (UKSR) is located throughout the British Isles, its headquarters in Bracknell, Berkshire housing approximately 1500 employees. Turnover in the UK for 1995 was approximately £1.7 billion.

1.2.1) Quality Management

In 1994, HP UK won the first President's Award for Quality, a prestigious honour given only to those entities that demonstrate a superior level of quality maturity backed up by sustained business performance.

1.2.2) Hewlett-Packard Ltd and the Environment

HP Ltd was a founder member of ICER, the Industry Council for Electronic Equipment Recycling, formed in 1992. The site at South Queensferry (SQF) was one of the first organisations in Britain to receive the British environmental management standard BS7750.

1.2.3) Research Context

In 1993 Mr Tom Davis was appointed Director of Environmental Affairs for Hewlett-Packard Ltd. Mr Davis is an experienced general manager in HP, previously holding such positions as Personnel Manager and Country Manager for HP Ireland. He had no experience of managing environment, health and safety. At that time Mr Davis believed that:

- public interest in environmental issues could cause potential problems for Hewlett-Packard Ltd's continued growth if they were not managed effectively;
- managing environmental issues effectively would have to involve a major attitudinal change process;
- The growth of public interest in the environment was considerable and could impact business results long before such a change process was complete.

Mr Davis wanted to apply a precautionary approach and take steps toward such an attitudinal change process before environmental issues impacted business results. His vision was that environmental management would be institutionalised, or part of normal business practice, within a 5 year time frame

With his experience and knowledge of HP business methodology he decided to implement a four year environmental management program. He developed a 3-5 yr. Environmental Management Ten-Step Plan. (See section 1.1.2)

One year later a Research Engineer (RE) from the University of Surrey / Brunel University engineering doctorate program was hired by Mr Davis. The RE (Zoe Jackson) was employed to advise HP on environmental issues as they impact business results. It was agreed that, through participating in the development of the Ten-Step Plan the RE would learn first hand the issues and factors which affect the "institutionalisation of environmental management" over a four year time frame (October 1994 to October 1998).

Section Two

Research Background and Contribution

The objective of the research program was agreed to be the "institutionalisation of environmental management". The previous section described the context of the research from the company's (HP's) perspective. This section now describes the research background in terms of:

- *Environmental Technology*
- *Environmental Management (including other research)*
- *The theory of institutionalisation and organisational change.*

An overall summary of the research objective and associated questions is then presented along with a summary of the contribution to knowledge.

2.1) Environmental Technology

Technology can be defined as the "application of science". (Concise Oxford Dictionary, 1982). Science covers a broad range of disciplines including natural, physical and social phenomenon. Application of any of these "sciences" could be described as "technology".

In this research the term "environment" refers to the ecological surroundings, including the air, land, water and animal species. Environmental technology, therefore, is the application of a "science" to issues which relate to the ecological surroundings.

Environmental "issues" have steadily grown in popularity and magnitude during the latter half of this century. Many factors have been blamed for the gradual destruction of species and resources including economic growth, the rate of technological change and industrialisation. None of these factors are independent of human beings and yet it is only recently that environmental scientists have included the social and human sciences in their "tool kits".

In order to reach the core of "environmental issues" today, environmental technology must include the application of the human sciences as well as the more traditional physical and natural sciences. Knowledge of human impact on the environment is no longer just the

domain of environmental scientists. Environmental issues impinge on every area of knowledge. Solutions to environmental problems require a multi-disciplinary approach.

This research focuses on environmental issues as they affect an organisation and the people inside that organisation. A wide range of science will be applied in the research, not least organisational science, in order to understand the way in which an organisation may contribute to the debate on environmental issues and technology.

2.2) Environmental Management

'Jaques has noted that most words in the field of organizational development - even "manager", "plan", and "work" - are ill defined. Such words have "so many meanings that they have value only as vague slogans"[4]. I would argue this is currently the case with "environmental management". According to Croner's

> It (Environmental Management) is probably best considered as taking environmental factors into account in all management decisions, from product design to ultimate waste disposal, through and including product life cycle[5].

A "green" company is one which totally integrates environmental considerations into all its policies, plans and practices choosing the most environmentally sensitive options *en route*[5].

For the purposes of this research environmental management is considered to be the management of environmental issues as they impact all areas of the business.

2.2.1) Environmental Management Research

There is still a great deal of confusion about what constitutes environmental management as far as the literature is concerned. In reviewing the literature (at least) the following phrases have been considered as being related to environmental management.

- Ecological Impacts
- Sustainable Development
- Eco-Management
- Total Quality Environmental Management.

Generally there are two types of audience for environmental management articles, practitioners (environmental managers) and the academic community. Each audience has specific needs and consequently requires a different approach.

Practitioner oriented research has produced numerous accounts of environmental management at work in a wide range of companies. A publication by the Institute of Business Ethics in 1992[6] described nine such case studies. Companies were described in terms of eight criteria, "Assessments", "Statements", "Targets", "Programmes", "Management", "Training", "Monitoring, reporting, auditing & review" and "Communications". Evidence for the case studies described appear in the most part to be from documentary evidence and interviews with senior members of the company's staff. A similar collection of "case studies" appear in Richard Welford's "Cases in Environmental Management and Business Strategy"[7]. He describes, in more detail, initiatives from four companies. Welford's approach is different to that of Hill, in that he describes specific (different) elements of the companies' environmental management approach and not general practices based on standard headings. Welford's evidence is also derived from interviews and company documentation.

Some individual case studies have tried to identify issues in the implementation of environmental management. Rothenburg et al[8] identified " some of the implementation issues that confront companies when they introduce environmental strategic change" A case study - Volvo - is used to highlight the difficulties encountered. The case study identified a number of factors that the authors believe will affect the implementation of an environmental management strategy. These were

- Organisational Context
- Organisational Structure
- Organisational Culture and History
- Products and Processes and
- Resources

This article goes half way to understanding the many complex interactions which may affect the implementation of an environmental management strategy. Bearing in mind that all these factors do affect the implementation of environmental management: What mechanisms are

there for achieving successful integration, and are there any general lessons that can be learned? For example, having selected an approach which is congruent with the above factors, what process must a company follow in order to integrate environmental management?

These types of case study serve a useful purpose in sharing and encouraging good practice across industries. They are normally based on success stories and use only company documentation and select interviews (where possible) as research material.

Articles that I would classify as academic research, fall into two further categories;

- Advice to practitioners based on broad experience in the subject, and
- Empirical studies of environmental management in a specific context

Obviously the two overlap, most empirical studies offer some kind of general advice, but I would like to consider them separately.

General guidance.

In an article called "Integrating Environmental Policy with Business Strategy", Hutchinson[9] describes, using examples, how integration of a firm's environmental policy with its business strategy has been accomplished and has benefits for the company, the environment and the community. Hutchinson presents a checklist of "criteria demonstrating integration of environmental policy and business strategy". Those companies which want their environmental responsibility to be an integral part of how they run their business are likely to agree with the items on the list. What is not described is the process of change that a firm must go through in order to get to the points on the checklist. For instance, how does a company get "Environmental Savings as an integral part of accounting and budgeting procedures in all departments."?

In "Growing an Environmental Strategy", Starik et al [10] state "Environmental Management is becoming increasingly accepted as a key feature of business strategy. However academic and practitioner publications on the subject develop few guides as to which process to follow to integrate environmental concerns and strategy" The article goes on to describe a kind of environmental gap analysis. A company identifies their current business "MOSAIC" -

Mission, Objectives, Strategic Orientation, Action Plan, Implementation and Controls" as they pertain to the natural environment. Then they analyse the company environment for trends, weaknesses and opportunities with stakeholders, including the natural environment. A revised MOSAIC is then produced based on the previous two steps. I believe, the next step for a company, once they have integrated the environment into business strategy, is to integrate the environment into business **practice**. A strategic orientation is a necessary pre-cursor to achieving practice on a day to basis, but it the day to day practice that ultimately changes a firm's environmental and business performance. This is a weak area in the literature on environmental management that my research can contribute to.

Empirical Studies.

Empirical studies on the broad topic of environmental management are rare, and have been conducted using a combination of interviews and document analysis. Halme [11] reviews "shifting environmental paradigms" in two Finnish paper companies. The methodology used in studying the shift in environmental management at the two companies was based on the grounded theory approach introduced by Glaser and Strauss (1967). "Grounded theory refers to an approach where the researcher systematically seeks to develop a theory appropriate for the empirical phenomenon studied"[11]. Semi-structured interviews were the main method of data collection. Documents like letters, memos, trade journals, annual reports, company histories and newspaper articles were also analysed.

It appears as though most empirical studies in this area are either based on interviews, documents or a combination of both. One avenue that has not been followed with environmental management research is participant observation. This could be due to a number of reasons.

- Environmental Management is a fairly new topic and thus in depth participant studies are unlikely to have surfaced yet.
- Environmental Management is a "hot topic", firms being unlikely to want to share their experiences in any great detail.
- Environmental Management is not an area that warrants prolonged participant observation.

In order that environmental management practice can be improved, a greater understanding of the internal mechanisms that prevent or encourage its implementation is required. Only through participant observation will research un-cover the underlying motives behind environmental management in companies and hence learn how to encourage good practices across industries. Environmental issues can be very controversial; getting to the truth behind decisions is often difficult. Prolonged participant observation can get over barriers which may prevent useful insights from being gained.

In her analysis, Halme[11] describes organisational "learning" with regard to environmental management. She says

> "It also appears that cognitive level organisational learning occurs in the course of action as new experience and knowledge are acquired. In the learning process, frame-breaking notions are, for instance, when management realises that environmental issues can bring out competitive advantage or other economic benefit"

Organisational learning with respect to the environment is an area of potential interest to this research. See "Future Plans" for more details.

2.3) The Theory of Institutionalisation and Organisational Change.

Most companies now admit that they have to change in order to stay is business. Continual adaptation to changing business environments is an essential part of any business strategy. Change processes usually go through a series of phases that, in total, usually require a considerable amount of time[12]. In Leading Change: Why Transformation Efforts Fail. Kotter[12] identifies "Eight steps to transforming your Organization" The eighth step is called "Institutionalizing new approaches".

> In the final analysis change sticks when it becomes "the way we do things around here," when it seeps into the bloodstream of the corporate body. Until new behaviours are rooted in social norms and shared values, they are subject to degradation as soon as the pressure for change is removed[12].

Thus, in order for environmental management to become "the way we do things around here", it must be institutionalised.

"One definition of institutionalization is the creation of formally sanctioned organisations and procedures that orient social behaviour according to recognizable, stable, and consistent patterns"[13]. In a study on the "Articulation and Institutionalization of Democracy in Poland",

Cirtautas and Mokrzycki[13] distinguish between "articulation", the processes whereby a given group develops and articulates a set of values around which action can be oriented, and institutionalization", the process whereby these values are concretized in authoritative patterns of behaviour". Institutional theorists are interested in the process by which items become institutionalised and the role of institutions in society (Scott, 1987)[14]. It appears the two definitions are similar, "articulation" being comparable to the "role of the institution" and, "institutionalization" to the process of embodiment.

Is institutional theory appropriate to environmental management research? In an article on "Ecologically Sustainable Organizations", Jennings and Zanderbergen[14] argue that institutional theory can be applied to the concept of ecological sustainability. Institutional theory..

> is useful for understanding how definitions of ecological sustainability are generated and accepted both inside and out of organisations. It is also for useful for.. describing how organization activities may, over time, come to contribute to sustainability[14].

It appears then that institutional theory can be useful framework for understanding how environmental management concepts are generated and accepted in an organisation, and also how those concepts become embedded into that organisation over time.

2.4) Research Questions

From reviewing the literature on environmental management and organisational change it is now possible to extend the objective to a set of questions to guide the research.

The objective of this research is to participate in, and monitor, the "institutionalisation of environmental management" in HP's UK Sales Region.

"Institutionalisation of environmental management" is considered to be a process, the outcome of which would result in a wide range of environmental management concepts being adopted pervasively and measurably throughout the company.

In order to achieve this the following questions will be addressed.

- What was the initial understanding of environmental management concepts in the organisation? How did this compare with peers and national norms?

- What are the compelling drivers of environmental management which business managers in HP would consider legitimate?
- What defines the acceptable vision of "institutionalisation" which will motivate change within the company?
- What organisational changes are required for the implementation of an environmental management strategy in HP
- What strategies and tactics should be adopted and / or avoided?
- What trends are observed in the institutionalisation of environmental management.

2.5) Summary of Contribution to Knowledge

The contribution of this research lies in three areas:

- Setting
- Research Methodology
- Subject

These are presented below.

2.5.1) Setting

Most research on environmental management focuses on manufacturing operations or at a strategic management level. This research chooses as its setting a distributed non-manufacturing organisation. It will examine the type of issues encountered in a non-manufacturing setting where the ecological environment is far removed from day to day business.

Communication technology is rapidly changing causing organisations to become more distributed. The environmental impacts of such distributed organisations are less understood than more traditional "sites". This research can contribute to the understanding of this growing organisational phenomenon.

2.5.2) Research Methodology

As has been previously mentioned, such prolonged immersion for environmental management research is rare. Having virtually unlimited access and participation to a

company undergoing strategic environmental management change will contribute greatly to both the understanding of organisations and to environmental management.

2.5.3) Subject

Due to the research methodology, the subject of this research can also contribute to its originality. Previous research either focuses on employee participation and training, or strategic change at a board level. This research bridges that gap and analyses the process by which individual action can result in organisational action and commitment. For instance, does involving employees in such projects as recycling paper encourage environmental issues to seep into their job? Or vice versa: Does having an environmental role in the company structure encourage more commitment to the environment on a personal level?

2.6) Outcome of the Research

The research will generate insights for the following audiences (written in no specific order)

- The academic community
- Practitioners of environmental management
- Hewlett-Packard's Environmental Management functions.

For academics the research will provide empirical evidence of the link between individual behaviour and organisational behaviour toward the environment. It will also provide insight into the barriers against, and motivations for, environmental issues in companies.

For practising environmental managers this research will provide insights, from first hand experience, on how you can integrate environmental management into the business. Specifically, the project will uncover general approaches that work and those that don't work in an environmental change program.

For Hewlett-Packard managers, these insights are especially relevant. Hewlett-Packard policies, processes and cultures are very similar around the world. The results of this research will be directly applicable in other HP sites.

Section Three

Research Design and Methodology

In previous sections, the background and objectives of the research have been described. The following section describes the strategy for carrying out research in order to achieve those objectives.

3.1) Research Design

Bryman[15] suggests that research *design* is distinct from research *methodology*. The research design is the overall structure and orientation of the project, whereas the methodologies described are the techniques used for data collection. I will first discuss the research design for this project and then the methodologies employed within that design. This research is a four year individual case study from which it is hoped that broader and general conclusions will evolve. Case study research is appropriate for this project as it allows for a "processual, contextual and generally longitudinal analysis of the various actions and meanings which take place in organisations"[16].

3.1.1) Action Research based Case Study

Case study research can include elements of other research designs both quantitative and qualitative. In this instance the role of the researcher is to facilitate change within the organisation and so methodologies associated with action research are appropriate.

> In action research, the researcher is involved, in conjunction with members of an organisation, in dealing with a problem that is recognised as such by both parties. The researcher feeds information about advisable lines of action back to the organisation and observes the impact of the implementation of the advised lines of action on the organisation. In a sense, the researcher becomes part of the field of investigation. It is the nature of the relationship between the researcher and his or her subjects that constitutes the prime reason for conceptualising action research as a distinct design [17].

Taking this definition and adapting it for this research project would read:

> In this action research project, the researcher is involved, in conjunction with members of Hewlett-Packard Ltd, in dealing with the potential business impact of poor environmental management. The researcher feeds information about advisable lines of action back to Hewlett-Packard Ltd and observes the impact of the implementation of the advised lines of action on the company.

3.1.2) Role of the Research Engineer

The research engineer works within the Environment, Health and Safety department at Hewlett-Packard. In order to achieve the research objective and address the research questions (section 2.4) different roles are assumed.

The most important roles are:

- Independent researcher.
  - In this role the researcher reflects upon her observations and although participating is not instigating any planned change to the organisation.
- Change Agent.
  - In this role the researcher introduces change to the company. For example setting up a new process or policy.
- Hewlett-Packard functionary
  - In some instances it is beneficial for the researcher to behave as a "normal member of staff". This person takes part in daily business activities and has a role in the Environment, Health and Safety department.

Other roles can also be assumed in a chamelion-like way in order to obtain access or trust. One example would be an "academic" role with no company ties.

These roles are used ethically at all times. They are used as the best means to obtain information from the organisation. Most, if not all, employees are aware of the research but accept the somewhat "dual" role that the RE plays.

3.2) Research Methods

There are many research methods associated with organisational research.

> Many case study researchers, in their pursuit of the delicate and intricate interactions and processes occurring within organizations, will use a combination of methods, partly because the complex phenomena may be best approached through several methods, and partly deliberately to triangulate (and therefore improve validity) [16].

Bryman [17] lists seven distinct types. Table 1. shows these methods and briefly describes where they are used in this project.

Table 1. Research Methods Used.

Method	Used?	Notes
Self Administered Questionnaire	Yes	Changes to internal surveys, general awareness surveys that are used to elicit environmental information and trends.
Structured Interviews	Sometimes	Mostly in association with specific projects. Uncover the same details for different people.
Participant Observation	Yes	Making observations by being in the context. Most information comes from this method.
Unstructured Interviewing	Yes	Less specific questions to elicit opinions on issues.
Structured Observation	No	Not required as researcher strongly involved with organisation.
Simulation	No	Not required as reality is seen anyway.
Archival Information	Yes	Minutes, Presentations, Company Reports, E-mail etc. to get the "written version"

Only two of the above types of research method are not used in this project (shown in grey). Structured observation is normally carried out by a researcher who does not participate in the day to day activities of the organisation. In this project it is part of the design that the researcher plays an active part in day to day activities so structured observation would be difficult to achieve. Similarly for simulation, there is no need to simulate real life situations where the researcher is so involved. The methods used in this project are described in more detail.

3.2.1) Self Administered Questionnaires.

Self administered questionnaires are normally a set of questions which the respondent completes on their own. The questionnaire is designed such that the responses can be assumed comparable. Filling in surveys or questionnaires at work is time consuming, especially if the subject matter appears irrelevant or of little value to the company. Internally at Hewlett-Packard, people hesitate in using surveys as a primary source of data for that reason. There are advantages to carrying out surveys though, if a good response can be

generated. In order to obtain a yardstick for the level of awareness in a company a broad survey can be an appropriate mechanism.

In this project the researcher uses existing surveys, that are accepted in the company and normally filled in, to obtain information on environmental issues. For example, until 1995 the Platform Services Survey (PSS, see section 6.5.2) at Hewlett-Packard did not include any EHS questions. The survey includes such questions every year now and acts as an important source of data for business planning and issue prioritisation.

Occasionally separate surveys will be carried out for this research. This will normally be when a specific issue needs improvement. For example in March 1996 a survey of recycling behaviour was carried out by the researcher and other members of a waste management project team.

3.2.2) Structured Interviewing

Structured interviewing concerns face to face precise and formulated questioning. In other words, having the same pre-determined interview schedule for many people. This is an area which will be used in this research, probably for specific purposes as opposed to general data capture. For instance, in a study on the perceptions of environmental issues in workplace a range of employees were interviewed according to a set of questions. Semi-structured interviews are also likely to be encountered.

3.2.3) Participant Observation

> Participant observation comprises the fairly prolonged immersion of the researcher in the context that it is to be studied with the purpose of gaining first-hand knowledge of that context, primarily through observation of individuals as they go about their normal work activities[18].

It is possible to distinguish three types of participant observer role: covert, full or indirect[19].

Full participant observation is employed in this project, that is, the research engineer has a work role within the organisation but as known as a researcher among most of the employees at the company.

The benefit of full participation in this project is the virtually unlimited access to employees and documentation within HP. This access extends to networks beyond HP UK. Senior EHS managers across the company world-wide are aware of and support the research. A recent example of this support appeared in an e-mail message from the European Environmental Manager in HP:

> "We are really looking forward to the findings of your work and to your recommendations on how best to integrate EHS in an organisation.
> Keep things up and best success with your work! "

Although the participation overall may be considered to be full, the degree of participation with individuals varies according to circumstance. In some situations the RE leads a project or meeting, in others she takes part but not in a leadership position. Other situations in the company are just observed and the RE has little role to play in their execution. A wide range of data is captured in all situations, the main differences between the three are:

- In a leadership role it is possible to explore different types of leadership and examine the reaction the group to the different styles.
- In a team role it is possible to note the performance of the team when the researcher is both present and absent. For instance, are environmental issues forgotten if the RE is not present.
- In a pure observation role, it is possible to really sit back and analyse the team interactions without the RE's intervention. Detailed note taking is also easier in this situation.

3.2.3 b) Field Notes

> Participant observers rely a great deal on recording as many of their observations as quickly as possible, by writing notes which record events or remarks of importance[17].

In this research, field notes are recorded regularly in a log book. One side of this log book is used for recording conversations, meetings and other "interactions" with the organisation. The reverse side is used to record rough comments, notes from seminars, conferences and EngD modules, "To Do" lists and general conceptual planning. Text recorded in both sides of the book is reviewed on a regular basis and key words are high-lighted. Once the words have

been highlighted, they are noted (along with their relevant page numbers) in an alphabetical card index system. Categories of key words currently used include:

Actors *(People involved in the change/project, departments or functions involved)*
HP Sites *(Since the Sales company is distributed)*
Stakeholders ***(Any other companies involved, Customers?, Media?)***
Environmental Management Concepts *(Recycling, Closing the loop etc.)*
Feelings ***(Motivated, Stressed, Pressured, Empowered etc.)***
Goals ***(Money, Audit, Personal)***
Outcome *(Worked, Didn't work, on hold etc.)*

This enables subsequent analysis of the data for relevant trends. The log book is backed up on a regular basis, to date it has been manual but an electronic version is currently being developed.

3.2.4) Unstructured Interviewing

With unstructured interviewing, the researcher may not have a set of pre-defined questions. This type of interviewing is designed to allow a more open ended approach to questioning allowing the informant to discuss the issue rather than answer a question. Unstructured interviews often form part of participant observation research as they can be conducted relatively spontaneously. In this research, unstructured interviewing does occur but an effective format for capturing the results of the interview is still under review (see Future Plans)

3.2.5) Documentary Analysis

The analysis of documents is generally used to supplement other research methods. This is the case in this project. Access to a wide range of documentation is possible. The researcher keeps a log of all electronic mail coming in and out of the EHS department as a kind of historical account of day to day events. Access to presentation material is also possible, along with minutes, reports and all other hard evidence. The documents are mostly used to triangulate other data, only when other data is not possible (for instance historical data or company financial information) are documents the only source.

Section Four

Theoretical Framework

This section of the report provides insight into the generation of a theoretical framework for the research project.

4.1 Background to theory generation

Development of theory is a central activity in organisational research. Traditionally, authors have developed theory by combining observations from previous literature, common sense and experience.[20] According to Hartley [16], the value of theory in case studies is key -

> "Although case studies may begin with only rudimentary theory or primitive framework they need to develop theoretical frameworks by the end which inform and enrich the data and provide not only a sense of the uniqueness of the case but also what is of more general relevance and interest.... without a theoretical framework, a case study may produce fascinating details about life in a particular organisation but without any wider significance"

Two main sources were used to develop a framework for this project. These were:

- Literature from the following (main) areas;
  - Institutional theory,
  - Action Research,
  - Environment and Environmental Management,
  - Research Methods,
  - Organisations and Management, and
- Initial observations at Hewlett-Packard.

As a result of these literature reviews and internal observations the following framework is presented as a guide for further investigation at the company.

4.2) Research Framework

4.2.1) Institutionalisation

From the literature reviewed it appears that there are a few critical components that must be evident in order for "environmental management" to be institutionalised:

- A common understanding of the concept of environmental management.
- Consistent action by the organisation and its members regarding environmental management.
- Environmental Management as part of the company orthodoxy

The first of these is the "common understanding of environmental management". This has to be at the level of the individual in the company. Unless individuals in the organisation understand and value the concepts of environmental management, institutionalisation will not occur. Individuals affiliated with organisations as owners, managers, employees, members and volunteers bring critical ideas and energy to the "greening" of their organisations.[21] This element is referred to herein as *Individual Values.*

Not only should individuals within the company have a common understanding of the concepts associated with environmental management, they should be taking action. Most individuals can actively contribute to environmental management at work. The nature of the role of the individual in the organisation will affect the magnitude and type of activities that they can perform though. For instance, the individual action of an administrator may be different to that of the finance director. Whatever their discretion though, consistent action of the members of the organisation is an important element of institutionalisation. This shall be referred to as *Individual Action.*

Institutionalisation is not just about individuals taking action. Consistent organisational action is also required. In a large organisation like Hewlett-Packard Ltd., the company is more than just a collection of individuals, although it is recognised that without those individuals the company would not exist. What constitutes organisational action and not just individual action is hard to define, for instance, organisational activities are often started by one person. In terms of HP an organisational activity is defined as one that occurs within the six key processes of the company. HP is a process oriented company with most, if not all, business

processes documented and monitored on a regular basis. The six key business processes are standard set processes covering all business activities. An example of a business activity therefore would be evidence of environmental management in a formal business plan as opposed to an individual cycling to work. This element will be referred to as *Business Activity.*

In the previous elements "action" was referred to as part of the institutionalisation process. Some authors suggest that total institutionalisation is the total absence of action.[22] In essence this is true, when employees of HP recycle (say) paper without it being an intended action then environmental management (or recycling paper at least!) will be institutionalised. However, whilst the process of institutionalisation is developing the term action will be used, both in terms of the business and the individual, to denote intended activity regarding an environmental management concept.

The final element of institutionalisation is evidence that the organisation has environmental management as part of its orthodoxy, or way of doing things. HP has a very strong culture known as the HP way. These are commonly cited principles and values which are consistent across changes in the company. If it were institutionalised environmental management would be understood as being part of the HP way. This is the hardest aspect of institutionalisation to measure but evidence will be sought in conversations and documentation. From now on this element will be referred to as *Company Projection.*

4.2.2) Environmental Management

The next step in developing a theoretical framework for this project is to consider the concepts embedded in "environmental management" that will be suitable for analysis within Hewlett-Packard.

"Environmental Management" means different things to different companies. Within Hewlett-Packard, environmental management encompasses occupational health, industrial hygiene, safety management and ecological protection. [23] As such, policies are implemented through Environment, Health and Safety departments around the world. The main focus of this research program however, is on environmental issues and not health and safety. The concepts within "environmental management" to be studied should be specific but open to

adaptation at a later date if necessary. For each element of institutionalisation, four concepts of environmental management, that have been chosen to provide a framework for further analysis, will now be described.

a) Element: Individual Values

There are a wide range of environmental issues that an individual could have an opinion on, ranging from acid rain to deforestation, bottle recycling and population growth. The following four subject areas will be examined in terms of individual understanding and priority. Examples of associated questions are shown in Italics.

Environmental issues at work: *Does work have environmental impacts? Should companies demonstrate environmental commitment?*

Waste: *What is waste? Is it an issue in society?*

Resource depletion: *What are natural resources? Are they running out?*

Air pollution: *What is polluting the air? Opinion on global warming and other atmospheric issues?*

These areas cover a good proportion of popular environmental issues in society. Evaluating the opinion of "environmental issues at work" is an important question designed to uncover any potential differences between the individual in the home and work environments. This element will take a slightly different research approach than the remaining elements: it is unlikely that employees will just talk about environmental issues on a personal basis at work. A series of discussion groups is planned that will attempt to uncover the understanding that people have about environmental issues, in particular the above four areas.

b) Element: Individual Action (at work)

In deciding what issues to focus on in terms of individual (environmental) action, it is important to remember that the organisation under study is a sales company. Consequently, activities that individuals partake in, on a day to day basis, appear to have very little environmental impact. If you consider the system of inputs and outputs that an individual has at work environmental impact is generated by (at least) the following activities.

- Disposing of office waste
- Goods Purchased e.g. stationery or food.
- Resources consumed in office activities and

- Travel to and from the office.

Specifically the areas that have been identified as critical "environmental management" concepts for individuals at HP are:

Office Recycling *How much office waste is recycled, re-used?*

Green Purchasing *Does the employee request /buy recycled paper or other more "environmental" products from the purchasing department. How much recycled paper is used compared to non-recycled?*

Energy Consumption Patterns *Does the employee... turn off his/her PC for environmental reasons? Reduce printer usage? Turn desk Lamps off?*

Travel Practice *Does the employee cycle or car share to work on environmental grounds?*

These particular aspects have been chosen to represent a range of "environmental maturity" at Hewlett-Packard. Currently, for example, the concept of office recycling is well understood but the impacts associated with energy consumption or travelling are not. Even within the area of office recycling certain materials, such as cups and white paper, are always recycled but others, such as aluminium cans, are not. This allows for more fine grained analysis of the drivers of successful environmental programs.

Information on these concepts will come from a variety of sources within the company including surveys, physical evidence & records and personal comments. Three types of data are likely to arise:

- Quantitative data such as physical reductions in waste or energy consumed
- Surveys of behaviour toward the concepts
- Observations of actual behaviour.

In this way data from either source will be validated by the other two.

c) Element: Business Activities

By applying the same principles, a business producing a service will have (at least) these impact areas.

- Waste leaving the building
- Company Transport
- Resources Consumed
- Goods Purchased

- Products Sold

Specifically, the areas that have been identified as critical "environmental management" concepts for HP as an organisation are:

> ***Impact Management*** *- managing the environmental impacts caused by operations such as waste, energy and transport.*
>
> ***Supplier Evaluation*** *- reviewing and demanding good supplier environmental performance.*
>
> ***Product Take-back or recycling*** *- processes to recycle or recover goods sold to the UK market.*
>
> ***"Green" marketing and sales*** *- activities to gain market share through competitive advantage or differentiation on environmental grounds.*

These areas were chosen by examining literature on typical environmental management responses in companies [14] and from initial experiences at HP. For example, although an emerging facet of environmental management at the moment is " environmental accounting" this is not an area worth focusing on in HP at this time. As with the areas chosen for individual action, the four aspects of business (environmental) activity are at varying levels of maturity in HP at this time. "Product Take-Back" is an emerging issue which may become more important to HP's businesses whereas "impact management" is more established and regularly audited. This provides varied data to help understand the institutionalisation process.

Evidence of change in these areas will be sought in:

- Minutes, presentation material and other working documents
- Observations at meetings and events
- Published HP documents.

This will also provide a spread of analysis in order to capture different perspectives on the same changes.

The measurement approach used for the "individual action" and "business activity" elements is similar to the one taken by Klinkers and Nelisson[24]. In their paper on environmental campaigning they differentiate between intended environmental behaviour (both individual and corporate) and actual environmental behaviour by using both a pre and post event measurement strategy. The time spent at the organisation in this project will allow for both

chronological and reverse chronological analysis. This will add validity and, most importantly, insights into the process of change at the company.

d) Element: Company Projection

For this element I have chosen the same concepts as for the first element (Individual Values). These were chosen intentionally to see if there is any correlation between the values that the individuals in the company have and those which are projected by the company.

4.2.3) Relationships

The four elements of institutionalisation as I have described them are by no means independent. It is possible that individuals who are personally concerned about environmental issues are more likely to behave environmentally at work. Concepts understood and valued highly by individuals in the company may relate to business activities and processes. I believe the elements are intricately linked to one another. Identifying the web of relationships present in the institutionalisation process is an important part of the overall research question.

One way of examining this web of relationships is to apply the literature on organisational learning. In order for "environmental management" to be institutionalised in an organisation, I would argue that the organisation must learn about the relevance of environmental management to the business.

As Kim[4] describes March and Olsen make a distinction between individual and organisational action in their model of organisational learning.

> In this model individual actions are based on certain beliefs. These actions, in turn lead to some organisational action which in turn lead to some environmental response. The cycle is completed when the environmental response affects the individual beliefs.

Tracing the process in terms of environmental management:

Individuals in the company may believe that environmental issues are serious and worthy of some action at work. In the model this would lead ultimately to some organisational action; for example an environmental management process or policy. The organisational action would cause a response from the business environment and contribute to the beliefs of the individual.

The use of an organisational learning model to explain the relationships between the four described is an area that will be developed in more detail in the next two years.

4.2.4) Change Context.

Changes in the chosen areas of environmental management will be referred to as the *content* of change at the company. Over the research period, other areas of environmental management, not covered by the areas described above, may develop or change. In order to provide a broader analysis of the changes occurring at Hewlett-Packard these contextual changes will also be recorded.

Documentary evidence and participant-observation will be used to evaluate the ongoing EHS context at the company. Three specific areas of context will be examined, described below. Examples are described in italics.

> **Awareness.** *How is EHS described at the company? What is the understanding of "environment" at the company, How is the environment positioned in terms of other objectives?*
> **Structures.** *What teams and committees exist? Are there any environmental leaders? What support is in place for issues to be dealt with? What reward and recognition processes are there?*
> **Activities.** *Audits, Awareness campaigns, Surveys etc.*

The institutionalisation process may also be influenced by more general contextual changes. Examples would be, company financial performance, strategic direction and organisational structure. This influence is acknowledged and will be recorded when major contextual changes occur. A recent example would be a company decision to merge two product divisions. The two divisions have different environmental management needs; one being more consumer driven than the other. This may affect the development of environmental management in the divisions and the company as a whole. The majority of evidence for these influences will come from documentary evidence.

Section Five

Initial Conditions.

This section describes the UK Sales company situation in relation to Environmental Management just prior to the arrival of the RE. It describes the "EHS Context" (see section 4.2.4) at that time in terms of:

1.) *Structures and organisation relating to environmental management.*

2.) *The level of environmental awareness.*

3.) *Environmental activities*

This section is written in chronological order so that the interplay between all levels of EHS activity at the time can be seen. The first section describes EHS at the company prior to October 1993. Activities in the Financial Year (November to October) 1994 are covered in the second section.

5.1) Prior to October 1993.

August 1992 saw the first meeting of the "UK EHS Council". This group was set up to

> "...discuss HP environmental issues and consider a possible process to establish our position in the UK relative to EHS matters; as seen by the HP community and our customers."

As can be seen, the original focus of this group was "environmental issues", the agenda items were:

- UK Environmental Policy Statement
- Environmental Review of HP UK
- HP's interface with the external world.

> "The meeting proved that a real EHS "information gap" exists between, not only what is happening at the different entities, but also as to where and who the world outside can go for information about our Environmental Policy and stand on these important issues. (Taken from the minutes of the meeting)

In November 1992, John Golding, the UK Managing Director, recognised the need for a senior field EHS spokesperson. At that time, manufacturing sites in the UK had EHS Managers but the sales and marketing company did not. It was felt necessary to have a representative in the field for greater focus and communication. At the second "UK EHS Council" meeting, the group covered the same topics relating to environmental issues and communication.

By January 1993, the council was considering changing its name to better reflect changes at a corporate level ("Corporate EHS" had become "Corporate Environmental Management"). The topics covered in this meeting were more or less the same as the previous meeting with a strong focus on communication and external relations. In March 1993 the council did indeed change its name to the UK Environment Council. The same topics were covered at the meeting but some areas had been completed or were coming to a halt.

There is very little information available between March and November 1993. Upon questioning, the chairman of this council said that there was a lot of activity around that time, especially the SQF EHS Audit. Consequently, meetings were either cancelled or not minuted. He had no record of meetings during that period either.

5.2) (November 1993 to October 1994)

Hewlett-Packard's financial year runs from 1st November to 31st October. November 1993 to October 1994 would be called FY94. The year is split into quarters.

5.2.11 Quarter One FY94 (Q1 FY94)

In October 1993 Tom Davis was appointed Director of Environmental Affairs for Hewlett-Packard Ltd. The following quote is based on his first meeting with the then Managing Director, and reflects the situation with regard to environmental management in the UK sales company at that time.

> Within the UK, and particularly within the Sales Region the responsibility for Environmental Management has existed for a long time, but has been characterised by a fairly short-lived and very part-time activity. In fact it seems very reminiscent of the early days of Quality Management, with lots

> of enthusiastic pockets of action, but relatively less alignment whether with the UK or with Corporate activities. [25]

At that time there had been 'quite a lot of committee work' but Environmental Management had not developed into top level business planning activities.

The UK Environmental Council meeting in November 1993 was overtaken by a presentation on the environmental management standard BS 7750. This was the first Environment Council meeting that Tom Davis attended as Director of Environmental Affairs. Many of the early topics, such as the development of a UK policy, were well under way.

5.2.2) Q2 FY94

By Q2 of 1994, a Field Environment, Health and Safety Council (FEHSCO) was established. It was Mr Davis' intention that the field EHS organisation would be a virtual one, made up of people across the organisation with some EHS related responsibility but no direct reporting lines to EHS. FEHSCO was originally made up of employees from Occupational Health, Facilities, Support Education, Finance & Administration and Regulations with EHS Staff from other sites acting as consultants. This council was set up to steer the Environment, Health and Safety plan of the time.

In the UK Environmental Council meeting of March 1994, a much wider range of topics were discussed. These included, for the first time, topics associated with Health and Safety. This meeting also introduced the concept of EHS representatives in the organisation. This appears to have been a move to try and encourage a greater degree of EHS ownership within the business units.

In March 1994, the first minutes of the "Amen Corner EHS team" appeared. The team had existed before this meeting but had changed ownership a number of times. Previous meetings were ad hoc and not very structured. The topics discussed at the first (minuted) EHS team meeting were mainly health and safety, recycled paper purchasing was mentioned but disregarded for apparent "lack of buy in from the company"

5.2.3) Q3 and Q4 FY94

By the third quarter of 1994, the UKSR EHS organisation was beginning to take shape. EHS roles and process owners were re-defined, a Generic EHS organisation was adopted and the Field EHS Council was working productively. [26] This continued into quarter four when the Amen Corner site EHS team and the UK Environment Council were both re-worked. None of the Amen Corner EHS team meetings referred to environmental issues in this time frame.

Informal interviews with members of HP's staff at the start of the research confirmed that the main areas of "environmental" activity were

- Involvement with the Industry Council for Electronic Equipment Recycling
- Recycled paper purchasing
- White paper recycling
- Plastic cup recycling.
- Wooden pallets and cardboard boxes recycling and re-use
- Light bulb crushing at pinewood.

An EHS assessment was carried out by the SQF EHS manager in November 1994. This was carried out using the company audit criteria as a basis for improvement. The report stated;

> "The site has been aware of the importance and extent of its various risks for some time and various people have devoted significant time to these issues over the years. The site has also worked closely with its manufacturing "countrymen" through John Golding and the UKEEC. This relationship was enforced in FY92 when the SQF EHS team were asked to support the UK field activities in a consultative capacity. This entire process began to finally consolidate with the integration of environmental management into its management systems, an area where the UK Sales region has already demonstrated much capability in the quality arena. Personally I feel that Amen Corner can be a leader in this arena too. [27]

In the same report the Environmental program summary included:

> "In order to raise the overall level of employee awareness and sensitivity to environmental protection, the site may consider developing programs of broad general interest, such as a solid waste reduction program, recycling initiatives, etc. and possibly leverage on these programs to continue and enhance the site public image and relationship with the surrounding local communities as well as employees.[27]

Twenty Four Month Dissertation

The end of quarter four also saw the start of the Brunel University EngD project providing a (semi) permanent focus on just environmental issues. This meant that Mr Davis could focus his attention on Health and Safety.

Comments

Prior to the start of the research project, environmental management at the UK sales company appeared to be quite an ad hoc activity. Committees and councils that did exist had few metrics or progress tracking mechanisms. The initiatives of the UK Environment Council (as it was then) were very much customer and communications oriented and Health and Safety was not on the agenda. After Tom Davis' appointment all levels of organisation dealing in EHS in the UK became more structured, more business focused and more aligned with corporate objectives. Issues relating to Health and Safety were given high priority, environmental issues being eclipsed for the time being.

When the RE started at the company, environmental issues (that were looked at) were all on the "operations" side and had been started due to individuals rather than recognised processes. No-one was co-ordinating efforts of environmental activity, in fact this was one of the main reasons that the research engineer was employed. The priority of environmental issues in the company at that time was fairly low.

Section Six

Initial Findings

This section briefly describes the status of "institutionalisation of environmental management" after two years using the framework presented in this report. Each aspect of the framework will be considered separately and an overall summary presented. A more detailed review of each area in terms of trends and obstacles in the change process in included in subsequent reports in the portfolio.

6.1) Individual Values

The methodology planned for uncovering individual values about environmental management is to use focus groups to generate informal discussions. The first two years of the research did not include any of these discussion groups, however it was possible to uncover some values through participant observation. The values uncovered thus far will provide a framework for the discussion groups planned later this year (1996). These are presented here against the four areas chosen to study (see section 4.2.2)

- ***Environmental Issues at Work.***

Environmental issues are important, but for someone else. Initiatives have got to be easy, convenient, regularly communicated, and have demonstrated value.

- ***Waste***

Landfill space is running out. It is un-necessary to waste things.

- ***Resource depletion***

No comments to date

- Air pollution

No comments to date. Some mention of air conditioning, internal focus.

6.2) Individual Actions

Insights into "individual actions" towards environmental management have been gained through a range of research methods. Actions witnessed thus far are presented here for the four study areas.

6.2.1) Office Recycling (main focus area)

A recycling survey carried out in March 1996 revealed that approximately 80% of respondents recycled their white paper, 90% recycled their plastic cups, 60% sent their toner cartridges for recycling. Very few respondents were aware of the glass and newspaper banks in the Amen Corner car park. Each figure will now be discussed individually.

White Paper Recycling.

The actual quantity of white paper sent for recycling does not appear to agree with a figure of 80% of employees recycling their paper. This difference could be due to:

- a non-representative survey sample
- 80% of employees recycling *occasionally* and not all the time
- Errors in calculating the quantity of waste sent for recycling.

Experience at the company suggests that a combination of all the above reasons contribute to the inaccurate data, but the second factor is the largest. This suggests that as far as paper is concerned, there is wide spread awareness of the facilities in the company, however it is not second nature to recycle as yet.

Plastic Cup Recycling

Data on the amount of cups being recycled confirms that a large percentage of purchased cups are indeed placed in recycling bins. As far as cups are concerned, more people take action and recycle them automatically. One comment which might explain the high take up of this facility is

> "When you go and get a drink, you just put your old cup in the cup bin and then get yourself another. It is really easy" (Anon)

This statement is also interesting as it highlights the fact that people do not think to re-use their cups throughout the day. Typically each person uses 5-6 cups a day, this equates to purchasing some thirty six thousand cups a week for just Amen Corner. Facilities to wash the cups are provided but are rarely used. Personal experience in this area suggests that washing a

plastic cup for re-use is too much effort.. and besides at least they are being recycled! It is easy to see how employees may feel virtuous about recycling their cups and thus do not consider re-using their cups, let alone reducing the amount they use!

Toner Cartridge Recycling

There is currently no physical data that will support the numbers obtained in the recycling survey. Experience at the company though would lead to the conclusion that some employees are aware of recycling spent toner cartridges, but is certainly not widely practised. Information on this facility in house is virtually non-existent which may explain the lack of commitment. Generally, if an employee happens to know what to do with a spent cartridge it will end up being recycled. Even if an employee doesn't know what to do with it, someone will and so recycling also occurs. At the moment success in this activity relies on personal knowledge and not on a formal process, but nevertheless some recycling is achieved.

Newspaper and Bottle Banks

Very few people at Amen Corner were aware of these facilities in their car park. The information provided about these banks is that they are for recycling waste arising in the home. There is no facility to recycle newspapers or glass bottles *inside* the office but the connection to use the banks *outside* is not made. Personal experience suggests that they are too far away, and that there is not enough information on their benefit to Hewlett-Packard or the environment, to bother using them.

6.2.2) Green Purchasing.

This has not been a main study area as yet, the following issues and activities have been witnessed by the researcher.

Recycled paper.

The purchase and use of recycled paper in the company is an issue which goes back to very early attempts to demonstrate environmental responsibility. Nevertheless it is only recently that people are starting to request recycled paper. At this stage, all headed note paper

purchased has a recycled content, as do the compliments slips and envelopes. Paper in the photocopy rooms is mostly from virgin material. A small percentage of paper provided in these rooms claim to have environmental benefits, no increase in the use of this paper has occurred since the start of the research. There are many myths surrounding the use of recycled paper at Hewlett-Packard. Some individuals believe it does not match other (headed) paper, resulting in an image of poor quality. Others believe that recycled paper clogs up the laser printers in the office and some just don't like the colour. It appears that the overriding factor in the individual use of a recycled item is heavily dependant on what is available for use and what the company policy on the subject is. If just recycled paper were available and the company policy was to use all recycled paper in their sales and marketing then no-one would mind using it.

Other "green purchasing"

Within the stationary catalogue, items that are recycled or have an "environmental benefit", are labelled as such. No data has been gathered on the quantities of these products bought compared to other "non-environment" products to date. The labelling is not very clear and so may go unnoticed. Hewlett-Packard has a list of preferred products that are commonly used items such as envelopes, pens and paper. If more of these were "environmental", individuals would automatically request them, increasing the quantities used.

6.2.3) Transport

The environmental impacts of transport is a topic rarely mentioned in Hewlett-Packard. No evidence exists that suggests individuals make transport decisions based on environmental grounds in this company. Experience at the company suggests that corporate image is very important to the employees of the sales region. At the moment , public transport or cycling just does not fit with that image. This is a planned area of detailed investigation in the final year of research.

6.2.4) Energy Management

At the moment an unknown quantity of employees leave electronic equipment on at the evening and at weekends. Research is being carried out at this time into the numbers involved and the financial losses caused. At least one employee has said that "turning off equipment at night, causes more damage than leaving it on, and results in greater costs". This is a common perception in HP world-wide and even in other companies. There is no evidence for this assertion, the idea is based on former technologies, but nevertheless the myth remains today. A white paper on the subject is planned along side a "turn me off" sticker campaign. A further step would be to turn off equipment at lunch-time. The researcher examined her own behaviour in this area and found that she never turns equipment off at lunch-time because the time taken to "log in" again after lunch is too long. Turning just the screen off was a suitable compromise which may be recommended across the sites for the time being.

6.3) Business Activity

Insights into the level of business activity toward environmental management have been gained through participant observation over the last two years. They are described below in the four areas of the framework.

6.3.1) Impact Management

This area includes all attempts to minimise the impact of business operations on the environment. This includes, waste and energy management, transport impacts and pollution control. This is the most mature area of Hewlett-Packards environmental management activities. Waste and Energy Management were Hoshin level objectives for the Field EHS Council in FY96. The Corporate EHS Audit currently focuses on mainly operational impacts such as pollution and waste which may be part of the reason that this area is more mature in the UK company. Even though this is the most "institutionalised" aspect of business activity toward the environment, changes have occurred over the last two years. These will be detailed in subsequent reports in the portfolio.

6.3.2) Supplier evaluation

There is some evidence that the company considers the environmental impact of its suppliers. The purchasing department uses the environment as a decision making criteria, the extent to which it affects the decision can be inferred from the following statement from a purchasing manager.

> "If it costs more than 5p per pound more than a non-environmental option then it is disregarded. A lot of 5p's add up very quickly."

This area will be examined in more detail in FY97.

6.3.3) Green Sales and Marketing

In terms of using environmental information in Sales and Marketing, the UK Sales company is immature. A number of events have occurred over the last two years in this area:

Green workstation

A product called the "Green Workstation" was developed by Hewlett-Packard in Germany. In the UK Sales company, a decision was made not to market the product. Reasons given were, lack of customer demand and strategic orientation of the company in terms of workstations.

Marketing Communications

A space for some environmental information became available in one edition of a company marketing newsletter. The newsletter went out to many (10, 000) corporate customers, a feedback slip included a question on the usefulness of environmental information to the customers, the results of which are not processed yet.

Generally the "Computer Products" group include environmental information on communications, like product release statements, where it is applicable and/or available. This is generally in the printer and computer product ranges.

Overall, business activity in "Green Sales and Marketing" is low. In the Computer Products Organisation (CPO), however, much greater level of awareness and activity is found. This could be due to the products having a short life span and using large amounts of consumables.

6.3.4) Product Stewardship

Business activity with regard to product stewardship over the last two years has increased in the UK Sales company. As well as initiatives in packaging, product recycling and consumables return the UK has agreed to fund a second research engineer from the engineering doctorate program (Brunel and Surrey Universities) to examine the logistics for product-take back. As with, "Green Sales and Marketing" The Computer organisation appears to be the main area of activity.

6.4) Company Projection

Over the last two years some activities have been identified with regard to company projection of environmental issues. These will be considered in the same subject headings as "individual values".

6.4.1) Environmental Issues at Work.

Hewlett-Packard has presented material at a small number of conferences on the HP's environmental position. The conferences were generally covering the topic of "green office equipment". Some articles have featured in the internal company newsletter, and at one site an environmental "tree" notice-board was erected for information and suggestions. Compared to two years ago the company position on environmental issues at work has improved. The consistency and strategy of communication in these issues is a weak areas though.

6.4.2) Waste

In terms of waste, there has been a couple of internal newsletters detailing HP's recycling facilities. These have very low key and do not appear to connect environmental management with corporate objectives.

6.4.3) Resource Depletion

The advent of the Energy Star eco-label has provided HP with an opportunity to communicate about resource depletion. Communications on how HP can save you energy have mainly come from other HP sites or corporate guidelines. The UK Sales company featured a section

on the energy star logo in a marketing communication (see "Green Sales and Marketing"). Such communication is not widespread and is focused on the effect of HP's products rather than transportation or operations.

6.4.4) Air pollution

An increasing area of concern that could be described as air pollution is that of low level ozone. Hewlett-Packard has responded to concerns from customers about ozone emissions from laser printers. This projection has been very re-active and does not really state HP's concern for human safety from this pollutant.

6.5) EHS Context

In terms of EHS Context a great deal of changes have occurred over the last two years. These are presented in terms of Structure and Organisation, Activities and Awareness.

6.5.1) Structures and Organisations

The Field EHS Council started just before the EngD research project (See "Initial Conditions"). Since its conception, FEHSCO has grown to include a member of Personnel and three business units representatives. FY95 was a successful year for FEHSCO in terms of Health and Safety awareness, but no environmental issues were covered. In FY96, Waste and Energy Management were Hoshin level objectives, immediately raising the profile of environmental issues.

As part of the Waste Management Hoshin, a Waste Management Team now exists to tackle environmental issues relating to waste disposal. The team was developed originally to tackle a specific project, but it appears that the team might meet on a regular, more permanent, basis in order to remain abreast of this changing field.

At the outset of the research, site EHS teams were just starting to meet on a regular basis. The amount of environmental information discussed at these meetings has increased, in fact one site developed a spin off "green team" to look exclusively at environmental issues. All the

EHS teams are still in existence, the majority of issues remain linked to health and safety though.

In the Sales company, each site has an Office Responsible Manager (ORM). This manager represents the site's interests in decisions and external communications. The role of the ORM was redefined last year to include site EHS responsibility.

The network of employees involved in EHS related issues has grown over the last two years. There now exists a full compliment of Fire Marshalls, First Aiders and VDU Risk Assessors. These are recognised as being part of the "EHS Organisation" and are encouraged to use their EHS Activities as part of their performance evaluation.

At a corporate level, a "Process Improvement Team" is redefining EHS for the whole company. Tom Davis is a member of this team. This has both positive and negative affects on the UK organisation. Mr Davis' absence from UK activities slow down the progress of the UK plan but his knowledge and experience of the corporate changes and needs mean the UK is at the forefront of HP's environmental activities.

Despite Mr Davis wanting EHS to remain a virtual organisation, increasing work-load meant that a UK Sales Region EHS Manager would be required to co-ordinate activities in the sales region whilst Mr Davis fulfilled his UK Director and European Field requirements. A manager has been seconded from the support services organisation in the UK to fulfil this role. Also, the appointment of a second research engineer to the department demonstrates the increasing need for full-time focus on environmental issues.

The final organisational change with regard to environmental issues over the last two years has been an alliance between the Quality, Communications and EHS departments. Each will contribute financially to HP's involvement with a growing forum for social responsibility. This alliance is at the highest level in the UK company and as such is an encouraging development.

6.5.2) EHS related activities

The EHS related activities which may have affected the more specific changes presented earlier are described below.

As part of HP's focus on both internal and external customers, regular employee surveys are conducted. The Platform Services Survey, measures the employee opinion of the platform services in the company such as personnel, quality and environment, health and safety. Until the arrival of the researcher there were no questions based on the EHS service at the company. For the last two years, the survey has included EHS questions. This has been used intentionally to both measure and raise employee awareness of the EHS department. Each year an employee satisfaction survey is also carried out. This is a more general survey about HP as a whole. In 1996, an environmental question was added to this survey to determine the employee perception of HP as an environmentally responsible company. This exercise was also intended to raise environmental awareness.

For the last two years, the UK sales company has been subjected to corporate EHS Assessments. In Hewlett-Packard, two assessments, based on audit criteria, are carried out before a full audit. The assessments take the form of an audit, the only difference being that the results are not sent to Lew Platt, HP's CEO. Undergoing an EHS assessment is an awareness raising tool in itself, the last two have seen an increase in knowledge and understanding of EHS issues in the sales company. For the FY96 assessment an awareness campaign was also launched to remind people that "EHS is everyone's responsibility". Feedback on the first newsletter of this campaign (the campaign is still running at the time of writing) was very positive and indicated that an increased level of awareness will result.

Over the last six months (March to September 1996) there have been indications that the UK company might produce an environmental report in a couple of years time. Data is currently being gathered in a common format to determine if this is feasible across the Sales and Manufacturing companies. This has been part of an overall improvement in UK sites working together towards the environment.

Very recently, it was decided that HP would like to be a leader in terms of environmental management, future communications and activities should hopefully reflect this intention.

6.5.3) Environmental Awareness

Results of surveys carried out over the last two years suggest that environmental issues are important to employees in HP. Most people believe HP to be an environmentally responsible company. Results of a survey carried out in July 1996, indicate that generally employees believe that "someone is taking care of it". "HP is a good company with strong citizenship objective, we must look after the environment". This indicates that people do not believe environmental issues are their responsibility, rather they are the someone else's. One area which was also highlighted in that survey, was the perception that environmental issues also include the building environment such as workplace health & safety and air conditioning etc. This is due in part to the strong health and safety focus in the objectives of the EHS department. Tom Davis' title is also Director of *Environmental* Affairs as opposed to EHS Director which may cause some confusion.

6.6) Company context

Over the last two years the following contextual changes have occurred.

At the outset of this research HP was divided into six business units. Two of those business units have now merged. The former Computer Systems and Computer Products Organisations (CSO and CPO) are now collectively known as the Computer Organisation. This has potential implications for environmental management at the company because the majority of HP's environmental issues (from the customer perspective) come from the former CPO.

Financially the company has also changed since the start of the research. Although growing at a large rate, operating costs of the company have also increased. Restrictions on travel and social events have been put in place. A part from affecting moral, these restrictions often prevent meetings from happening and hence any action.

Due to record growth the company profit sharing scheme saw record payments to employees. The method used for calculating profit share has been revised and a new model has been proposed. This caused some confusion, employees could not understand how record growth meant they received a lower payment. A great deal of effort went into explaining this to employees to maintain HP's image as a good employer.

6.7) Relationships

The relationship between all of the elements of institutionalisation is as yet unclear. This is likely to be investigated in terms of organisational learning (or un-learning). See "Future Plans".

The following insights are emerging as trends though:

- Environmental actions are made when there is no disadvantage in time or money spent. i.e. actions take little time and cost little money
- People in the company need leadership in this area. This may have something to do with fear of being seen to be green or have ultimate responsibility for it.
- People believe environmental issues are part of the citizenship objective and do not yet see the link to other objectives like profit or growth.
- Individual actions are not transposing to business decisions yet.
- Issues which are projected are random
- The informal organisation is useful for facilitating change.

These general insights will be used to further examine the process of change at the company over the next two years.

It should be possible to see from this review that environmental management concepts are starting to become accepted as part of business activity in the UK Sales company. Most elements of "institutionalisation" are present to some degree. At this stage though, the level of business activity is quite low compared to initiatives taken by individuals. Environmental management has not been accepted as a standard part of business processes yet. If institutionalisation is to occur, a greater degree of business commitment as well as individual commitment is required.

Section Seven

Future Plans

This section describes the future direction and plans for the research project. It is split into two sections.

- *Theoretical Framework*
- *Research Methodology*

7.1) Theoretical Framework

The theoretical framework in Section Four describes the critical environmental management concepts that will form the basis of this study. Each year of the program will focus on a small number of these concepts for more detailed analysis. In the financial year '96, impact management (business activities) and office recycling (individual actions) were chosen as the main area of investigation and change. The following diagram shows the time frame planned for each area of the framework.

The table represents only the main areas of focus. Every element in the framework has been, and will continue to be, monitored throughout the project. The topic of main projects or research will change each year though. The elements described for both FY97 and FY98 are not confirmed at the time of writing. The development of a second research project on product -take back will provide a permanent resource in this area from FY97 onwards.

The second aspect of the framework is the monitoring of contextual changes in both environment, health and safety and more general company activities. Both of these areas will continue to be examined for their potential impact on the institutionalisation of environmental management.

Table 2. Framework Schedule

Element	FY95	FY96	FY97	FY98
Individual Values				
Environmental Issues at Work		Form initial categories and provisional discussion areas	First discussion groups.	Repeat discussion groups
Waste				
Resource Depletion				
Air Pollution				
Individual Actions				
Office Recycling	No specific focus, issues identified and prioritised.	Improvement Project.		
Green Purchasing			Process improvement activity	
Energy Consumption patterns		Focus area		
Travel Practice				TBA
Business Activity				
Impact Management	No specific focus, issues identified and prioritised.	FEHSCO activities		
Supplier Evaluation			Process Improvement	
Product Take-back			Permanent in house resource	Permanent in house resource
Green Marketing and Sales				TBA
Company Projection				
Environmental Issues at Work	In house literature	External literature	External Conferences and Media	TBA
Waste				
Resource Depletion				
Air Pollution				

The final aspect of the framework, as presented in this report, is the relationship between each of the elements described. Section ?? introduced the concept of organisational learning as a way of analysing these relationships. This avenue will be examined in more detail over the next year.

The overall framework will continue to develop throughout the next two years as new literature and experiences are encountered.

7.2) Research Methodology

Section Three described the current methodologies employed in this research. Table 3. shows the planned improvements for the foreseeable future.

Table 3. Improvements for Research Methods.

Method	Future plans
Self Administered Questionnaires	No change, continue to use as appropriate.
Structured Interviews	Increase no. and improve documentation
Participant Observation	Improve note-taking of observed activities
Unstructured Interviewing	Improve record keeping
Archival Information	No change, continue to use as appropriate

The main areas of improvement are in note-taking and other record keeping. Much progress has been made in these areas since the start of the project, but further structure and discipline is required to ensure the validity of data.

7.3) Other research projects

Previous reports in the research portfolio describe related research projects. Briefly these are

- A longitudinal study with the working title "Environmentally Responsible Organisational Change".
- A conjoint analysis - "Establishing the importance of environmental product attributes to HP customers".

Both of these projects should produce results and academic papers over the next six months. For more details on the projects see earlier reports.

Section Eight

Research Review and Conclusions

This, the final section of the report summarises the first two years research in terms of:

- *Supervision*
- *Research Design and Methodology*
- *The Company*
- *The subject area*

Some general conclusions on the outcome of the research so far are then presented.

7.1) Supervision

Over the last two years guidance from both industrial and academic supervisors has been excellent. The supervisors each contribute valuable insights from their specialist areas. The combination of management, engineering, environmental and social sciences expertise has sparked many interesting conversations and has enabled a multi-disciplinary approach to the project. Regular supervisor meetings have kept the research (and the researcher!) on track and have ensured that problems are tackled when they arise.

7.2) Research Design and Methodology

Since the start of the project, my understanding of research methodology in general has improved. My understanding of organisational research has also developed, particularly in the last year (Since the appointment of the second academic supervisor Dr Alan Irwin). Continual learning of the research process has refined the thesis of this project to a framework which will be used for further investigations at the company. I am sure that this learning will continue and that the outcome of the four year project will be useful to both academic and industrial audiences.

Being immersed in the organisation presented a range of methodological problems, one of which was data capture. At the outset documentary evidence was kept describing a wide range of activities in the organisation. As time progressed, collecting all this evidence became

time consuming. Better time could have been spent analysing existing data rather than collecting more. The collection of data is now much more rigorous, experience in the company has made it possible to make some judgement as to the usefulness of information. Generally a rule of thumb applied is "if in doubt - keep it"

An other methodological problem, early on in the last two years, was the practicalities of note taking. In participant observation this is an essential component and should be done immediately or as soon after an observation as is possible. Before the advent of a formal log book, this was difficult to achieve. Specific time had to be set aside for "writing". Even with the log book, this is an occasional problem area especially at times when very little observation is taking place. An example would be when EngD coursework or reports are the main priority.

Over the next two years I would like to further develop note-taking in this project. I plan to develop a pro-forma to fill in after "chance" conversations or meetings that would capture the same information each time. Since the development of the research framework it will be easier to focus on specific issues and record any observations in a more ordered fashion.

An interesting point which has caused both problems and opportunities over the last two years is the degree of acceptance of the researcher in the company. Most people know the objectives of the researcher, everyone is told when they are first introduced, however the amount of time spent at the company is sufficient for employees to consider the RE to be a part of HP. This means that people feel more comfortable talking about issues in the workplace but it is often hard to ask simple questions about the way HP works.

7.3) The Company

Hewlett-Packard is a very good company to "work for". The office provides a suitable environment for my research although, sometimes, the open plan design affects prolonged periods of concentration and writing not normally required in day to day business. Information Technology is one of the fastest growing industries and so it is interesting to do research for a leading company in this field. Information Technology is also becoming more consumer driven making environmental issues increasingly important. The culture at the

company (the HP Way) is also an interesting aspect of the research, its emphasis on social responsibility provides an excellent opportunity for environmental research.

7.4) The Subject Area

Research in environmental management is developing rapidly. Developments in understanding and best practice appear on a regular basis. Specifically the notion of "institutionalising environmental management" is very popular amongst industry at the moment. Motorola organised a two-day symposium in February 1996 on the subject of integration or institutionalisation of environmental management and many other companies have expressed interest in the research. Within Hewlett-Packard, a corporate re-engineering team are looking at ways to integrate environmental concerns with business activities, this provides ideal circumstances in which to study the change process in the UK.

7.5) General Conclusions

Research to date has provided a firm foundation for the next phase of the engineering doctorate program. The research engineer is now in a position to use the research framework developed to guide further data collection and interpretation. The next year should see further development of the research thesis, in particular the development of models or process diagrams to explain the phenomena encountered.

Even after two years, the research project has made a contribution to HP's environmental performance. Interest in environmental issues is starting to increase (almost exponentially) providing an exciting environment to study.

Continued research over next two years should be able to provide a full analysis of how an organisation made the changes required in order for environmental management to be institutionalised.

Glossary of Terms

Words	Description
Amen Corner	Name for the UK Headquarters site
Field	Term used to mean the sales environment.
Environment	The ecological surroundings including air, land water and plant and animal species.
Ten-Step Plan	Hewlett-Packard's proprietary business planning methodology
Green	an adjective describing something which has no negative impact on the "environment"
Pinewood	An HP site in the UK Sales Region
Acronyms	**Definition**
EHS	Environment, Health and Safety
HP	Hewlett-Packard
UKSR	United Kingdom Sales Region
FY**	Financial Year
SQF	South Queensferry
RE	Research Engineer
PSS	Platform Services Survey
FEHSCO	Field EHS Council

Eighteen Months

Part Four - Progress Reports

"Eighteen Months"

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[1] In the original document

Abstract

The following report describes the third period of six months research carried out for the Engineering Doctorate Programme in Environmental Technology. The doctorate, run by Brunel/ Surrey Universities, is being carried out by Zoe Jackson at Hewlett-Packard Ltd (HP)

The third report is intended to complement the first two, expanding on areas previously documented and, introducing new research topics which have evolved over the last six months. It will make only minor alterations to the initial project scope, justifying any changes, and will focus on the latest six months of research.

The report starts with a brief introduction to the project. Following this, is a description of the theoretical framework of the project including a definition of the word "institutionalisation" which appears in the project title. Also in this section is an excerpt of a research précis written in the last six month period and a review of some relevant literature. The next section describes the methodology of the research including how the data is captured and analysed. After this is a section describing the implementation of the project giving details of various activities which the researcher is involved in. Details of related activities such as progress reviews and other research are presented in the penultimate section. Conclusions for this period and planning for the next six months of research are presented in last section.

Project Introduction

The following section describes the background to the research project.Business and Industry have an important function in the transition to more sustainable forms of development. The challenge facing companies is no longer one of competitive positioning; new threats and opportunities require one of fundamental organisational change. Simply making "green" products is not sufficient to satisfy the environmental standards, lobby groups and legislators. Environmental Management should become a part of good business practice and culturally accepted as "the way things get done around here" (A direct comparison would be that of the quality movement some ten years ago). In other words environmental management should be **institutionalised.** Bansal (1993) indicates that there are a number of ways that firms can institutionalise their responses to environmental concerns. These are:

- Through Leadership
- Through changes in organisational structure so that an individual or department was delegated responsibility for environmental concerns;
- Through changes in organisational culture;
- Through elements of environmental management systems; and
- Through networking with other organisations like environmental consultants, community groups and even competitors.

This research project aims to influence and identify behaviour, in both individuals and the organisation as a whole, as Environmental Management becomes institutionalised through these methods. The researcher is considered by the organisation as a member of staff in the Environment, Health & Safety (EHS) department of Hewlett-Packard Ltd. Her role is to facilitate the progress of a four year change plan. This is undertaken in parallel to the research project although there is a high degree of overlap. The high degree of involvement with the EHS department enables full participant observation with the organisation. A full participant observer has a work position within the organisation, but is known as a researcher among all or most of those with whom they work (After - Bryman 1989: pg 143). The design of the research will be similar to those used in action research programs. In action research, the researcher is involved, in conjunction with members of an organisation dealing with a problem that is recognised as such by both parties. The researcher feeds information about advisable lines of action on the organisational problem. In a sense, the researcher becomes part of the field under investigation. It is the nature of the relationship between the researcher and his or her subjects that constitutes the primary reason for conceptualising action research as a distinct design. (Bryman 1989: pg 21)

Section 1

Theoretical Framework

Definition of Institutionalisation.

Since the objective of the research is to **Institutionalise** Environmental Management. A definition of what this concept means is vital for the research process. Stead et al (1989) define institutionalisation as "the degree of sustained organisational commitment". This definition will be used in the design the measurement system required to determine the degree of institutionalisation over the four years.

The last six months' research has produced a clearer definition of the meaning of "institutionalisation", in this context, and what would be required to measure it. The following section describes the main factors of institutionalisation.It is important to define institutionalisation in the terms of the corporate culture in order to ensure that the goals of the research program and the company are consistent. This was achieved by establishing the following criteria with members of the organisation. There are four aspects of institutionalisation in terms of this research. The first two relate to the behaviour of the individual and the second two refer more to organisational activity. Only when environmental management features consistently in all these areas will it be truly institutionalised.

- The way individuals act within the organisation

  This aspect of institutionalisation refers to the individual behavioural level. Examples of this would be people recycling their paper or cups, being involved in "Green Teams" teams or turning off computers at night.

- The way individuals think.
  This is the most crucial aspect of institutionalisation. It refers to the inherent beliefs or value systems of the people in the organisation. What is required is consistent evidence of environmental thinking at an individual level. This is also the most challenging aspect to determine.

- The way business is conducted
  The third aspect of institutionalisation refers to the business behaviour regarding environmental management. Associated questions could be; does it appear in Business plans, processes or strategies?

- The way the organisation represents itself.
  The final aspect of institutionalisation is about external representation. i.e. is the company reporting its environmental position, sponsoring environmental projects or using recycled letterhead paper?

Measuring Institutionalisation.

Section 1 iii) in the "Year one" report refers to a set of *'inferential indicators which will be used to assess the degree of institutionalisation'*. Each of the four aspects of institutionalisation will have a number of criteria indicating whether or not they have occurred. For instance, in the area "the way individuals act" indicators could be: the number of PCs turned off over time; take up of "green initiatives"; or owning a recycling tray. For each of the areas mentioned, it has been decided that there will be a critical few indicators. These will be chosen from a longer, brainstormed, list to be developed in the next six months.

Research Précis

At the time of the last six-month report a second supervisor (Dr Alan Irwin - Brunel University) joined the project. A précis, including a research question, was written to introduce the thesis of the research to Dr Irwin. The following excerpt is taken from the précis. A full version can be found in Appendix A.

The objectives of this research are; Using action research, institutionalise environmental management into the UK sales company of Hewlett-Packard Ltd, that is, ensure that environment, health and safety is considered as part of daily business operations. To achieve this by managing a four year change plan based on internal Quality methodology. To run this plan as a precautionary full scale change process, the outcome determining the validity of the approach. The research project focuses on the following question;

Is a precautionary approach to environmental management essential to continued business success? examining both the need for environmental management in a growing business and the need for a precautionary approach to it. A number of subsidiary questions will also be addressed:

- What organisational changes are required for implementation of an environmental management strategy?
- How effective are environmental management strategies in improving environmental and business performance.
- Is Total Quality Management a suitable method for institutionalising environmental management?

Writing the précis helped to clarify the academic contribution of the research. Consequent literature studies have been focused on; the effectiveness of quality management, measurement of organisational change, action research methodologies and developments in environmental management. Prior to writing the précis, literature reviews, although thorough, were not focused in this way.

The researcher is aware that, although the subsidiary questions reflects the true nature of the research, the main question does not. The précis is under revision to try and correct this.

Contribution to knowledge

In the last six months the following research position diagram was developed (Fig. 1)

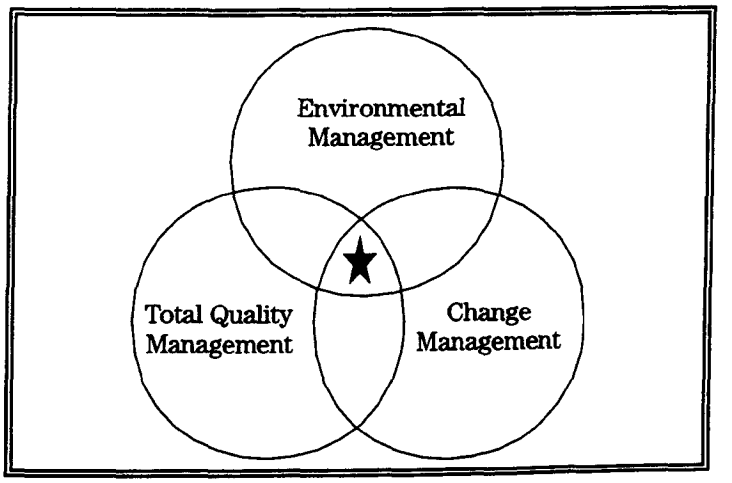

Fig. 1 Research Contribution

The contribution of the research lies at the intersection between Change Management, Environmental Management and Total Quality Management. There is an increasing amount of research being carried out into why or how organisations change to incorporate environmental management. There is also a great deal of information on the Total Quality aspects of environmental management. The Journal *Total Quality Environmental Management* is a good example of this. Within Hewlett-Packard there is a good understanding of how Quality Management techniques can facilitate change programs. 'The Ten Step Framework... can serve as an organisational change framework' (Hewlett-Packard literature 1990).There is also a wide range of general literature on the effectiveness of quality management in change programs. This research project makes its contribution by analysing and influencing a change program in environmental management using the established quality methodology at Hewlett-Packard. The outcome will contribute to Hewlett-Packards Quality techniques, environmental management position and its understanding of how change programs are best facilitated. Academic contribution also lies in taking part in the plan as a participant observer. 'It is only by getting closer to the everyday cultural, environmental and economic realities experienced by individuals that it is possible to pierce the rhetoric and evangelicalism of the proponents of cultural transformation in the green business literature'. (Crane 1995)

Sections of portfolio.

As a result of a recent progress review, a list has been devised suggesting the sections of the research portfolio. This is the first draft of the list which will be adapted as the project progresses. This has helped to identify areas of research in need of greater attention, for instance the initial conditions at the company and the parallels between quality and environmental management. The layout of the six-month reports in the portfolio has adapted to suit these subject headings. A copy of the first draft is contained in Appendix B

Literature.

Earlier in the last six month period, it was acknowledged that the research design for this project is similar to action research. At that time texts relating to action research methodologies were reviewed. The researcher was looking for a simple introduction to the field methodologies relating to action research in particular. Two books were reviewed in detail on this subject.

- The Action Research Planner. Edited by S. Kemmis and R. McTaggart 1988

  This guide is designed for helping researchers engaged in action research. Although the examples used are from an educational reform perspective, the book helped in the understanding of action research process. A useful model of institutionalisation is also presented in the book which influenced the definition covered earlier in this report.

- Experimenting with organisational life. Alfred W. Clark 1976

  This book introduced the different levels of engagement, or participation, which are common in action research. It also gave the researcher advice on how to ensure the methodology chosen in a research project is valid.

For related reading on environmental management topics the researcher subscribes to *Greener Management International*. A special edition of this journal was published in October 1995 on "Organisations Culture and the Environment." Two articles in particular from this special edition were relevant to the question of institutionalisation.

- Rhetoric and Reality in the Greening of Organisational Culture. Andrew Crane

  This paper assesses the potential for cultural change prescriptions as a means by which businesses can be greened. The article introduces the concept of corporate culture, and the various ways it can be interpreted, and assesses their potential to be greened. This was very useful for the researcher given her engineering and not management background.

- Environmental Management Styles, Corporate Culture and Change.

  This paper starts by describing corporate culture and management styles and goes on to outline characteristics of environmentally-succesful-management styles. Particular attention is given to the congruence between personal and organisational values. This paper was also useful for the researcher in terms of knowledge of management concepts.

Both articles in this journal influenced the recent definition of institutionalisation. The concept of goal congruence[2] as discussed in the second article has been taken on-board by the researcher and is intended to form part of her portfolio material.

With her engineering background, it is necessary for the researcher to be up to date on general management concepts. Carol Kenney's *Managing with the Gurus* helped this process

- Managing with the Gurus. Carol Kennedy. 1994

  This book is an overview of the work of the "best management writers and practitioners of our time". This helped the researcher to understand of a wide range of management concepts. Examples include; Managing change, Managing people, Leadership and Corporate culture.

  One of the "Gurus" referred to in Managing with the Gurus is Peter Senge. His book *The Fifth Discipline* is regarded as a classic text on the learning organisation. Managers at Hewlett-Packard regard this book very highly. The industrial supervisor recommended the book for understanding the concepts surrounding organisational learning and systems thinking.

- The Fifth Discipline. Peter Senge. 1989

  This text has demonstrated that many problems occurring in business can be shown to be due to non-systemic thinking. The book details a set of 'systems archetypes' which are typically found in many organisational problems. The researcher plans to identify these systems archetypes, which cause obstacles to the institutionalisation of environmental management.Another author has also contributed to the researchers knowledge of systems thinking on a larger scale over the last six months.

- Uncommon Wisdom. Fritjof Capra. 1989

  This book had a profound effect on the researcher's understanding of systems thinking. Capra Links social problems to non-systemic attitudes. This caused the researcher to consider how actors in the client organisation are thinking non-systemically. The book helped link eco-systems to business systems.

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[2] Goal congruence is based on the assertion that motivational benefits can arise from the harmonisation of individual and social values.

Section 2

Research Methodology

Section 3 of the "Year one" report stated that;

> *'Over the last year I have found a number of formal research methodologies which could be used in this type of project. I intend to evaluate a number of these in the next six months to provide an academic grounding for the research activities'.*

Over the last six months, the researcher has reviewed some types of methodology applied in organisational research. These were; the various levels of participant observation, unstructured interviewing and the use of supporting documentation. The following sections describe the field work methodology in these areas.

Participation with the organisation.

Throughout the duration of this project, the proportion of engagement with the organisation may vary according to circumstances. A wide range of both involvement and influence is observed with the organisation. This works both for and against the project; the more the researcher identifies with the fate of the client system, the less he/she retains of his/her legitimacy and his/her unique competence as observer, measurer and interpreter of events, however some events are not adequately observed except by an engaged participant. (After - Clark 1979) There are a number of "roles" which the researcher demonstrates at any one time in this involvement. These generally fall into the categories of;

- Independent researcher.

  This role appears to be used the most frequently[3], it is independent to that of the company and is behaving as a participant observer in most cases. In this role the researcher reflects upon her observations and although participating is not instigating any planned change to the organisation.

- Hewlett-Packard functionary.

  In some instances it is beneficial for the researcher to behave as a "normal member of staff". This person takes part in daily business activities and has a role in the Environment, Health and Safety department. The researcher effectively then becomes the change agent, with a high degree of intervention with the organisation

- Member of society.

  This role is useful for gathering general information about perception of environmental issues in the workplace.

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[3] The extent to which the role features is recorded in the researcher's log book

- Student.

  The dual nature of the Engineering doctorate requires that the researcher attends masters level modules. This role is essentially the academic attending these modules and discussing concepts in an academic fashion. The role has been employed at the company, for instance in gaining access to libraries in HP

The extent to which each of these roles features in the research is recorded in the field work log book. The need for further clarification of the independence of the researcher is recognised.

Data Collection.

Participant observation is rarely conducted on its own, in that it is usually accompanied by some interviewing and analysis of documents. (Bryman 1989: pg 142) There are principally three forms of data collection being used for this project. A log book, documentation and unstructured interviews.

- Field work log book.
  One side of this log book is used for recording conversations, meetings and other "interactions" with the organisation. The reverse side is used to record rough comments, notes from seminars, conferences and EngD modules, "To Do" lists and general conceptual planning. Text recorded in both sides of the book is reviewed on a regular basis and key words[4] are high-lighted. Once the words have been highlighted, they are noted (along with their relevant page numbers) in an alphabetical card index system. Categories of key words currently used include Names, HP Sites, Environmental Management words, Companies and those describing general behaviour. The log book is backed up on a regular basis.

- Supporting documentation.
  The second form of data capture is in documentary form. Evidence collected to date is in the form of e-mail messages, internal newsletters, minutes of meetings and other related documentation with relation to environment, health and safety issues. A wide range of more general information is also kept, for example company performance reports or product release statements. Although both types of data are regularly obtained there is little coding or categorisation at this time.

- Unstructured interviewing.
  The aim of unstructured interviewing is to elicit a respondent's way of thinking about the issue with which the researcher is concerned, so that there is usually a preference for minimising the degree to which they are constrained. (Bryman 1989: pg 157) The third form of data capture is the least established at the current time. It is intended that interviews (probably unstructured) of key actors in the change processes will occur to support the assertions made by the researcher from fairly minimal contact.

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[4] The key words were established initially by highlighting all words of direct relevance to the research process. After approximately one month the words were categorised into the topics listed in the main text.

Section 3

Implementation

In order to assess the changes in all four areas of institutionalisation it is essential that I interact with the organisation at a number of different levels. For instance, individual employee level through to board level activities. Over the last six months I have been involved, to a greater or lesser degree with the following activities at HP.

Management involvement.

The four year change plan is operationalised by the Field Environment, Health & Safety Council (FEHSCO). This council is made up of employees, mainly managers, who have a direct interest or influence on EHS in the work-place. Examples include the UK Facilities Manager, the UK Sales Region Occupational Health Manager and member of the personnel department. Tom Davis (director of environmental affairs) leads this team. The researcher is also a member of the council. At the start of the Fiscal year it is standard practice within HP to revisit long term plans. The researcher was responsible (HP functionary role) for steering the FEHSCO team to update the plan. A copy of the updated plan is not included with this report; copies of the plan at all stages of it's development will be included in the portfolio. The key differences were noted in a change history which has been included in Appendix B for reference. Leading the change process in this way gave the researcher first hand insights into FEHSCO team dynamics; Individual perceptions and barriers to change; and the HP planning process.

The performance of the activities of FEHSCO are measured on a bi-monthly basis. Each member has an individual "implementation plan". Progress is assessed on a Red/Amber/Green basis (Red = Off track, Green = On track) with pre-determined metrics. Presence on this council is beneficial to the research process. The researcher uses her knowledge of these performance criteria to motivate employees lower down the organisation. For example, an employee's actions will affect someone else's targets which will affect someone else's targets and so-on, often as far as the Managing Director. This method of motivation is only effective because the methodology being used to track performance is accepted as standard across the UK organisation and so most people understand what they mean.

Measuring the performance of the EHS dept.

There are a number of ways that a function within Hewlett-Packard can obtain a measure of it's performance. Two of these have been used over the last six months.

- Platform Services Survey.

  The platform services survey is an annual employee survey carried out for the benefit of the supporting service functions like Information Technology, Personnel or Finance & Administration. The Environment, Health and Safety department submitted questions to this survey for the first time in the financial year 1995. The researcher is the principle point of contact for this survey and is responsible for adapting the survey and deciding the sample of employees to be targeted. The survey is managed by a member of the Quality department. Each year the survey is managed by a different person, normally an industrial trainee (IT), The ITs are placement students from University, often in their penultimate year. Interacting with the younger members of HP's staff in this way gives added benefit to the research. As students, the ITs relate to the researcher easily and consequently help the researcher in obtaining information and establishing contact with more senior people. They are more legitimate members of the organisation with an understanding of the researcher's needs.

- Quality Maturity Reviews

  Hewlett-Packard has an established Quality Maturity System (QMS). The long term vision of the Environmental Management plan is to arrive, within four or five years[5], at a QMS score of 3.5 for each of the elements of the scoring system, Approach, Deployment and Results. In 1994, after the first year (approx.) a self assessment was carried out using the standard Quality Maturity Review (QMR) questions and the answers were submitted to John Hamilton, the then UK Quality Manager, for scoring.

  At the end of 1995 a second self assessment was carried out by the researcher along with Tom Davis, Director of Environmental Affairs. On this occasion a Business Performance Assessment software tool, specially developed in Australia with the co-operation of Corporate Quality, was used in the assessment. It is anticipated that the scores derived from this will be similarly ratified by an independent QMS reviewer

Both of these activities help the researcher to prioritise future actions and keep track of changes. Tracking these changes, in the way that the organisation would do naturally, is intended to form a comparison with the researchers conclusions of the change process. Valuable insights are also gained in understanding the way in which the company assesses itself and plans business.

Projects

In the HP functionary role it is important that the researcher is involved in the typical activities of an internal change program. An example of such an activities is a TQC project. A TQC project at HP is a project designed to address identified problems of a business process. A cross functional team will follow a standard procedure for identifying the root cause of the problem and implement an innovative solution.

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[5] The 4-5 year time frame is left purposely vague to avoid a self fulfilling time scale.

"Eighteen Months"

Section 2 ii) in the report "Year one" stated that *'Site facilities managers in all UKSR sites are now interested in conducting a waste management project... The team is hoping to carry out this project as a recognised TQC project'* .The waste management project is now underway with the researcher as team leader. For this project it was necessary to act as leader in order to set an example of an environmentally driven project. Future projects may involve a less important role. The issue statement for the project is *"A large volume of unidentified waste is being dealt with inefficiently leading to unnecessary costs. Employees are unaware of the potential benefits of improved waste management to either HP or the environment." The* meetings associated with this project are a valuable source of data on the acceptance of environmental change. The experience of taking part in this TQC project has prompted the researcher to consider taking part in a TQC project which is unrelated to environmental management in order to assess any differences in motivation or behaviour.

Section 4

Related EngD Activities

There have been two formal progress reviews since the last six-month report. Copies of slides presented at both can be found in Appendix D.

- Progress report - November 27th 1995

  A progress report was given at the quarterly review meeting held between RE and supervisors. The review consisted of research methodology, EngD competencies and an update of current projects.

  The outcome of this meeting was that the researcher is generally on track but more written submissions to the portfolio were recommended. Improvement of writing skills was seen as a necessary precursor to this by all involved.

- Progress report - 4th March

  This progress review focused on the three areas of Theoretical contribution, Methodology and Action areas[6]. The researcher presented a definition of "institutionalisation" for debate. After some discussion a conceptual definition was accepted. Further clarification of the indicators which will measure the changes was advised. (see section.. for more details)

Four masters level modules have been taken as part of the EngD since the last report. These were;

- Clean Technology.

  This was the most interesting EngD module to date. As part of the coursework students were asked to write a piece on how the module affected them. This document can be found in the portfolio. No mark for has been awarded as yet for this submission.

- Business & Environmental Strategy.

  This module was taken by the researcher as the compulsory elective module. Presented by the Brunel Management Program. Gave an insight into how environmental strategies and policies are formulated in business. Examples from industry used. Coursework completed on writing environmental strategy & policy for Hewlett-Packard. No mark given as yet.

- Risk Communication.

  The coursework for this module is due in before May 1 1996.

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[6] Action areas are projects or work relating to the implementation of the four year change program.

- Environmental Law.

The coursework for this module is due in before Jun. 7 1997.

Complementary Research Activities

- Establishing the importance of environmental product attributes to HP customers.

This research is being carried out with an Engineering Doctorate Research Engineer. Mr Graham Earl is researching and developing the financial implications of environmental investments. The joint research program will focus on one HP product, colour inkjet printers, and will uncover how the consumer is making decisions with regard to the environment in purchasing this equipment. Much work has been carried out in determining that "the environment" is considered in a purchasing decision, this research aims to take this further by using Conjoint analysis[7] to infer what trade offs would be made, in terms of other product attributes such as price and specification, in order that the product be environmentally sound.

Since the last report a pilot study has been carried out for this project. The full scale study is planned for the next six month period. Further details of the project can be found in the portfolio.

This research project is intended to assist researcher activities in establishing the business impacts of environmental issues. The results will be used to demonstrate the need for environmental management within the organisation.

- A longitudinal study with the working title "What are the Corporate Objectives in organisational change regarding the eco-environment"

This is a three way study being carried out by the research engineer at Hewlett-Packard, a research engineer at Rank Xerox and an assistant professor in the Dept. of Management at Georgia State University. The research is designed to monitor organisational changes at Hewlett-Packard and Rank Xerox with regards to the environment and to determine the drivers for those changes. Ethnographic data is captured both chronologically and reverse chronologically as to the decision processes which generated these changes and hopes to provide an analysis of why such changes occur. Further details of the research structure and resulting papers can be found in the portfolio. The researcher is now collecting data for this project and a first paper is planned for August this year. Reflections from this project help the researcher understand the drivers for the changes that are occurring within the organisation through the institutionalisation process. A draft copy of an abstract for the planned paper can be found in Appendix E.

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[7] A conjoint analysis tool is any decompositional method that estimates the structure of a consumer's preferences, given his or her overall evaluations of a set of alternatives that are prespecified in terms of levels of different attributes.

Section 5

Conclusions and the next six months.

The last six months has been most significant in terms of understanding the process of research. Specific areas of improvement have been:

- More focused literature reviewing.

  This report has shown that defining the contribution of the research has helped in prioritising areas of literature to review. The suggested structure to the portfolio also helped in this area.

- Developing the field work log book.

  This has been a good improvement over the last six months. Data collection has been much more rigorous and easy to interpret. A further development of the system could be to set up an electronic version of the log book for improved backup and ease of analysis.

- Improving the definition of institutionalisation.

  This is an ongoing activity which had a particular focus in the last six months. This report demonstrates the value of having documented this definition.

- Acknowledgement of participation levels.

  Over the last six months, a lot of time was spent reviewing the degree of participation with the organisation. This helped in guiding the researcher to the most appropriate literature.

All of these areas require continual improvement, in particular literature reviews. Over the next six months a document summarising the key findings of all the literature reviewed to date will be produced. The progress made on the academic contribution should also provide a good grounding for the twenty-four month report.

Activities for the next six months are;

- Clarify opinion and contribution to knowledge
- Further develop sections of portfolio (and hence the 24 month report)
- Construct literature review document
- Data review
- Examine data captured in log book and supporting documents
- Identify patterns in behaviour and changes

Other objectives of the researcher in the next period are to; obtain a greater understanding of systems thinking and how it affects the research, prepare a paper and poster-board for the EngD conference 1996 and to search for a non-environmental TQC project to be involved in.

Overall this has been the most productive six months in terms of the academic background of the research. The challenge for the remainder of the project duration is to maintain this focus and to ensure the data collection records evidence within the academic framework.

Year One

Part Four - Progress Reports

"Year One"

Abstract

The following report provides an insight into the second six months of research carried out in the first year of an Engineering Doctorate Programme. The doctorate, run by Brunel/ Surrey University, is being carried out by Zoe Jackson at Hewlett-Packard Ltd (HP)

The second report is intended to compliment the first, expanding on areas previously documented and, introducing new research topics which have evolved over the last six months. It will make only minor alterations to the initial project scope, justifying any changes, and instead will focus on the latest six months of research.

The report includes details of Literature reviews, research areas related to the development of an Environmental Management strategy and other research projects which the author is involved in. Details of the next six months of research are outlined in the final section, designed to provide the reader with an insight into the short term future of the project.

Section 1

Project Scope

The first six monthly report in this portfolio introduced the broad project scope. I would like to summarise, and expand this with the following points;

In the first six month report section 1.2 stated that

> '..Environmental Management should become a part of good business practice and culturally accepted as "the way things get done around here".' In other words Environmental Management should be institutionalised.

The objective of the research is to Institutionalise environmental management through a structured four year "Ten Step"[8] plan.

Institutionalisation of environmental management cannot be measured directly.Thus, a number of inferrential indicators will be used to assess the degree to which institutionalisation has occurred[9]. These include

- Internal Quality management techniques used to assess the progress of the Ten Step plan. The Quality Maturity Review System is one example.[10]
- Internal and External stakeholder perceptions of Hewlett-Packard Ltd's Environment function.
- Physical environmental indicators such as volumes of waste or consumption of resources.

As well as monitoring the indicators of institutionalisation, the research will collect a range of supporting evidence designed to confirm any developments in the program. The supporting evidence will come in the form of desk messages (internal electronic mail system), internal magazines / newsletters,and presentations all relating to developments in the UK EHS organisation. A comprehensive list of the types of information gathered can be found in the Appendix.

As well as monitoring its progress the research will also influence the development of the Ten Step Plan. This will be achieved by using data generated by the research to establish goals and objectives for the plan.

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8 "Ten Step" planning is one aspect of Hewlett-Packard's quality methodology for customer focused business planning. For details of the UK Ten Step for Environmental Management see Appendix

9 A presentation was given on this subject as part of a progress review and can be found in the Appendix.

10 Summarised copies of the Quality Maturity Reviews for the EHS function (to date) are included in the EngD portfolio for reference

Section 2

Research to date

The second six months of research has followed, broadly, the programs documented in the first report. These focused on environmental awareness / acceptance of the employees and the current environmental performance of the organisation. As well as this the last six months has seen a greater understanding of the internal Quality maturity system and how this relates to the title concept of institutionalisation.

Literature

Over the first year a wide range of literature has been collected, on a broad range of subjects including;

- Organisational Change and Change Management
- Strategic Environmental Management
- Institutionalisation of "Quality Management"
- General Environmental Issues

To date, literature gathering and reviewing has not been tightly structured. It is anticipated that as the research methodology becomes more formalised over the next six months the literature review process will follow suit. The appointment of a second supervisor, familiar with sociological aspects of organisational change, will also help in identifying areas of contribution and originality which will direct the literature searches.

Implementation of the Internal "Environmental Management Plan".

As aforementioned, the Ten Step Plan for Environmental Management provides structure for this research. At Hewlett-Packard a function management team will tackle a breakthrough issue (known internally as a "Hoshin"), i.e. one in need of continuous improvement focus. Along side this basic elements of the business are managed through a set of "business fundamentals" The EHS council at HP defined the FY95 focus as improving Health and Safety at Work. Environmental Issues were acknowledged but it was felt that improving employee Health and Safety was more important at that time. A number of strategies were developed in order to reach this breakthrough objective. A copy of the FY95 Hoshin and strategies can be found at the back of the Ten-Step plan. (For further information on Business Planning at Hewlett-Packard see Apendix) The FY95 Ten Step plan for Environmental Management was already in place at the outset of the research and as can be seen, this years

focus was on the internal organisation, raising the awareness of the EHS function and initiating training in key issues. In line with this focus, the last year has involved

Environmental Awareness/Maturity studies.

A pilot scale environmental awareness program at a small site in the UK (Pinewood) has been taking place. Although Pinewood is not strictly part of the UK Sales company, the site is known for it's community spirit and existing concern for environmental issues. The pilot is thus hoping to produce measurable success stories of how sites can go green.To date the project has focussed on minimising pinewood's waste (as this is a measurable improvement) through an internal campaign facilitated by a spin off to the existing EHS team, the "Pinewood Green Team". All developments of the pilot have been tracked from initial meetings to employee suggestion schemes.The pilot project will be monitored throughout it's natural life (which may extend beyond the time frames of this research) but an account of the events and lessons learned to date can be located in the portfolio.Results of the pilot will be used as evidence in justifying institutionalisation of environmental management in the remainder of the UKSR. Throughout the campaign attitudinal shifts have been noted and used to the best advantage of the program.The role of the research engineer in the campaign has also been tracked in order to determine the extent to which an outside influence is required in setting up such an awareness program.

The pilot project at pinewood has also produced a spin off project in Waste Management. Site Facilities Managers in all UKSR sites are now interested in conducting a waste minimisation project. This will incorporate waste stream analysis, selection of the best practicable environment disposal option and a minimisation campaign. The team is hoping to carry out this project as a recognised TQC improvement project.[11]

The employee awareness survey documented in the first six monthly report revealed that at the moment the principal concern was *Health and Safety* with *Energy consumption of office equipment* and our *responsibility toward customer environmental demands* rating second and third respectively. This information has been used in prioritising issues within the company over the last six months. It is now time to conduct the annual survey again and, as designed, the questions will remain the same for continuity. A summary of the results obtained in the survey can be found in the Appendix.

[11] TQC improvement projects in HP are projects designed to save money or resources by demonstrating exellence in one of the five areas of Total Quality. See Appendix for more details.

Integration of Environment, Health and Safety considerations into business processes.

The first six month report stated that

> *'Hewlett-Packard believes that all business operations are essentially a series of activities or processes. Process Management at the UKSR is concerned with continually improving the efficiency and productivity of all business processes.....*
> *...Part of my research has been to juxtapose environmental considerations on to existing business processes and to monitor the effects of doing so in terms of business performance and environmental awareness This has fallen into two areas, the environmental improvement of existing processes and the development of generic "consider the environment" processes.'*

Although this is anticipated to be an ongoing aspect of the ten-step plan in FY96 a recent re-evaluation of Process Management in the EHS function has slighlty changed this activity.

In FY95 the researcher had regular liason with the Quality department on effective process management techniques. The author became aware that other functions in the organisation were using a set of standard business processes to manage their businesses. Processes in the UK EHS function are now organised around this standard approach. Recently, at a World Wide Environmental Process Improvement Team meeting, the approach taken in the UK was commended and may form the basis of a company wide "best practice". Developments in Process Management to date can also be found in the research portfolio in the *Progress towards institutionalisation* document EHS

Communication and Environmental Reporting (Internal)

As documented in the first six monthly report, this area of research is primarily to generate communication tools for "selling" environmental management to the internal organisation. An effective communications strategy forms part of the ten step plan and in FY95 this was added to the list of "Hoshins" late on in the year. It is likely to remain a "Hoshin" for the next period.Examples of internal environmental communication which have arisen in the last year include regular articles in employee internal magazines and environmental statistics on noticeboards.

Internal "Good Practice" sharing.

The last six months has seen a number of visits to other Hewlett-Packard sites. This was arranged to assess and compare their environmental activities such that environmental good practice can be shared. The outcome of this is likely to be a matrix of environmental good practice distributed to all UK sites to compliment good work and to encourage greater communication between EHS departments.

Communication with Global EHS community.

The research is now known internationally within the HP-EHS community and is strongly aligned with the world-wide plans. Institutionalisation is strongly dependant on the activities of European and Corporate Environmental Management and strong links have been established this year with these organisations. The Ten-Step plan has been accepted as a company wide best-practice and as such the research is now influencing these wider EHS practices. audience. At the moment a significant proportion of efforts have been toward functions The next step in this strategy is to communicate EHS considerations to a wider audience whose expertise are not in Environment, Health and Safety.

Hewlett-Packard Products and the environment.

In the first six month report, section 1.4i stated that

' Being a strong sales company it is necessary for Hewlett-Packard to be able to communicate sound environmental performance to its customers and prospects. To do this the employees of the UKSR need to accept the importance of environmental issues and must also have an appreciation of the environmental performance of the products they sell. One of the areas of my research will be to develop an understanding, in the form of written reports for the sales region, of the environmental performance of major product lines. This will be achieved by interviewing various "Product Stewards"[12] across the global organisation examining the "Design for the Environment"[13] Criteria for their product(s). This information could then be communicated to the sales operation and could potentially be used as a differentiator for managing market share. Such product ranges will include some of the major current HP products including ink jet technology, microwave equipment, computer systems or opto-electronic components.'

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12 Product Stewardship at Hewlett-Packard is a philosophy that the manufacturer of a product should be responsible for that product and associated environmental impacts throughout the product life cycle.

13 Design for the Environment (DFE) is a component of Product Stewardship with the objective of reducing and minimising the environmental impacts of the manufacture, use and disposal of products and associated support products.

One such investigation has occured this year. A visit to Corvallis in Oregon, USA was organised to establish a knowledge of the environmental impact of one of HP's more visible products, Inkjet printer pen cartridges. A visit report describing the objectives and the progress made during the visit is included in the Appendix. A short paper titled 'Does Environmental Practice Travel Well? *(With particular reference to an InkJet printer supplies organisation)*" was presented, in relation to this visit, at the EngD Annual conference in September 1995. As an introduction, the abstract of the paper states

> *'A current area of interest at Hewlett-Packard's United Kingdom organisation is the concept of environmental management in a multi-national organisation. One particular issue is that of an American manufacturing and assembly plant planning to expand into Europe. A site just outside of Dublin, Ireland has been chosen to assemble ink pens for Hewlett-Packard printing technology. In this paper I shall attempt to identify any differences in country culture, government policy and legislation, geography and technical environmental issues between the existing parent site in Corvallis, Oregon USA and the proposed site in Dublin, Ireland. In doing so I shall address the title question "Does Environmental Practice Travel Well?".'*

A copy of the full paper can be found in the Research Portfolio, and copies of the slides used at the conference are located in the Appendix. As a follow up to this exercise a further study will be carried out into the Best Practicable Environmental Option for disposal of waste, ink and cartridges, from the new assembly facility. This study is aimed at providing the newly appointed EHS Manager at the new site with information in environmental matters whilst more important Health and Safety considerations are being dealt with at the operation start up. The initiative also fits with the vision of the Ten Step plan (FY96 version) that *'Hewlett-Packard's UK EHS function receives the same world class acclaim as it's products'* and will contribute to the UK being recognised as a leader in providing pro-active guidance in environmental management.

Research Progress and Direction.

There have been two formal progress reviews since the last six month report. A brief summary of the outcome of the meetings is outlined below. Related presentation material can be found in the Appendix.

'Current research Strategy and "Significant" Analysis'

This presentation was given on May 10th 1995 as part of the third progress review meeting held between RE and supervisers. The presentation discussed the structure of the research at the time and provided an review of work being carried out on the definition of "significant" environmental effects. The outcome of this meeting was that the RE should continue working to determine significant environmental effects, with increased literature searches to ensue the work is not re-inventing the wheel. This avenue of work has since been put on hold. It was felt that although an understanding of the significance of HP environmental impacts is useful

in providing justification for institutionalisation, it need not be an in depth study in it's own right. Instead a greater proportion of time is to be spent on the development of the ten-step plan and on monitoring organisational changes with respect to the eco-environment.

'Institutionalisation of Environmental Management, Measurement and Metrics - *A Preliminary Discussion*".'

This presentation was given on August 23rd 1995 as part of the fourth progress review meeting held between RE and supervisers. The presentation highlighted the difficulty in measuring institutionalisation and suggested metrics and methods for inferring it's presence. The outcome of the meeting was that the RE should consider using or adapting the internal Quality management techniques which assess progress in organisations. This fits in with the business planning of the EHS function and was considered to be suitable for EngD research. The meeting also revealed that a definition or description of institutionalisation had not been formalised and should be done so fairly shortly. This description is to be written by January 1995. (see Section 3 The Next Six Months)

Complimentary Research Activities

Two other avenues of academic research have also been initiated in the first year. (associated reports and papers will be located in the portfolio as they are produced)

- **Establishing the importance of environmental product attributes to HP customers**
  This research is being carried out with an Engineering Doctorate Research Engineer. Mr Graham Earl is researching and developing financial implications of environmental investments. The joint research program will focus on one HP product, colour inkjet printers, and will uncover how the consumer is making decisions with regard to the environment in purchasing this equipment. Much work has been carried out in determining that "the environment" is considered in a purchasing decision, this research aims to take this further by using Conjoint analysis[14] to infer what trade offs would be made, in terms of other product attributes such as price and specification, in order that the product be environmentally sound
- **A longitudinal study with the working title "What are the Corporate Objectives in organisational change regarding the eco-environment"**
  This is a three way study being carried out by the research engineer at Hewlett-Packard, a research engineer at Rank Xerox and an assistant professor in the Dept.of Management at Georgia State University. The research is designed to monitor organisational changes at Hewlett-Packard and Rank Xerox with regards to the environment and to determine the drivers for those changes. Ethnographic data is captured both chronologically and reverse chronologically as to the decision processes which generated these changes and hopes to provide an analysis of why such changes occur. Further details of the research structure and activities can be found in the appendix and resulting papers in the portfolio.

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[14] A conjoint analysis tool is any decompositional method that estimates the structure of a consumer's preferences, given his or her overall evaluations of a set of alternatives that are prespecified in terms of levels of different attributes.

Section 3

The Next Six Months

Description of and Progress towards "Institutionalisation"

A report which will discuss the degree to which Environmental Management has been "institutionalised" after the first year will be written and completed by January 1996. A description of what "institutionalisation of environmental management" will involve will form the introduction to this report. Subsequent reports documenting progress towards institutionalisation will be produced annually but will not include the phrase description.

Further clarification of research methodology

Over the last year I have found a number of formal research methodologies which could be used in this type of project. I intend to evaluate a number of these in the next six months to provide an academic grounding for the research activities. Briefly as an introduction to that evaluation I will be considering (amongst others)

- Organisation Learning Histories
- Active Research in Organisational Change and
- Longitudinal Research Methodologies

Ad Hoc Projects for HP's internal EHS Program

There are likely to be a number of these over the next six months, potential projects are

- A comparative waste study for the new assembly site in Dublin. This will form part of some continued research into the development of the new assembly plant at Dublin. See earlier sections for details.
- An energy audit of the UK Headquarters building to be conducted with the help of a final year student from the Brunel Special Environmental Engineering undergraduate course. This will provide further data and justification for environmental improvements in the UKSR by identifying business and environmental impacts of energy consumption. A project outline can be found in the appendix.
- A Waste Survey for a Corporate Environmental Management report. This is likely to be carried out as part of the Waste Minimisation project outlined in section 1.ii.a. The survey will provide a structure for assessing the quantities of waste arising from the site. In terms of the overall plan this project will raise the profile of the Environment, Health and Safety department and will enhance EHS process improvement skills.

Note: As mentioned in Section 2 i) the appointment of a second academic supervisor experienced in social sciences research will help guide the research from now on. It is anticipated that a more structured approach to the research will evolve early in the next six months which may affect previous plans. As details of research structure become formalised, associated documentation will be submitted into the portfolio.

Appendix

Contents

- Hewlett-Packard FY95 Ten-Step Plan for Environmental Management
- Hewlett-Packard Quality business planning literature.
- Copies of slide presentations given at two progress meetings since the last report. For more information see Section 2 (Research to Date).
- Current research Strategy and "Significant" Analysis
- Institutionalisation of Environmental Management, Measurement and Metrics - *A Preliminary Discussion*"
- Copy of slide material relating to paper presented to EngD Conference 1995 'Does Environmental Practice Travel Well- *with particular reference to an InkJat printer supplies organisation'*
- Visit Report - Corvallis Oregon, USA May / Jun 1995
- Details of complimentary research with working title 'What are the Corporate Objectives in organisational change regarding the eco-environment'

The First Six Months

"The First Six Months"

Abstract

The following report provides an insight into the first six months of research carried out at Hewlett-Packard Ltd (HP), by Zoe Jackson, in association with the Engineering Doctorate Programme run by Brunel/ Surrey University.It is broadly split up into two sections, the first of which describes the project and the scope for research and the second the work carried out to date and the future potential research. To set the scene it gives a brief introduction to Hewlett-Packard Ltd operations and their commitment to the environment.Following this, a project introduction justifies the research and briefly explains the main theme of the work. This section also lists the wide range of research areas which will be encountered over the four years. The research carried out, to date, is detailed under the research headings highlighted in the project introduction in the previous section. Details of the next six months research are outlined in the final section to provide the reader with an insight into the short term future of the project. This information is also highlighted in the gantt chart located in the Appendix.

Associated texts and documentation are also listed at the rear of the report. Unless otherwise stated these are not direct references but material which has contributed to the views presented on Environmental Management after the first six months of research.

Section one

Project Background, Justification and Research Areas.

1.1) Background to Hewlett-Packard Ltd.

Hewlett-Packard Company is a leading global manufacturer of computing, communications and measurement products and services recognised for excellence in quality and support. HP has 98,200 employees and had revenue of $25 billion in its 1994 fiscal year.

Concern for the environment has always been an integral part of HP's corporate objectives, embodied in the citizenship objective to honour obligations to society by being an asset to each community in which they operate. Hewlett-Packard's environmental management[15] (herein referred to as EM) objective is to provide products and services that are environmentally sound throughout their life cycles and to conduct operations world-wide in an environmentally responsible manner. Hewlett-Packard is also no stranger to environmental monitoring. They provide systems for analysing air, water and ground pollution to help meet the ever increasing demand for a better quality environment.

The successful UK subsidiary of Hewlett-Packard has R&D, manufacturing and office based sites throughout the UK employing some 5000 people. The UK Sales region (UKSR) is located throughout the British Isles ,its headquarters in Bracknell, Berkshire housing approximately 1400 employees. The Annual UK Turnover is approximately £1 billion.

[15] Environmental Management at Hewlett-Packard encompasses the areas of Occupational Health, Safety, Industrial Hygiene and Ecological Protection.

1.2) Introduction to the Project

Information technology, looks set to be the worlds biggest industry by the early years of the 21st century. Until very recently, in the eye of the consumer, the industry was seen to be environmentally clean. Recent examples of massive clean up operations in California's Silicon Valley have increased the pressure on the industry to be more "environmentally responsible" in its manufacturing. Along side this an awareness of the environmental implications of energy consumption have meant that the Information Technology industries are now under scrutiny to justify their products and services in an environmentally informed manner as well.Some 75% of Hewlett-Packard's revenue comes from products developed in the last four years and this trend is continuing. With over ten thousand products world-wide the environmental impact of such disposable technology must be significant.

These statements are indicative of the important role companies like Hewlett-Packard play in society today. Business and Industry have an important function in the transition to more sustainable forms of development. The challenge facing these companies is no longer a competitive positioning one, but one of fundamental organisational change Simply Making "green" products is not sufficient to satisfy the environmental standards, lobby groups and legislators. For Hewlett-Packard to maintain its rapid growth rate (revenue 24% in 1994) and to establish itself as an environmentally conscious company, the organisation must accept the increasing importance of environmental issues to its business results. Environmental Management should become a part of good business practice and culturally accepted as "the way things get done around here". In other words Environmental Management should be **institutionalised.**

That the environment should be considered as "daily business operations" is widely accepted. What is not accepted is the methodology behind achieving this. My research aims to address this issue by monitoring the gradual implementation of an environmental management strategy into Hewlett-Packards United Kingdom Sales organisation (from herein called UKSR). By evaluating all levels of the plan from birth to completion, the research should provide a subjective "fly on the wall" report as opposed to an after the event objective account. The essence of the research is the ownership of a "Ten Step"[16] plan for Environmental Management. It will be my responsibility to drive and change the four year plan such that EM is recognised as an internal and external environmental role model.

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16 "Ten Step" planning is one aspect of Hewlett-Packard's quality methodology for customer focused business planning.

1.3) Engineering Research Requirements

Although "The Institutionalisation of Environmental Management" could be described as an organisational issue the project can still be treated as any other engineering investigation. In that respect there are a number of skills[17] which should be demonstrated throughout the research.

i) My perception of issues relating to the project should be as accurate as possible by constantly reviewing popular media, environmental journals and by attending relevant meetings and seminars in industry.

ii) All aspects of the research must be investigated and not just those which are familiar to myself or to the company.

iii) Any communication of results or reports to the company, or other interested parties, should be of sufficient accuracy and simplicity so as not to cause confusion or uncertainty.

iv) The research should include productive two way communication with all stakeholders including, legislators, government organisations and environmental lobby groups such that solutions to problems are easily generated.

v) A range of solutions should be developed, to organisational problems, from simple housekeeping issues to strategic change and only the most appropriate (to all involved) selected.

vi) The research should uncover all the potential benefits and also the disadvantages of the proposed solutions such that the information can be communicated to the key decision makers in the organisation.

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[17] skills based upon those described in the DoE Engineering Council Guidelines on Environmental Issues *"The role of the Engineer"*

1.4) Scope of the Research

The Research will focus on

i) The Environmental Performance of HP Products,

ii) The Environmental Performance of HP operations and

iii) The Cultural Acceptance of Environmental Management

incorporating all principles of Environmental Management[18]

i) Environmental Performance of HP Products

Being a strong sales company it is necessary for Hewlett-Packard to be able to communicate sound environmental performance to its customers and prospects. To do this the employees of the UKSR need to accept the importance of environmental issues (Cultural Acceptance of Environmental Management) and must also have an appreciation of the environmental performance of the products they sell. One of the areas of my research will be to develop an understanding, in the form of written reports for the sales region, of the environmental performance of major product lines. This will be achieved by interviewing various "Product Stewards"[19] across the global organisation examining the "Design for the Environment"[20] Criteria for their product(s). This information could then be communicated to the sales operation and could potentially be used as a differentiator for managing market share. Such product ranges will include some of the major current HP products including ink jet technology, microwave equipment, computer systems or opto-electronic components. Metrics suggested to indicate success in this area of research are, at this stage,

a) No. of Products purchased with "Environment" as a high criteria (information from customer surveys of individual business units)

b) No. of HP marketing tools incorporating environmental performance. (information from Marketing and Sales organisations (increasing nos. required))

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18 As defined in the DoE Engineering Council Guidelines on Environmental Issues "Principles of Environmental Management"

19 Product Stewardship at Hewlett-Packard is a philosophy that the manufacturer of a product should be responsible for that product and associated environmental impacts throughout the product life cycle.

20 Design for the Environment (DFE) is a component of Product Stewardship with the objective of reducing and minimising the environmental impacts of the manufacture, use and disposal of products and associated support products.

c) No. of queries on the environmental performance of products received by HP. (Information from various internal departments (decreasing nos. required))

ii) **Environmental Performance of HP operations**

The second area of my research is to look at the environmental performance of HP operations. This covers such issues as Waste Management, Energy Conservation and Pollution Control. The research will include the feasibility of integrating environmental considerations into a selection (ultimately all) of existing business procedures or processes. The results will take the form of written reports and presentations given to the UKSR. Metrics suggested to indicate success in this area of research are, at this stage;

a) Volume of waste leaving organisation. (Information from Facilities Dept.)

b) Reduction in Energy consumption .(Facilities)

c) No. of sites requiring Environmental Assessments. (Real Estate)

b) No. of cars used in fleet. (Facilities operations / Fleet desk)

iii) **Cultural Acceptance of Environmental Management**

Another important area of my research in the drive towards institutionalisation will be to study the changes in company culture (in terms of environmental awareness) as

a) The Environmental Management strategy progresses and

b) Societal values change.

The latter incorporating

1) The increasing burden of Environmental Legislation and

2) Developments in environmental technology.

Metrics suggested to indicate success in this area of research are, at this stage,

a) No. of employees / managers attending Environmental Training

b) No. of employees involved in Environmental Initiatives

c) No. of internal inquiries to Environmental Affairs department.

d) Improvements in response rate and results of Awareness Surveys

Significant Environmental Effects

Both the aforementioned areas of environmental performance monitoring involve the assessment and categorisation of "environmental effects" My research at Hewlett-Packard will include developing methodology to determine the environmental effects of both the operations and products. This will have to include an attempt to define the term "significance". The nature of this study is not intended to provide a universal solution to the question of significance but to develop a model of what might constitute a "significant environmental effect" to HP and its stakeholders.

Metrics suggested to indicate success in this area of research are, at this stage,

a) No. of Effects Identified (Environmental Affairs)

b) No. of Effects classified as "Significant"

c) No. of confirmations of "significant effects" from interviews

1.4) Areas of Research

The Research will be based at the UK Sales Region Headquarters and will include

i) Internal (both UK and global) interviews and questionnaires.

ii) Specific Industry bench-marking

iii) A thorough review of environmental management and organisational theory literature

iv) External interviews and questionnaires, including suppliers, competitors, customers, environmental lobby groups and other stake-holders.

v) Communication and Best Practice sharing with similar researchers in academia.

vi) Product Stewardship investigations

Section two

Research to Date and the Future of the Project.

2.0) Research to date

The main focus of the research to date has been a situation assessment, incorporating the current environmental **awareness / acceptance** and the current environmental **performance** of the organisation.

2.1) The General awareness of the company and its operations

A review of the company and its operations has been essential to the early stages of this research. Through interviews with established employees and researching company literature and documentation it was possible to ascertain a good background knowledge of

i) The history of the company

ii) Current operations and success stories

iii) Hewlett-Packards commitment to the environment

iv) The Company culture or "HP way"

Although no official report was required by HP on this topic, my initial findings in this area could be summarised as:

The overall company culture is very strong at Hewlett-Packard. The HP-Way is as old as the business itself and is still very evident today. The people who work at the Sales Region are very hardworking individuals who often sacrifice a lot of personal time "just to get that last quote in".

This highlights the main driver in the organisation, that of market share. HP likes to be "amongst" the leaders in any given field but prefers to avoid a costly leadership position except where it is essential to market share. This unwritten policy has meant that Hewlett-Packard is still growing at a tremendous rate despite the UK recession.

In terms of environmental maturity Hewlett-Packard is in much the same position as other electronic equipment manufacturers in that they are somewhat aware of the environmental implications of their business but are still reacting to increasing legislation and customer demand. Generally there is a trend towards becoming more proactive about the environment in industry and Hewlett-Packard is no exception. From convenience interviewing I have been able to develop the hypothesis that the UKSR is currently nearer reactive but is nevertheless on the road to becoming environmentally proactive. (See Fig. 1)

2.2) Literature

In order to justify the project work and to follow the guidelines described in section 1.3i, a literature review was carried out incorporating the following research areas;

i) Environmental Management, tools and good practice

ii) Organisational Theory

iii) Corporate Strategy

iv) Environmental Effects and Standards

My conclusions on this, to date, are

i) The concept of "Environmental Management" in most journals is still based on the reactive end of pipe technology dealing essentially with such things as pollution control measures and stack emission control. It is only in the Strategic or Business Planning Journals that Environmental Management resembles my "Environmentally Responsible Business Management" (see Fig. 1). This is indicative of the preconceptions that most people have about Environmental Management and is something of great importance to my research.

ii) There is a great deal of material covering the organisational issues involved in instigating change. Somewhat less about instigating environmental change although this could be due to the fact that in general environmental change, particularly in a non-manufacturing organisation, is a relatively new concept. Whether or not one can apply the methodology of other organisational change mechanisms has yet to be tested. I hypothesise that the environment has a number of additional factors which must be considered before any change in the organisational environmental maturity will occur.

iii) Due to the unique positioning of the research, i.e. from inside the company with sustained academic input, there should be no problems associated with its originality. The engineering approach to what is essentially organisational research will also add to the contribution to knowledge that this research will make. The literature review shall however continue throughout the development of the project as more specialised areas of environmental technology are encountered.

2.3) Environmental Awareness/Maturity study

As previously mentioned (Section 1.4iii.) understanding the overall level of environmental awareness of the company is an important aspect of this research. To measure this awareness I designed a brief questionnaire, covering aspects of Environmental Management at

Hewlett-Packard, to be distributed to the Sales Region. A copy of the questions can be found in the Appendix. This is an ongoing area of my research not exclusive to the six month report. The results of the survey have yet to come in.

2.4) Integration of Environment, Health and Safety considerations into all business processes

Hewlett-Packard believes that all business operations are essentially a series of activities or processes. Process Management at the UKSR is concerned with continually improving the efficiency and productivity of all business processes.

As mentioned in section 1.4ii part of my research has been to juxtapose environmental considerations on to existing business processes and to monitor the effects of doing so in terms of business performance and environmental awareness This has fallen into two areas, the environmental improvement of existing processes and the development of generic "consider the environment" processes. As can be seen by my project planning (Appendix), both of these are ongoing areas of my research and are therefore not exclusive to the first six months. Processes which I have designed or improved over the last six months are also included in the Appendix.

2.5) Environmental Performance Reporting (Internal)

The first six months of research has included the initial investigations of three areas of environmental performance. All of which fit into the operations category defined earlier. (Section 1.4ii)

i) Solid Waste Management (SWM)

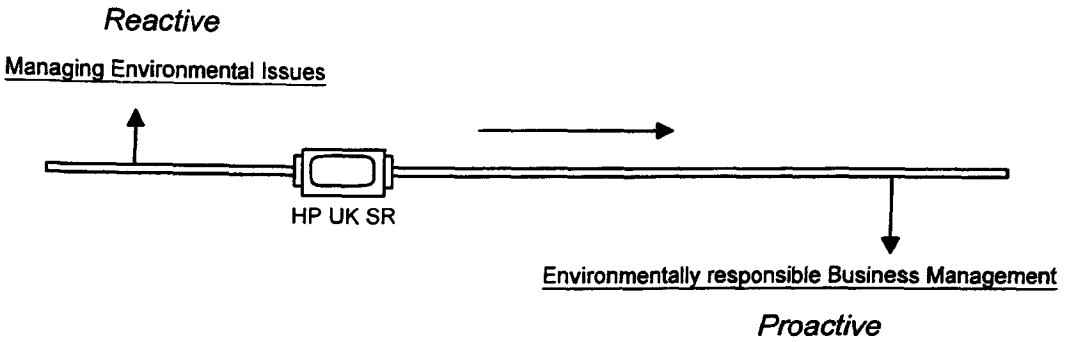
A SWM policy is currently being developed as part of my research (un-finished at the time of writing) for the UKSR. This incorporates the quantities of waste leaving the buildings, the methods of transportation and disposal and suggestions for waste minimisation.

ii) Energy efficiency of office equipment users.

Alongside the Information Technology Department strategy for improving office efficiency I am working to evaluate the environmental impact of such office equipment energy waste. The results of this research are likely to be discussed in the annual report.

iii) Contaminated Land Evaluation.

Fig. 1 The sliding scale of Environmental Management



As part of a corporate objective to minimise the environmental impact of HP sites on to land/water I have produced a situation statement for three of the UK sites. Due to the sensitivity of the information, this statement is not included in the Appendix.

3) The Next Six Months

The next phase of my research will be to

i) Commence product stewardship investigations.

It has been proposed that I visit the InkJet Supplies Business Unit in Corvallis, Oregon, USA this summer (1995) to investigate the environmental technology of the Hewlett-Packard InkJet product range. If the proposal is accepted a written report will be presented to the UKSR in July 1995.

ii) In depth Study of Environmental Perceptions

A series of in depth interviews (approx. 1/2 hr) with selected employees of Hewlett-Packard Ltd will be conducted to examine the extent to which the role of the employee and their Business Unit[21] affects the interpretation of "environmental issues". A number of questions will be developed to ascertain this information, possible suggestions are

i) Which of the following, do you think, plays the largest role in terms of environmental change from your position within the company?

Corporate Instruction

Legislation

[21] Hewlett-Packard UKSR comprises broadly six business units. Computer Systems, Computer Products, Test & Measurement Equipment, Components, Healthcare and Analytical.

Customers

Suppliers

Fellow Employees

Competitor environmental positioning

ii) What would encourage you to take part in an HP environmental initiative?

iii) What are the important environmental issues affecting HP?

iv) Do you think that environmental performance will be a differentiator for your product range at any time in the future? Is it already?

The questions will be directed at a broad range of professionals and ages over the next few months and will provide an idea of what employees of HP perceive to be environmentally significant and what the drivers for environmental change are for them. This will enable a more customer based approach to the communication of environmental performance and requirements as opposed to working on the assumption that all employees have the same environmental concerns.I will also continue to develop environmental performance statements for the company, the results of which may be documented in the annual report.

4.0 Summary

The first six months of this research have been very useful in terms of orientation and understanding of a large multi-national organisation. I feel I am now in the unique position of being accepted as a Hewlett-Packard employee, with associated responsibilities, whilst also maintaining the academic stance of researching the company operations. An area of improvement which I can see after completing this six month report is that a more formalised set of metrics or measures need to be defined of what the project aims are. As a piece of engineering research this is essential. Until the end point has been defined it is very difficult to get there! Once the goals have been defined the rate of progress towards them will be easily monitored. I have attempted to suggest some metrics for the project in the first section of this report, these will no doubt be subject to review throughout the research but I felt it was necessary to document them in the early stages of the programme. I look forward to the next six months of research in particular the potential visit to the United States and the associated technical investigations. I am also looking forward to the rest of the project, it looks to be a challenging engineering doctorate research project at a crucial time for environmental management in industry.

Appendix

Contents[22]

- Project Gantt Chart @ March 1995

  A Gantt Chart drawn up after progress meeting of Feb 9th, to encourage greater project management.

- Progress meeting presentation "A Quality Environment"A presentation given at the second progress review meeting highlighting the similarities and possible future of Quality and The Environment.

- Brainstorming Session Presentation "The Environmental Effects of the Pinewood Site" Session carried out to assess the employee perception of "environmental effects" and to help establish the environmental awareness of employees in general. **Now contained in Story Board Three, Part Two of the portfolio.**

- Results of Brainstorming session (Pinewood site)
  Now contained in Story Board Three, Part Two of the portfolio.

- Hoshin and Implementation charts

  At HP progress is monitored by an in house planning methodology similar in essence to Gantt charts and traditional project planning. I have such a plan for my role at HP. Latest versions enclosed.

- Processes developed @ March 1995

  See "Research Carried Out...." Point No. 2.4

- Awareness survey questions

  See "Research Carried Out..." Point No. 2.3 **Described in Environmental Measurement Coursework and Story Board Three, Part Two of the portfolio.**

[22] Original versions of these Appendices are contained in the Portfolio.

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Fig. 9 Bridging personal and company values (January 1997)
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Appendix A

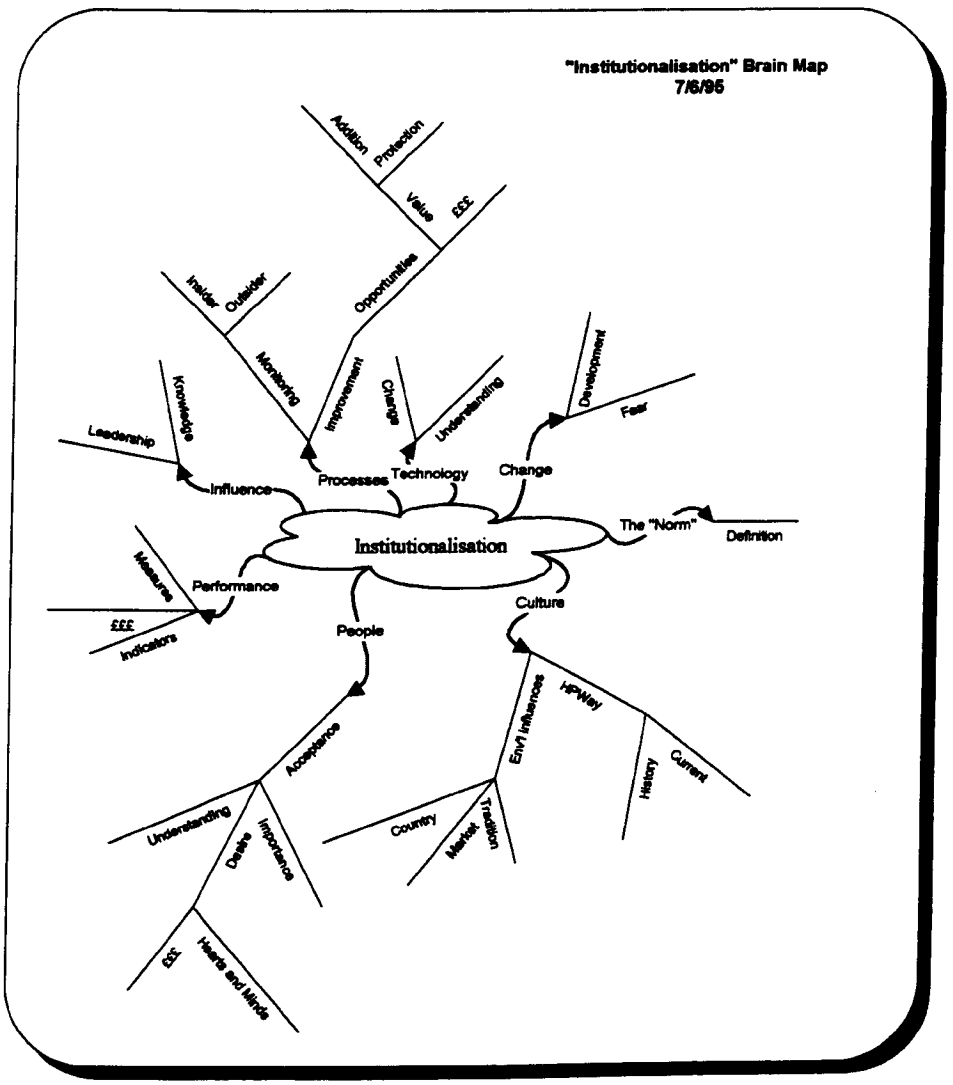
Expanded figures from Story Boards

Introduction

The following diagrams are presented here as a supporting tool for the story boards. They have been increased in size for easier reviewing. Figure numbering is consistent with the story boards'.

Diagrams supporting Story Board One

Fig. 3 Institutionalisation Brain Map June 1995



Appendix A

Expanded figures from Story Boards

Current Projects

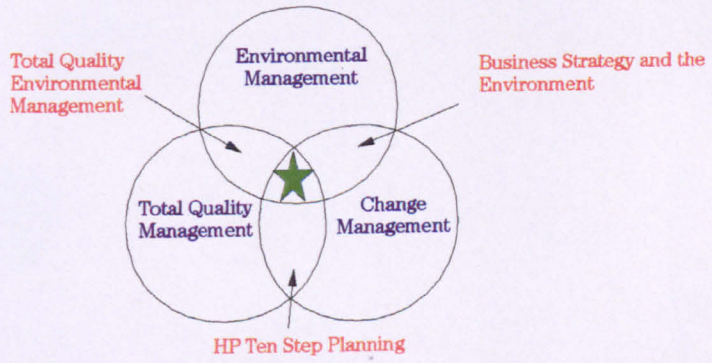
- ★ Waste disposal study
  - ✓ Contact with Irish EHS Manager made
  - ✓ Visit likely in December 1995
  - ✓ Project due to commence shortly
- ★ Ten-Step plan & QMS review process
  - ✓ Ten-Step plan
    - initial review with action team
    - second review with TD
    - team consulted individually before 6/12
    - plan to be confirmed 6/12
  - ✓ QMS review
    - preliminary discussions with TD
    - formal self assessment procedure before end of calendar year

- ★ Pinewood E-team
  - ✓ Team set up and objectives set
  - ✓ Initial projects started
  - ✓ First results analysis
  - ✓ Continued efforts supported
- ★ Complementary research activities
  - ✓ Need identified
  - ✓ methodology decided
  - ✓ data capture
  - ✓ data review
  - ✓ results published
- ★ Thames Valley Waste Management
  - ✓ Team set up and objectives set
  - ✓ Project initiated
  - ✓ Results analysis
  - ✓ continued efforts supported
    -

HEWLETT PACKARD

Fig. 4 Above and Below, Progress meeting slides (November 1995).

Research position (Fig. 1)



HEWLETT PACKARD

Appendix A

Expanded figures from Story Boards

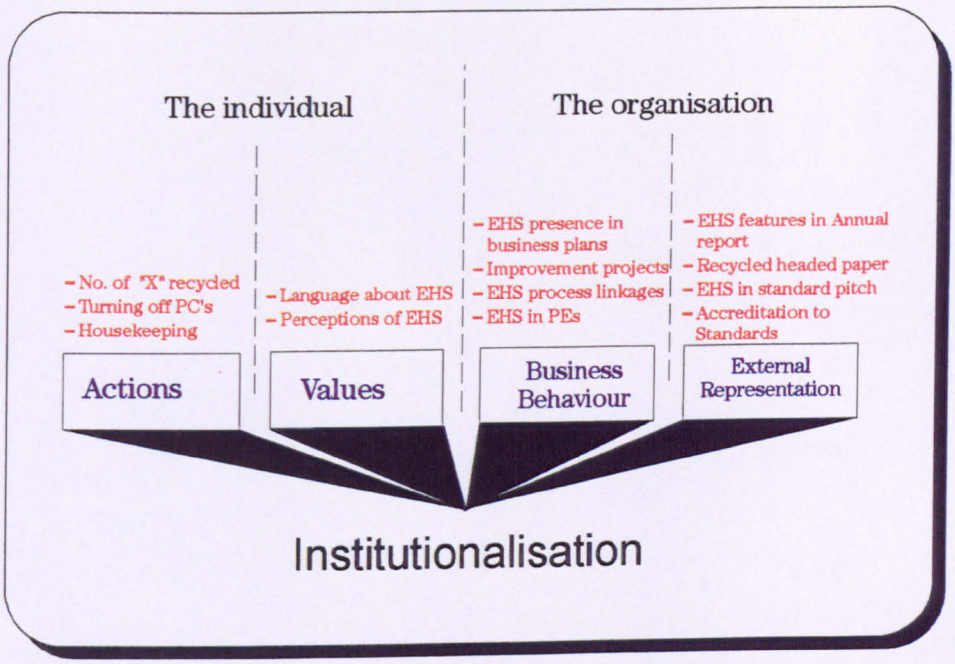
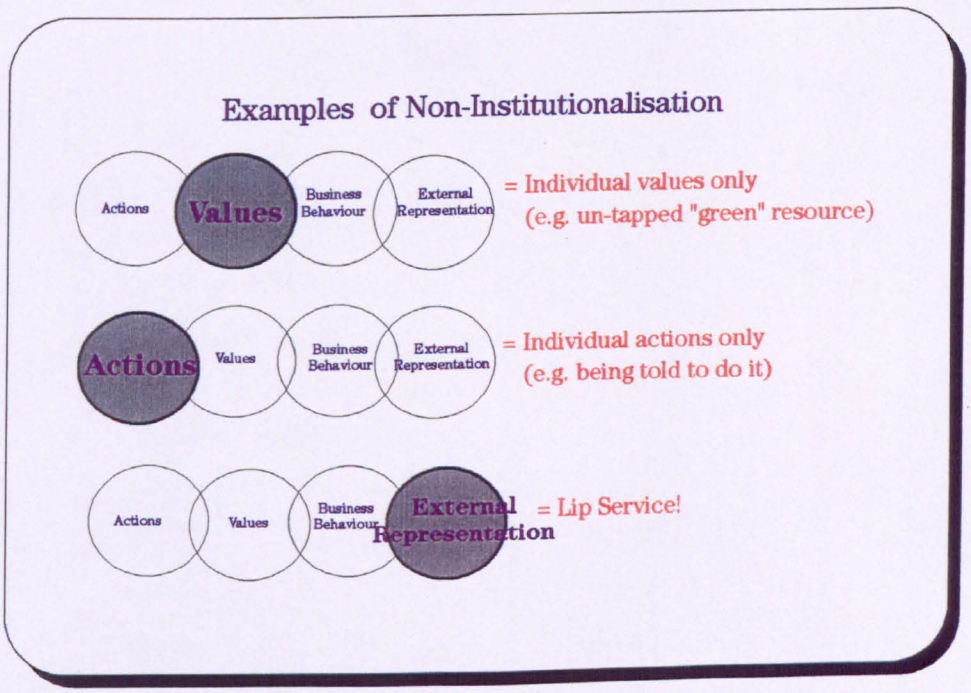


Fig. 5 Progress meeting slides (February 1996)



Appendix A

Expanded figures from Story Boards

Fig. 6 Research Framework (July 1996).

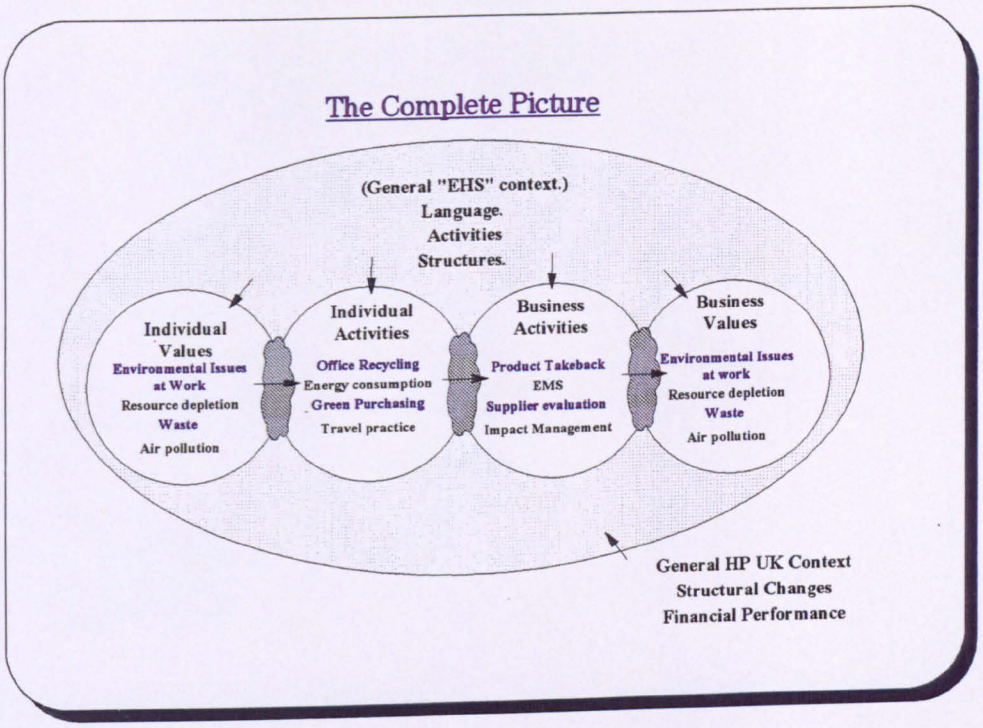
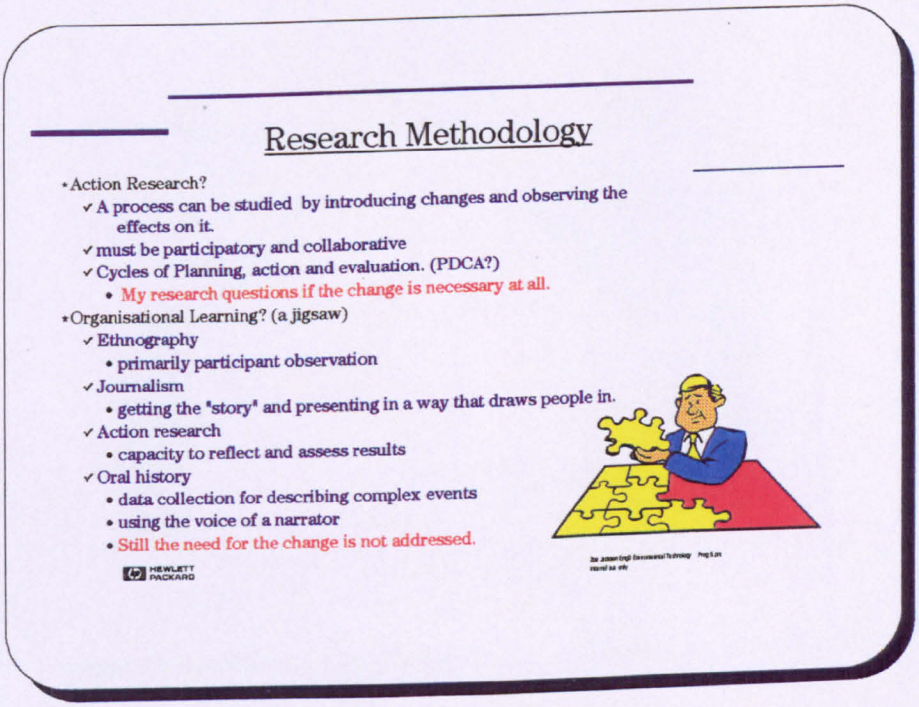


Fig. 7 Progress meeting slides (July 1996).



Appendix A

Expanded figures from Story Boards

Fig. 8 Environmental Management with no EHS department (January 1997).

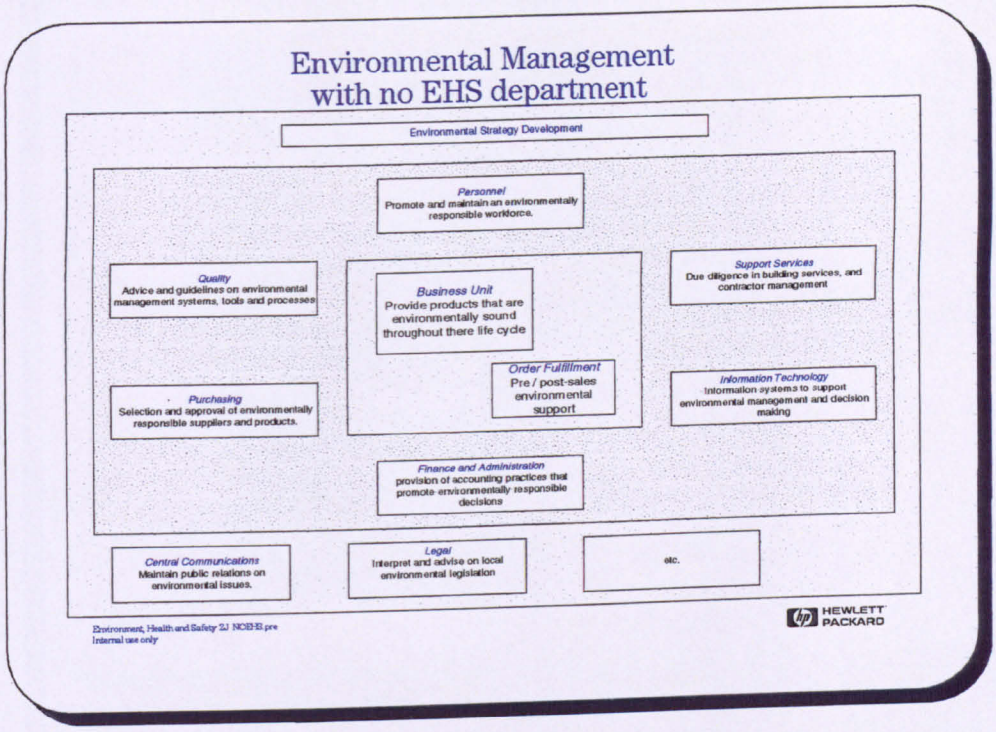
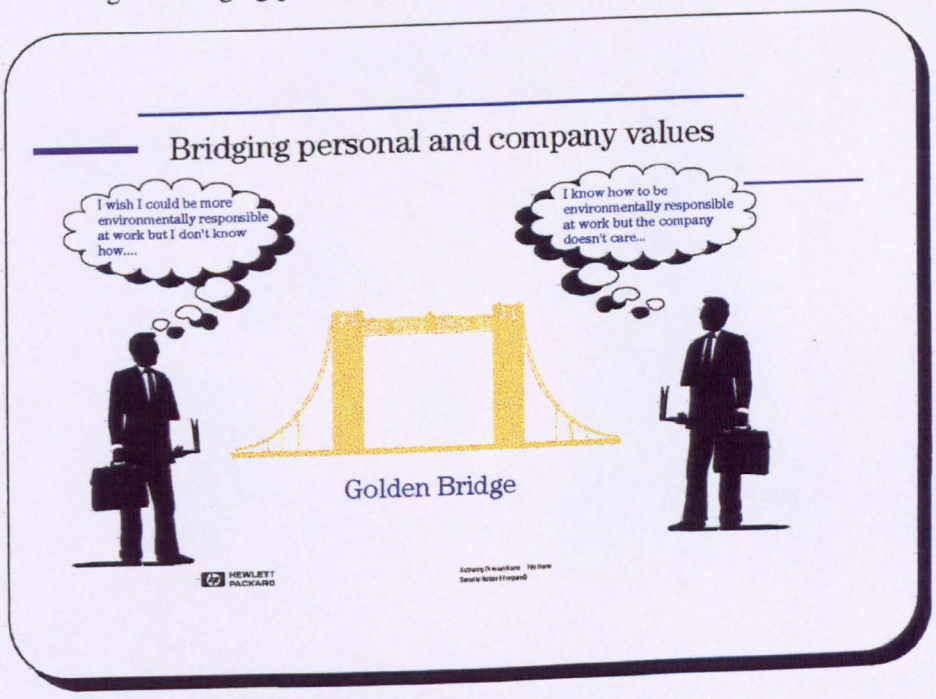


Fig. 9 Bridging personal and company values (January 1997).



Appendix A

Expanded figures from Story Boards

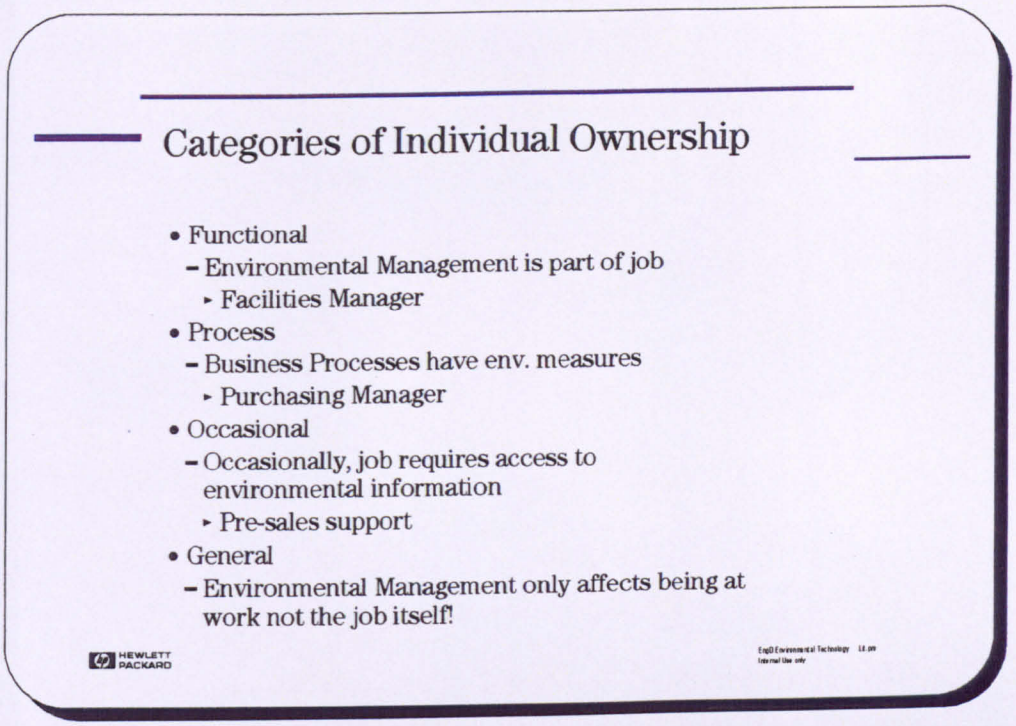
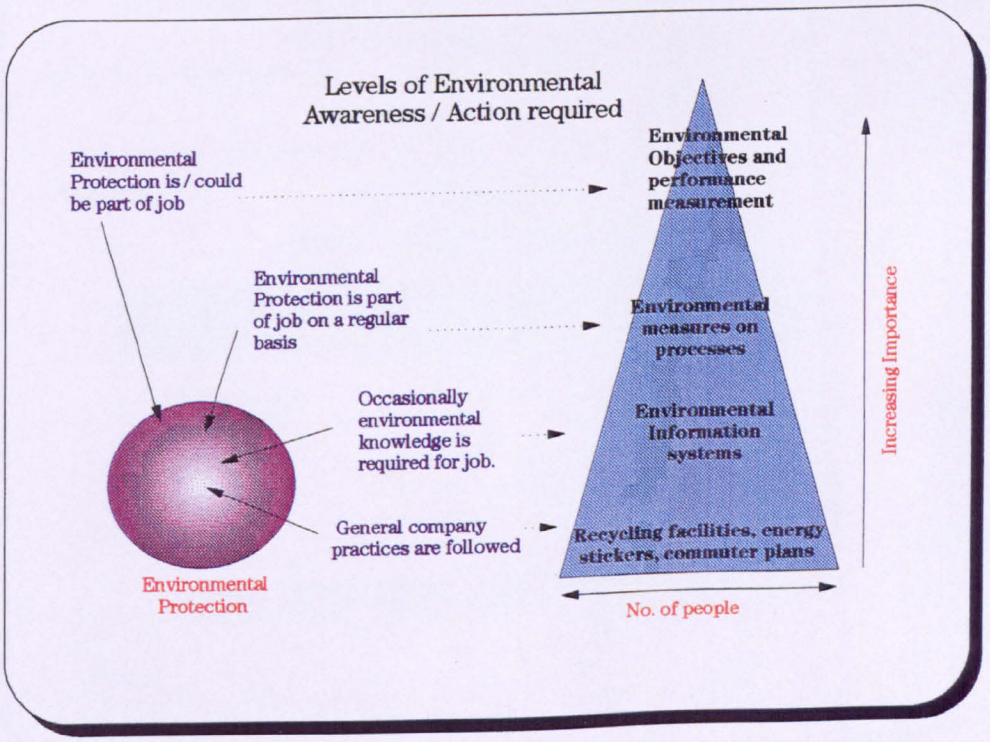


Fig. 10 (Above and below) Categories of Individual Environmental Management Ownership



Appendix A

Expanded figures from Story Boards

Fig. 11 Research Contribution - Core Concepts

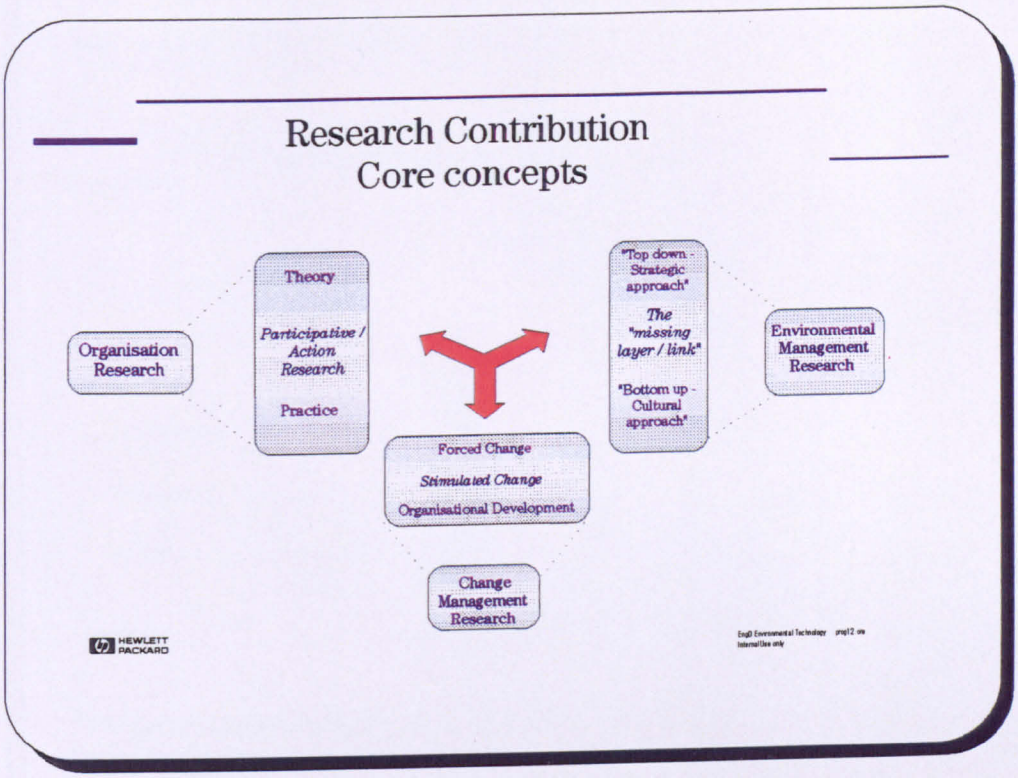
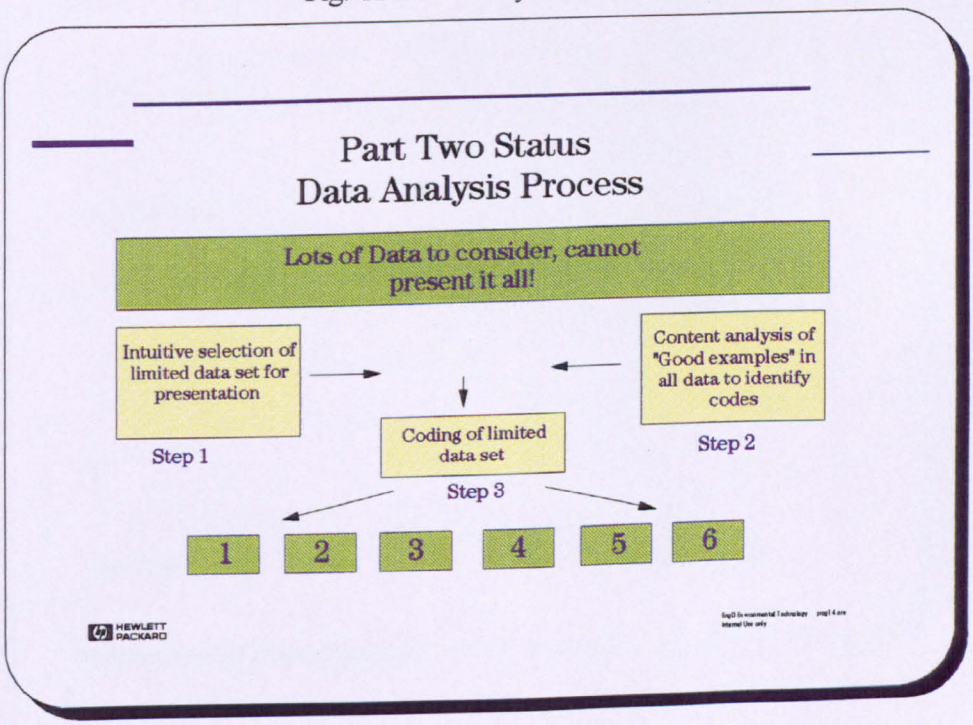


Fig. 12 Data Analysis Process



Appendix A

Expanded figures from Story Boards

Diagrams supporting Story Board Two

Fig. 13 Environmental Management and Business Results (October 1994)

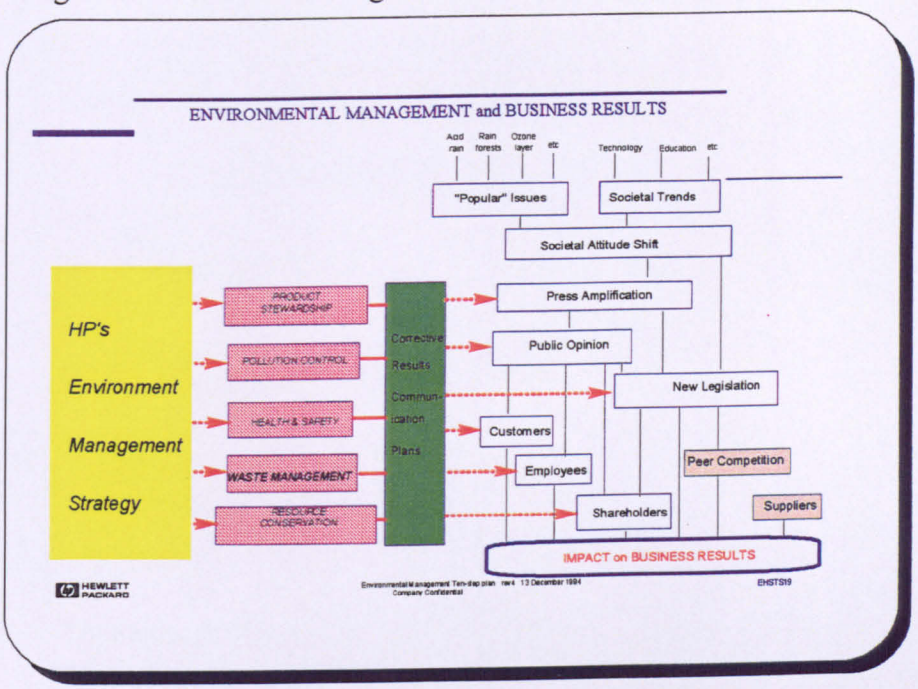
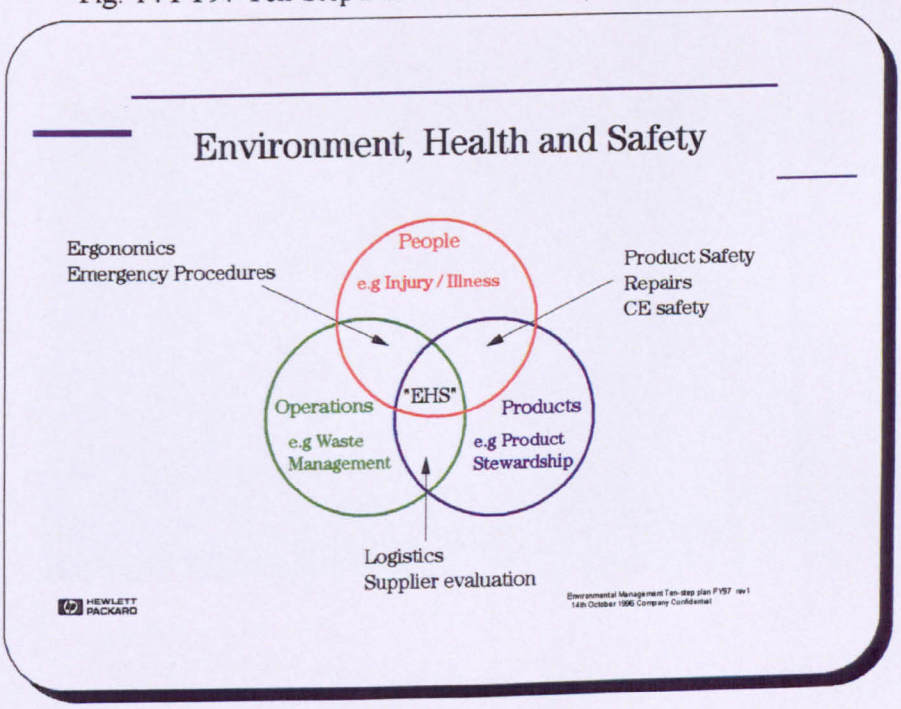


Fig. 14 FY97 Ten-Step Plan "Environment, Health and Safety"



Appendix A

Expanded figures from Story Boards

Fig. 15 FY97 Ten-Step Plan "Value Chain"

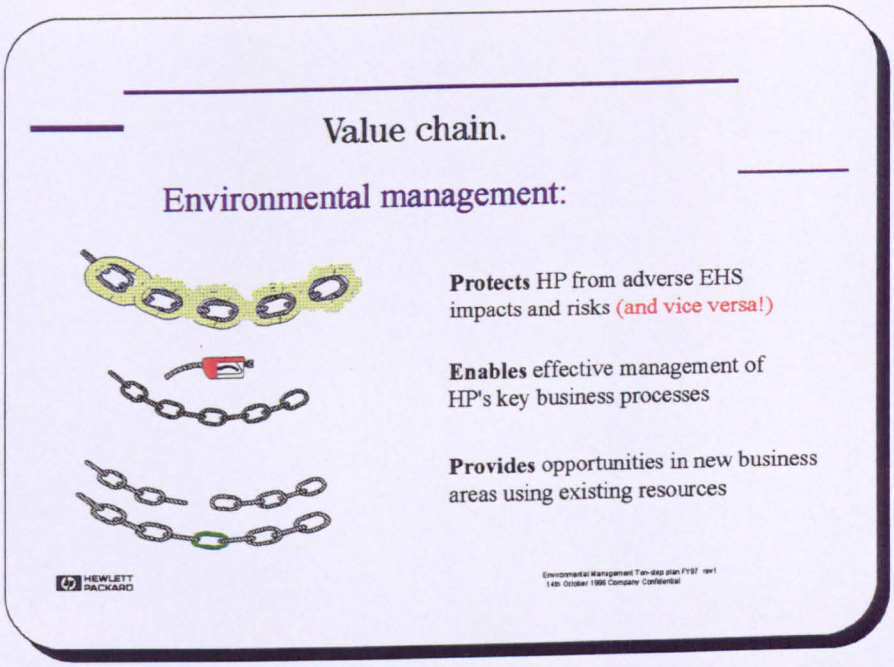
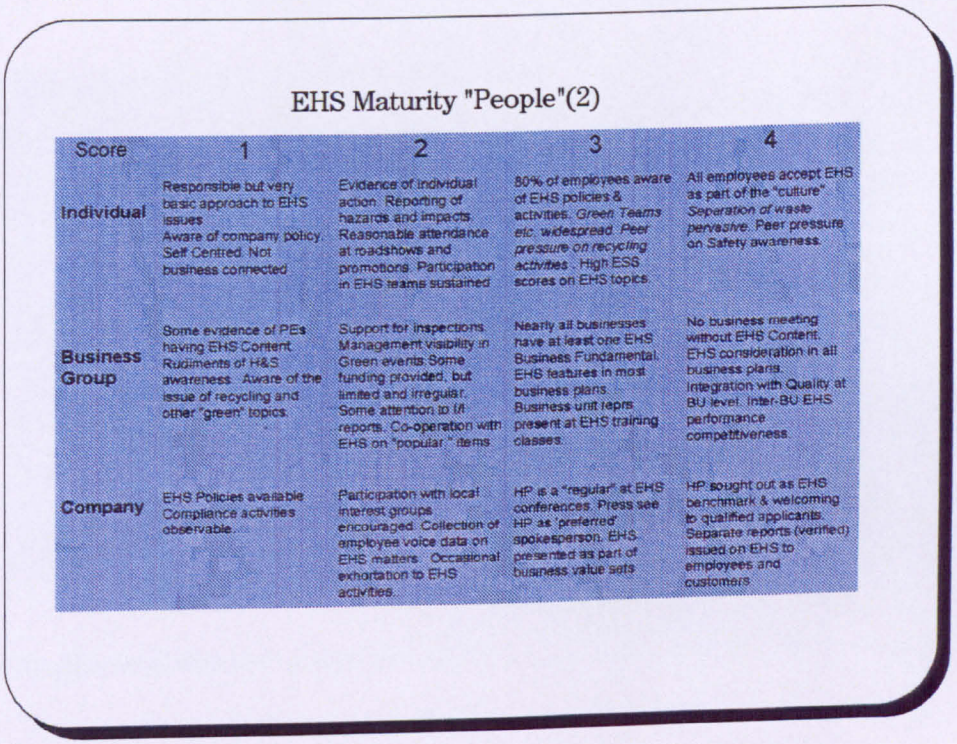


Fig. 17 (a, b and c) Environmental Management Maturity in QMS terms



Appendix A

Expanded figures from Story Boards

EHS Maturity "Operations" (2)

Score	1	2	3	4
Individual	Basic Awareness of some site environmental impacts. Small number of employees concerned. Little peer support	Employees generally knowledgeable of key environmental impacts. Evidence of some individual avoidance / corrective actions. Limited support for company EHS schemes.	Most employees fully knowledgeable about company EHS activities. Personal EHS slogans & notices widely available. Employee activities can be used as basis for company action	Typical employee talks enthusiastically about "HP & EHS" Home and work EHS activities linked and cross fertilised. Strong and effective EHS suggestion scheme
Business Group	Evidence of aspirational statements in some business plans. High risk areas show some token deployment of preventative/corrective activity	Major impacts recognised and communicated. Mostly defensive action. Some analysis of EHS importance shown in some business plans. Mostly "champion" activities	EHS impacts covered by Business Fundamentals. Some improvement plans in place. Some pro-active EHS planning in business strategies	EHS figures in business presentations as matter of course. Sophisticated EHS metrics adopted and revised. Citizenship ideals interpreted into business plans
Company	Some attempts to demonstrate accepted conventions in EHS operations. Basic "legitimacy" approach	Some environmental targets. Compliance to accepted norms taken as company standard. Defensive drawer statements in place	Cautious attempts at self publicity on EHS matters. Fairly consistent EHS improvement results. Benchmarking activitiescautiously undertaken. Reporting plans in place	Environmental impact objectives and plans in company reports. Environment mentioned in most company presentations. Environment placed in competitive analyses.

EHS Maturity "Products" (2)

Score	1	2	3	4
Individual	Many employees aware to some extent of actual and perceived environmental reputation of company products	Employees generally aware of company products and reputation, d some can justify with limited examples	Most employees aware of the environmental impact of company products and their importance. Some awareness of general competitive position with respect to EHS	Most employees familiar with environmental features of company products, understand the competitive strengths & weaknesses and are aware of " trade/offs"
Business Group	Business aware of company environmental policies, and capable of presenting when asked to do so	Use of prepared statements and documents. Re-active positioning of Company. Dependence on staff function "experts" for credibility.	Capable of customising individual responses. Use of experts to enhance results. Wide recognition that "environmental products" can be advantageous.	Environmental Products image used repeatedly as differentiator by internal staff. Individual presentations assembled based on specific customer needs.
Company	Use of already-available features presented "environmentally to demonstrate responsibility."	Design for environment shows up in some product lines. "Low hanging fruit exploited for EHS legitimacy.	Wider public evidence of Product Stewardship. Proven positive consequences of green products. Evidence of "green" features in projected company image.	Separate environmental reporting. Ccompany Literature regularly features green-ness of products. Regular demands for public speakers. Environmental talks given by non-EHS-specialists.

Appendix A

Expanded figures from Story Boards

Fig. 20 Field EHS Council Organisation Chart FY96

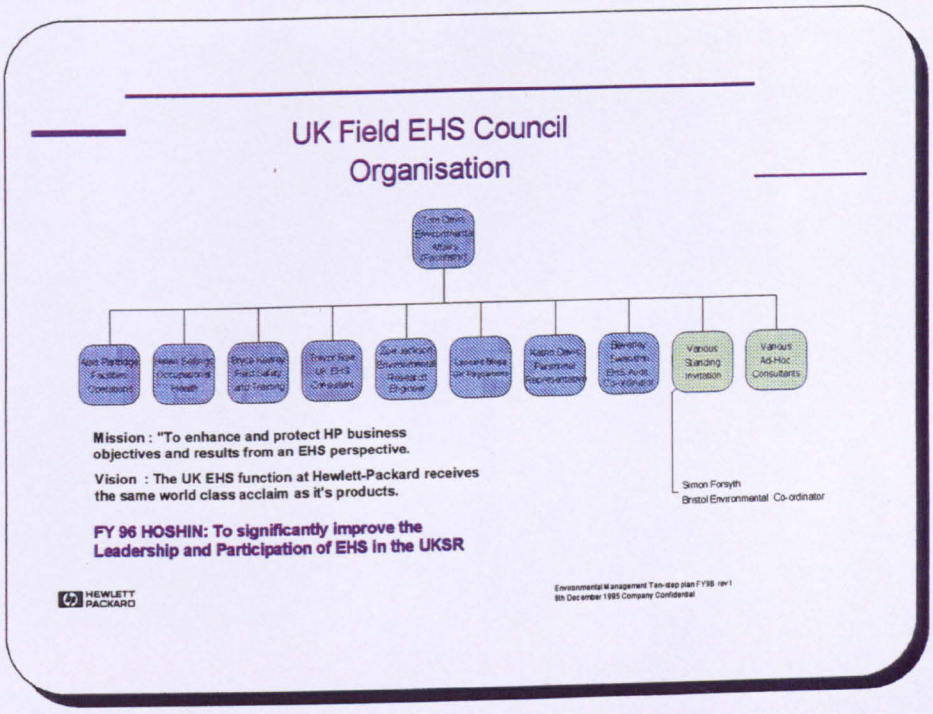


Fig. 22 Horizontal and Vertical Risk Management

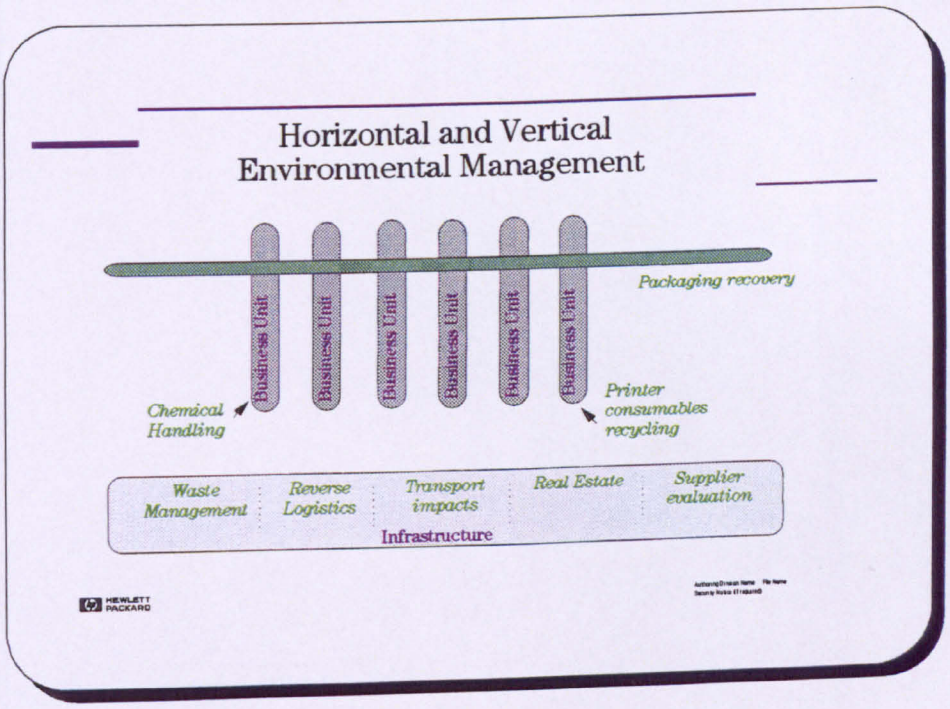
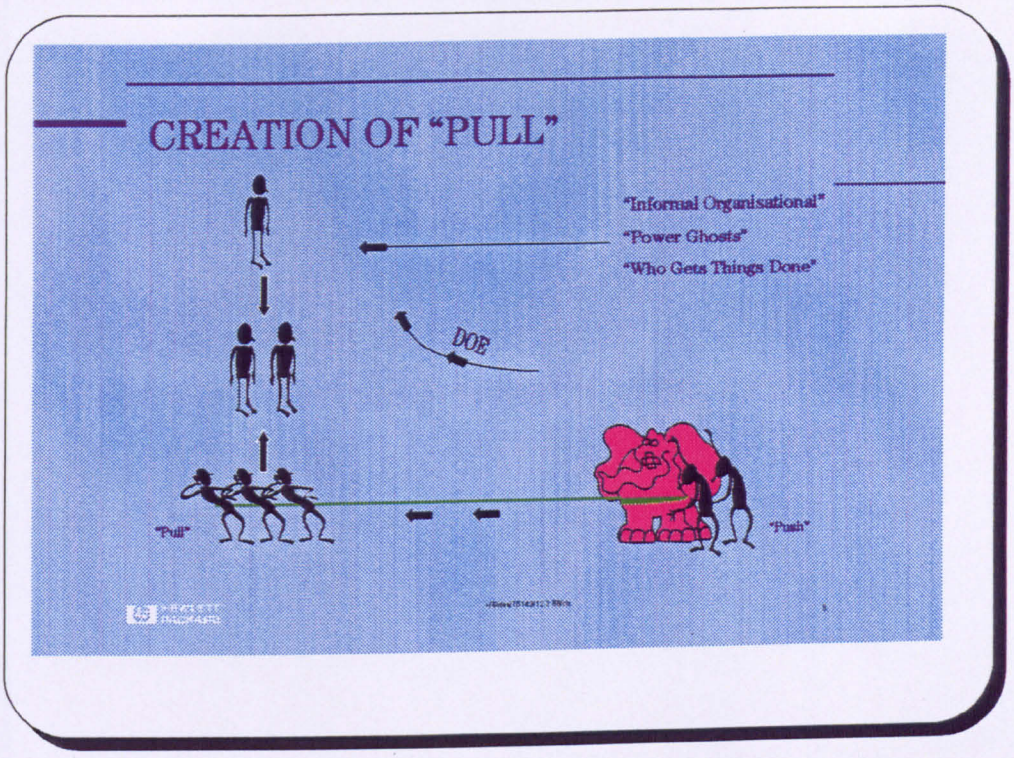


Fig. 23 Creation of Pull for Environmental Management

Appendix A

Expanded figures from Story Boards



Appendix B

Evidence of Themes in the Data

Contents

Themes in the Communications Data

Themes in the Waste Management Data

Appendix B

Evidence of Themes in the Data

Finding	Codes	Examples in the Communications Data used in Story Board Four						
2	**Business case**	This goes to show that environmental initiatives do not necessarily have to cost the earth, and can be part of a succesful business operation. *"What's edible 100% natural and doesn't cost the earth" - August 1995*	This is a classic example of HP exploring a business opportunity which also benfits the community *"HP puts cleaner water on tap" - December 1996*	There are three main benefits to this new service - the paper is collected for free from HP premises. - all paper collected goes to make recycled paper - For every tonne recycled £10 goes to charity. In particular the following services have added real value to the management of our business, financially as well as in terms of employee welfare. *"EHS Newsletter" - March 1997*	Switching reycled paper is an important first step in reducing the environmental burden of our paper consumption, reducing the amount of unnecessary paper used at work would also help, and save money at the same time. There is also an increasing volume of customers, from major accounts to the household printer, that are requesting collection and scarpping of their out of date equipment. *"EHS Newsletter" - May 1998*			
2	**Quality**	For HP this focus on improvement underpins the way we run our business - making environmental management a natural extension of Total Quality Management *"Model Environment" - June 1995*	While working on their Express Evolution Project which won the 1995 Quality Recognition Award, the team had some concerns about the environmental health and safety aspects of the foam packaging. *"What's edible 100% natural and doesn't cost the earth" - August 1995*	He told guests of HP's commitment to the quality of the environment in a whole host of areas. *"HP and the Environment" - March 1996*	In fact, industry observers agree that environmental performance will be at least as important as quality in selecting suppliers. *"Environmental Management for business today" - December 1997*	Last year, one of Lew Platt's Hoshins was the development of environmental management.... *"Pinewood Post" - June 1995*	Bracknell's EHS programme is chracterised by strong senior management ownership, solid business planning and alignment with the principles of Total Quality Management our audit results will go all the way to LP so that he can monitor us against what he considers to be a very important business fundamental. *"EHS Newsletter" - August 1996*	The change in approach has been a direct result of a TQC project on waste reduction in the workplace. *""EHS Newsletter" - March 1997*

Appendix B

Evidence of Themes in the Data

	Codes	Examples						
2	**Commit-ment**	He told guests of HP's commitment to the quality of the environment in a whole host of areas.. *"HP and the Environment" - March 1996*	Recycling all types of paper in this way will enable much more waste to be diverted from landfill; a goal which HP is committed to worldwide. ...and also to encourage employees that did not attend to think about avoiding waste in the office and help HP's commitment to the environment. *"On the conservation trail" - June 1997*	Similar commitment from all of us will ensure that HP maintains its strong market position *"Environmental Management for business today" - December 1997*	That is why we area asking you, in coming weeks to make every effort to ensure that we can demonstrate our commitment to environment, health and safety. *"EHS Newsletter" - August 1996*	The Environment, Health and Safety group depend on your commitment to a safe working environment. *"EHS Newsletter" - March 1997*		
2	**Partnerships**	HP's Real Estate Manager, CH joined forces with other major companies and Bracknell Forest District Council to oppose Berkshire's Waste Local Plan *"Rubbish plan thrown in bin" - March 1995*	HP has been working with the British Standards Institution since 1991 to help develop the environmental management standard Their policy is one of honesty and partnership with Lothian Regional Council. *"Model Environment" - June 1995*	HP's Chemical Analysis Group is working with a number of UK companies to improve the quality of our drinking water. *"HP puts cleaner water on tap" - December 1996*	Shortly, the EHS department, in conjunction with Site Facilities, will be running a recycling awareness campaign so watch out for that too. *"EHS Newsletter" - August 1996*			

Appendix B

Evidence of Themes in the Data

	Codes	Examples						
2	**HP-Way**	"Hewlett-Packard is a model of good environmental citizenship. Their policy is one of honesty and partnership with Lothian Regional Council. *"Model Environment" - June 1995*	From HP's point of view, environmental management is an obvious extension of our traditional corporate objectives, starting with "Citizenship". In keeping with its history of responsiveness, HP is aware of emerging trends *"Environmental Management for business today" - December 1997*	By doing this, HP will be disposing of its equipment in a responsible manner whilst at the same time fulfilling is legal obligation and being a "good citizen" *"EHS Newsletter" - May 1998*				
2	**HP positiong**	SouthQueensferry has received BS 7750 certification for environmental management- one of the UK's first large operations to receive this certification *"Model Environment" - June 1995*	and HP is respected world-wide, as a leading contributor to environmental practices and standards *"Environmental Management for business today" - December 1997*	The objective of the council is to make sure Hewlett-Packard in the UK, internally and externally, is seen as one of the leading proponents of Health and Safety Management. *"Pinewood Post" - June 1995*	This year we would like to keep up the excellent reputation that we established last year and demonstrate best practice in field EHS. *"EHS Newsletter" - August 1996*			

Appendix B

Evidence of Themes in the Data

	Codes	Examples						
3	**Leadership**	The UK has a field Environment, Health and Safety council. TD is the manager, reporting directly to JG. *"Pinewood Post" - June 1995*	Bracknell's EHS programme is chracterised by strong senior management ownership, solid business planning and alignment with the principles of Total Quality Management Next year our audit results will go all the way to LP so that he can monitor us against what he considers to be a very important business fundamental. *EHS Newsletter" - August 1996*	JG expressed great pleasure at the outcome of the assessment. He would like to personally thank everyone who contributed to the success of the EHS programs this year. *"EHS Newsletter" - October 1996*				
4	**Personal**	And whilst we wouldn't choose to lunch on Green-Fill, it does bear a strong resemblance to flavourless 'Wotsits' *"What's edible 100% natural and doesn't cost the earth" - August 1995*	Children often lead the way in teaching adults about protecting the environment. *HP and the Environment" - March 1996*	A video starring John Cleese and Prince Charles ran throughout the event. *"On the conservation trail" - June 1997*	Last quarter, HP sites across the Thames Valley used five and a half million sheets of paper. That is equivalent to nearly 30 tonnes of paper (about 500 trees!!) *"EHS Newsletter" - May 1998*			

Appendix B

Evidence of Themes in the Data

	Codes	Examples						
4	**Empowerment**	Employees will also be able to influence the Action plan *"The Way to Work" - December 1997*	What we are looking for here are your ideas on how Pinewood affects the environment... This is an area where individual and group effort will make all the difference. *"Pinewood Post" - June 1995*	This is your audit and not only that of the EHS group. *EHS Newsletter" - August 1996*	Here, these empowered employees could well be showing us the rest of the way. *"Environmental Management for business today" - December 1997*			
4	**Recognition**	This recognition is thanks to countless individuals across the world who personally consider the environment to be an important part of our business practice *"Environmental Management for business today" - December 1997*	In this issue of the EHS newsletter the EHS team would like to congratulate and thank all of you for the work you did for the recent Thames Valley EHS Assessment preparations *"EHS Newsletter" -* *October 1996*	JG expressed great pleasure at the outcome of the assessment.e would like to personally thank everyone who contributed to the success of the EHS programs this year. *"EHS Newsletter" -* *October 1996*				

Appendix B

Evidence of Themes in the Data

Finding	Codes	Examples in the Waste Management Data used in Story Board Five						
2	Business Case	**" Build a waste management system to reduce costs, optimise revenues and minimise environmental impacts as indicated by the EHS audit score."**	She said "the cost of sorting our paper doesn't make it economical even of we get paid for it".	it should cost less to wash glasses than to throw away plastic cups. Even if it doesn't HP should take the "greener" option.	They are interested in improving our relationship with them, in particular having more dialogue on new trends such as the landfill tax and the packaging recovery regulations.			
	Stakeholder pressure	Given the climate around the world, and Europe in particular, companies are being pressed to reduce their volumes of solid waste.						
	Compliance	The reason this was highlighted in the newsletter was that the recent assessment picked it up as an area in need of significant improvement.	They are interested in improving our relationship with them, in particular having more dialogue on new trends such as the landfill tax and the packaging recovery regulations.	I also said that I would like to have any new relationship set up well before the next EHS Audit! ...If we can get a good management contract going with *a waste contractor*, I think we will be able to meet our Audit criteria a lot more simply.				
2	Quality	The project has a potential to become a TQC project but I think we should start by simply trying to improve the process and then see if we can get somewhere with it.	AN took over and really helped us to generate our process and do a fishbone analysis. I didn't mind the takeover and I don't think anyone else did. The quality approach works again.	In order to make the program successful and get the necessary attention and resources, a formal plan with business goals, objectives, and measures needs to be developed.	The first is that I'd be interested to know how the new system will be monitored, and improved if necessary			

Appendix B

Evidence of Themes in the Data

2	Openness	ust one more notice about the meeting on Thursday (23rd). I have invited SF to attend the first meeting. He is the environment manager at Bristol and has some experience in setting up waste management projects. He is there to be probed about his experiences so please feel free to think of any questions he could help us with.	This issue statement is intended for the UK Thames Valley sites although other sites can be used for best practice sharing and consultation.	I hope this answers some of your concerns, if we do implement such resource saving programs please encourage more people to send feedback or concerns. We cannot improve without feedback.				
Finding								
2	HP-Way	Something isn't quite right - it may be the "culture" or it may be to do with the working environment."	For every tonne of waste paper we recycle, £10 will be donated to *A Charity* - watch this space for amount donated in the first month.					
2	Partnerships	They are interested in improving our relationship with them, in particular having more dialogue on new trends such as the landfill tax and the packaging recovery regulations.	As part of the first stage we (facilities) had a meeting with CM and BM from *the cleaning company* and we found this an essential first step to ensure we all move forward as a partnership.					

Appendix B

Evidence of Themes in the Data

Finding								
3	**Policy**	Quite a surprising turn of events actually - VB jumped up (literally) and said "we don't want to ask people what to do - we want to tell them!" - "We want to say that this is HP's policy" - "you put those things here and these things here". So I guess that is what we will do!	Once developed, the effective communication of the plan and results to management and all employees needs to occur.	I think a lot comes down to individual motivation, but some corporate encouragement can only help.				
4	Ind action		My initial impression is that in the CSO/PSO area (first floor building 1), we still have a problem with the amount of paper that people simply put into the plastic bins immediately under their desks.	I certainly put all my waste paper into the new recycling bins, but I can't see an easy way to persuade other people to if they, don't care	However, behaviour change is another matter. It's a VERY slow process, and needs constant prodding. But we're getting there.....	"I shall be handing over the practical side of Pinewood's waste to Petula - I think in answer to your question - I shall remain interested but not involved.Certainly if you are looking for interested people, you can look in my direction!!"		

Appendix B

Evidence of Themes in the Data

4	Home /work	I find plastic is far and away the worst household recycling problem. I try not to buy things in disposable plastic containers, but inevitably we acquire some - I take the plastic bottles to the dump once in a while, but they take up a lot of space waiting to go, and there's no sense in driving to the dump specially.	Even though I think it is admirable that we are nor recycling these cups, wouldn't it be better to go one step further and get rid of the majority of these as much as possible by asking people to bring in their own cups/mugs from home and using these?"	" I noted the minutes on waste reycyling. What about removing vegetable matter from the rest of office waste? My apple cores and banana skins ferment a treat in Pinewood's environment, so I tend to wrap them up to keep the smell down, thus wasting two resources! Wokingham district council is currently encouraging home composting by selling the equipment at discounted prices - and has a source of lidded bins which may be used for recycling the significant quantities of vegetable waste generated in the office area - particularly on Tuesdays and Thursdays!"				

Appendix B

Evidence of Themes in the Data

4	Individual Buy in	I think this might be more practical as it would enable us to get the project more visible more quickly and get people used to the idea of recycling etc	I think this is a good idea. It is very important to start asap raising employees awareness and putting together and implementing plans to raise the recycling awareness	Once developed, the effective communication of the plan and results to management and all employees needs to occur.	Many interviewed where aware of a waste reduction program, but did not know how it impacted them specifically.	I know we have bins for paper in Amen Corner - but nearly everyone just throws everything into the waste paper bin under their desk. Batteries are a source of serious environmental pollution if treated as normal waste - and again in Amen Corner they just get thrown into the normal bins (I take mine to facilities, who can arrange for them to go to the right disposal process, but I doubt whether many other people do).	I think the culture is slightly different at Bristol, but only for the continual efforts of the EHS staff and other green people.	I think a lot comes down to individual motivation, but some corporate encouragement can only help.
5	Right People	By now all HP sites shoud have a designated SWM coordinator to facilitate this effort.	I am looking to set up a team with facilities (or a suitable volunteer in the satellites) representatives from A/C, CSC, Pinewood and the Satellites, myself and possibly a couple of others to have a look at the way we manage our waste.	The team was not really interested in the results as such, as ever they just wanted to get on with finding a solution. I think facilities managers are very much like this i.e. "fixit" types.	The original team focuses on raising awareness in the workplace... launching a campaign etc etc. At the same time.. I work with the Facilities Managers on getting new contracts organised.	In FY97, I plan to raise the profile of green issues in the UKSR through green teams or volunteers.	I think the most appropriate team of people for the initial scoping discussion would be those responsible for the actual operational side of the waste contract	To ensure that we have the commitment of the cleaning company and their staff, I feel that all the relevant people within the cleaning company organisation should be invited to attend the next meeting.

Appendix C

Action Research Matrices and Log Book Indeces

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Appendix C

Log Book Indeces

Log Book Number One

February 1995 to end July 1995.

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Contaminated Land (a great deal)
- Office Waste Management (a great deal)
- Transport (a tiny bit)
- Hardware recycling (a tiny bit)
- Ink-Jet recycling (a bit)
- Definition of Waste lobbying (a tiny bit)
- Packaging (Green-fill) (a bit)
- Energy Star. (a tiny bit)

2) "Context" included.

- Hosting an environmental brainstorming session @ PWD
- Developing EHS Process management
- Issue tracking for environmental issues (started)
- Visit to Corvallis
- Contemplating conservers at work.
- CPO public relations
- Audit
- Platform services survey
- Mention of ORM meeting
- Best-practice sharing with Bristol.

Appendix C

Log Book Indeces

3) Research ideas included. Those highlighted, (looking back) are most significant.

- How to green a company, customers and employees required
- The recipe for environmental management (citizenship and profit)
- Defining Significance
- A survey of environmental perception @ HP (not ever done!)
- Environmental flavour of the month
- Environmental Change is Different
- Matrix of significance based on risk perception
- How to do longitudinal research
- Hewlett-Packard's impact on the environment and society
- Not having a chance to test my ideas about institutionalisation.
- Brain maps of institutionalisation and the role of EHS.
- Zoe was here! In Tom's e-mail
- Need to set up a file of environmental effects!

Appendix C

Log Book Indeces

Log Book Number Two

August 1995 to end January 1996.

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Recycling area at PWD.
- Waste management at IJBU
- Office waste at A/C
- Fibre-fuel facility
- Energy and Water
- Ireland environmental programs
- Energy Management

2) "Context" included.

- Reviewing the TSP.
- Asking what people though Institutionalisation was.
- Re-invent EHS discussion with Mary Masters
- Graham Earl doing research on IJ stuff.
- E-team work @ PWD.
- Contemplating conservers at work.
- Tima research (Product, Policy, Process)
- Discussions with Andy Hughes. Conservation communications (post Natwest)
- Waste team concept devised!
- IBM and Ecotec. Benchmarking club.
- QMS Review
- Visit to HP Ireland.

Appendix C

Log Book Indeces

- Attend Environment Council meeting on Stakeholder mgt.
- Brunel SEE student project
- Tom attending PIT team meetings. W/W to consider 6 key processes.

3) Research ideas included. Those highlighted, (looking back) are most significant.

- Deals won or lost from environment
- Defining Institutionalisation.
- An e-team for Amen Corner!
- An Energy footprint for HP.
- A hazard map around HP for say waste.
- The timing of Institutionalisation – there will be a time which is better when the environment is more accepting. Could we be too good? Could we lose out by spending too much money?
- A site environment report for UKSR
- More issue tracking required.

Appendix C

Log Book Indeces

Log Book Number Three

February1996 to end July 1996.

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- EOL take back
- Office waste management.
- Environment article in CPO newsletter
- 7750 / ISO 14 000
- MARS environmental award
- Use of green paper.
- Toner recycling.
- Green Workstation

2) "Context" included.

- Attending EOL conference
- More process management.. continually
- Blue Angel article in measure
- Zoe assists FEHSCO plan owners.
- Thoughts about adapting CFS system.
- UK as role model for Europe... Bracknell to go for 7750!?
- Spain and Portugal, low maturity like the UK two years ago.
- PIT team
- Thoughts of hiring an EHS Mgr for A/C.
- Survey for waste project and results
- Proposal for HP to sponsor Environment Council Web-pages.

Appendix C

Log Book Indeces

- Proposal for New EngD in Product Take-Back
- EHS QMS Review
- Trying to release Trevor Rae from EOL and EMERG etc
- Brunel energy project.
- Closing the recycling loop with Bayer.
- Cliff Bast, HP rolling out a product stewardship QMS self assessment.
- EHS noticeboards.
- Thought to have green business fundamentals.
- EHS brainwave scheme idea... (not ever done)
- CATALOG project.
- Harry Reid, Sustainability visit to Xerox.
- Motorola hold a symposium on the institutionalisation of environmental management.
- Discussed having an environment fair.
- Defensive driving course refused on cost basis.
- Xerox switching to recycled paper!
- Preparation for EHS assessment.
- Sonja Biaggi visit – re environmental communications.
- ESS and PSS surveys (environmental sections in).
- QMS review from Stan Gage.
- Packaging legislation conference mentioned.

3) **Research ideas included. Those highlighted, (looking back) are most significant.**

- How does varying participation affect my research. "It is interesting what people will and won't say to you".
- Some work on defining the business impact of environmental management.

Appendix C

Log Book Indeces

- Trojan Horse
- Sometimes the US and Europe will be influenced by our plan, sometimes not... but we will always be institutionalising environmental management (whilst I am here).
- Effectiveness of quality, people's response to it.
- Am I forcing the progress of the plan?
- Ethical and Ecological issues are a natural progression from learning
- Seems to be a little resistance from the virtual organisation – people who are not directly EHS are finding it a bit of a bind.
- The TSP is sometimes too different for Corporate EHS plans... a tricky situation.
- Institutionalisation is becoming a fashionable buzz word.
- Links between QMS and EHS
- EHS policy needs a revamp.
- What is the relationship between institutionalisation and organisational learning.
- Greater integration of POP
- Head, heart and guts in terms of institutionalisation.
- Main environmental issue here is WASTE.
- Take the HP Way and examine how the environment fits with the overall corporate strategy.
- What are the constituents of "behaviour"?
- Three strands to research. (What is happening.. physically... what does the official documentation say... what do I see.)
- What are the facets of an environmental organisation.
- My role in the institutionalisation process
- Does obtaining a quality score.. improve environmental performance.
- Why is Quality different to environmental management.

Appendix C

Log Book Indeces

- Observations of environmental management led to the concept of institutionalisation – but once the concept is formulated, the problem of how to make systematic observations presents itself.

- Critical elements of institutionalisation expanded.

- The link between POP and the levels of change. For instance... People. identification with the issue. Operation... change "at work" practices. Products.. USE environmental awareness in job (and not just at work).

Appendix C

Log Book Indeces

Log Book Number Four

August 1996 to mid March 1997.

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Waste Management
- Toner recycling
- Packaging take-back
- Environmental reporting
- Energy (a tiny bit)
- Transport.

2) "Context" included.

- New Academy for social responsibility involvement.
- EHS Assessment
- Response from feedback in CPO article.
- Statoil benchmark
- EHS QMS linkages ongoing.
- IBM Benchmarking
- Development of an environmental program (slides)
- Involvement in Berkshire Environmental Forum
- Involvement with transport 2000.
- Lots of customer packaging requests
- RATER.
- UK Hosts Euro FIELD EHS program meeting.
- Waste Lunch day.

Appendix C

Log Book Indeces

3) Research ideas included. Those highlighted, (looking back) are most significant.

- Looking at Action Research
- Defining institutionalisation STILL
- The link between individual and organisational learning
- Writing the dissertation (ie takes up time)
- Tom's strategy is very much based on the informal organisation.
- Ability(person), Desire, Can(discretion).
- Process of institutionalisation
- Golden bridge... linking personal and corporate values.
- What are the organisational connects between the regulatory, quality and environmental management organisations. One looks at the employee.. one the customer and one both...
- "I believe my credibility and knowledge allows me to come out of my job and just watch.. more than initially".
- EHS is different to E... like the Xerox model.
- You can have a check list for H & S but not for E.. because there is no law.
- I think Ireland improved quicker in EHS because we are a slow dinosaur.

Appendix C

Log Book Indeces

Log Book Number Five

Mid March 1997 to Mid July 1997.

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Transport
- Sustainability
- Packaging
- Toner Returns
- Waste Management

2) "Context" included.

- British Quality Award, impact on society section
- RATER.
- Sustainability meeting organised (and subsequently cancelled).
- Bracknell Environment Fair.
- More thoughts about Conservers at Work
- Ideas to follow up the green day.
- Environmental Performance Measurement
- BSE Conference abstract / paper
- EHS Audit
- Carboard Recycling Trials
- Martin Charter
- Environmental Reporting
- ISO style environmental impact analysis
- Presenting about packaging at the Environment Council

Appendix C

Log Book Indeces

- Eco-workers"
- Discussion with Richard Hanscott – Comet advert etc

3) Research ideas included. Those highlighted, (looking back) are most significant.

- Link the sources of data to research question.
- Need to reverse polarity of literature review and write my opinion, backing it up with literature as opposed to the other way round.
- Environmental Management Literature Reviewed.
- Economics Module
- Communicate environmental management to FOMT
- Where do facilities fit with the key business processes.
- Tima Paper
- Level of individual responsibility
- Concept of push vs pull
- Importance of "process"
- EHS w no EHS department
- Measurement is part of the HP culture

Appendix C

Log Book Indeces

Log Book Number Six

Mid July 1997 to End January 1998

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Packaging
- Product Take-Back
- Toner cartridge take back
- ISO 14000
- Waste Management
- Transportation
- Hazardous Ink
- Impact on Society!

2) "Context" included.

- EHS in infrastructure group
- Inter organisation communications
- New Academy Social Responsibility Network
- EOL spontaneous IT forum hosted by HP
- Country level EHS Web-site
- UK EHS Web page
- Writing BSE Conference paper
- Lots of packaging
- Need for a placement student
- Channel 4 Interview
- Greater focus on environment

Appendix C

Log Book Indeces

- Future of REHSCO – new environment group
- Simon Forsyth wanted to organise a more grass roots approach.
- Tom European EHS Manager
- BS role accelerated
- Placement student to be hired
- "For the first time having the right people in the room talking about waste" notes
- Cardboard recycling in building 2 too!
- Packaging meeting in Grenoble – Paul Russell too
- Product Environmental Profile sheets
- Zoe's TRSE responsibilities – E-regs forming
- Andrew Perrins
- Mars Environmental Award (see reception)
- Irish Packaging Regulations
- Tony Hince and Packaging
- CIC toner recycling query ownership
- UK Environment Group
- Readout article
- Hp vs the people.com
- Attending Transport 2000 ground floor partners meeting
- British Quality Award
- Influencing PTB position statements with kieren
- Thomas Bazlen and Bernd in BBN
- Lots of process management

Appendix C

Log Book Indeces

- ICER meeting
- Valpak analysis
- RATER
- CARS – AL and Bernd
- Chat to David Shepherd at IRS – eventually was an article in a journal.. I forgot that I had spoken to him!
- EHS QMS Review
- Proposed funding model for PTB – see kieren
- PTB influencing activities in the UK
- Ten-Step plan consultation process
- QMS 3 Training – diagram!
- RELOOP
- PLANET development team
- Impact on society with David Gee
- UK EHS Web (Regs vs EHSTAS)
- Toner Bins new emphasis on program

3) Research ideas included. Those highlighted, (looking back) are most significant

- Anglian Water "journey" – they institutionalised a cultural concept in a very different way to HP style. Compare?
- Research Design –
- Newton and Harte article
- Culture vs Strategy split in EM literature
- Interview with Tom Davis
- "Creating enabling conditions" – Seizing opportunities as they arise.

Appendix C

Log Book Indeces

- Horizontal issues such as diversity.. currently ignored to BU split (decentralisation problem!)
- Person dependency noted in interview with Tom
- Maturity – see slide on research question
- Split between TRSE and AUDIT issues
- Matrix of environmental maturity
- EngD conference paper – snakes and ladders
- Second part of methodology i.e what is the plan about
- Al's orientation interviews as measure of maturity?
- Activities in Environmental Management
- Role of Env Regs Engineer vs EHS co-ordinator
- Think about components environmental data base?
- Lessons learned from European Trip
- Regulations Interpretation vs Implementation
- Communication inside first then outside
- HP has a positive environmental image
- HP should impose what we want.. not what we don't
- Common regulatory process?
- Talking to the media module
- Mindmap - Connections in research (ended up as concepts)
- Portfolio planning
- Mind Map started – doing research in an organization

Appendix C

Log Book Indeces

Log Book Number Seven

End January 1998 to date

Need to cross match this with e-mail and documentation and diagrams (flw)

1) "Issues" included.

- Packaging
- Transport
- Waste management
- Product take back
- Sustainability
- ISO 140001

2) "Context" included.

- ICER meeting 3/2/98
- BU Packaging Interviews
- Waste meeting @ PWD (after jennies remark) – had to give to get
- Al taking over most of work.
- VALPAK, PRNS department activities etc
- Environment Reporting group
- Movie theme for EHS Audit awareness
- Tom – I want a railway station
- Improving customer enquiry process
- Jim Sheats visit
- Operational Sustainability to Environmental Management
- Tom talking about "aspects" – ISO 14001 training
- Harry Read out article

Appendix C

Log Book Indeces

- PR meeting with Catalysis
- Waste "donation to charity" posters

3) Research ideas included. Those highlighted, (looking back) are most significant.

- Need to link my learnings to specific projects?
- Convert previous lit review to sections of portfolio in line with core concepts model
- Celtic Diagram?
- Will top down eventually meet bottom up? How can I isolate the middle section?
- Hard work balancing uni and work as decreasing HP activity – decreasing recognition for doing anything... feel a bit isolated.
- What is the link between levels of service in HP and the level of change required as per my model.
- What are the data review themes?
- Defining the "match"

Appendix C

Action Research Matrices

Issue - Log Book One	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General	EHS Process Management	Mention of ORM meeting	Environmental Brainstorming at PWD	Issue tracking for environmental issues started	Audit preparation	Issue tracking for environmental issues started	
	EHS adopts 6 key business processes	Establish a Green Team at PWD	Contemplating Conservers at work		Platform services survey	Best practice sharing with Bristol	
					Need to set up a flile of environmental effects	IOD conservers at work meeting	
						Environment Council meeting on identifying environmental impacts	
Waste Management							
Office Waste Management					Initial meeting with Doreen Barnes	Approached by March consulting - Thames Valley waste	think about acetate recycling
Product Stewardship							
Hardware recycling			Presentation at FEHSCO (3/5/95) meeting				
Packaging			Readout article on Green Fill				
Inkjet recycling					Corvallis staff surveyed	Visit to Corvallis	
Energy Star			Tom presentation to conference				
General			Meeting with MH, CPO Public relations activity required				
Resource Conservation							
Water Consumption					Initial meeting with Doreen Barnes		
Energy Conservation					Initial meeting with Doreen Barnes		
Pollution Control							
Contaminated Land							Approached and selected consultants for remediation work

Appendix C

Action Research Matrices

Issue - Log Book Two	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General	Review TSP	Tom at the PIT team meetings	Contemplating Conservers at work			Discussions with Andy Hughes (post NatWest)	E-team work at PWD
	Re-invent EHS discussion with Mary Masters		Environmental Stories for Readout			IBM Benchmarking club started	
	EHS QMS review					Visit to HP Ireland	
	WW takes on 6 Key processes					Environment Council event on managing stakeholders	
	PLanning FY96					Tom at the PIT team meetings	
						Zoe at Barcelona EHS meeting	
Waste Management							
Office Waste Management		Waste Team Concept Devised	Recycling area at pinewood				The Fibre Fuel facility?
					Brunel SEE student		
Waste mgt at IJBU						Assisting with Dublin waste management processes	
Product Stewardship							
End of Life Mgt						Comments to Richard Page @ DTI	
Packaging							
Inkjet recycling				GE Research on IJ recycling			
Energy Star							
Resource Conservation							
Transport impacts					Brunel SEE student		
Water Consumption					Brunel SEE student		E-team work at PWD
Energy Conservation	FEHSCO plans include Energy				Brunel SEE student		E-team work at PWD
Pollution Control							
Contaminated Land							

Appendix C

Action Research Matrices

Issue - Log Book Three	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General	More process management	Thoughts of hiring an EHS manager for bracknell	HP asked to sponsor environment council web-pages	Thoughts about adapting the CFS system	UK as a role model - Bracknell to go for 7750!		
	Zoe assists FEHSCO plan owners		EHS noticeboards		Spain and Portugal low maturity like UK two years ago	Mars environment (96) award launched at HP PWD	
	PIT Team		Thought to have a EHS Brainwave scheme		Preparation for 2nd assessment.	PIT Team	
	EHS QMS Review		Discussed having an environment fair		ESS and PSS surveys with environment in	Harry Reid Sustainability visit to Xerox	
	Thought to have green business fundamentals		Sonja Biaggi visit & program			Motorola symposium on the institutionalisation of environmental management	
	Review of QMS process		Forum for the Future approached HP for sponsorship			Environmental Co-ordinators workshop	
						Forum for the Future approached HP for sponsorship	
Waste Management							
Office Waste Management		Need to get the cleaners involved	Waste matters on the web planned.		Recycling survey fpr waste management project		Recycling of visitor badges
		Meetings better with Anne Neave there.			Brunel SEE Project		Tender process
					UK Waste analysis of Thames Valley quantities		

Appendix C

Action Research Matrices

Product Stewardship							
End of Life Mgt		New EngD student project				American Embassy EOL meeting attended	
		Plans to release Trevor Rae from EOL / EMERG				CATALOG project	
Packaging						Conference mentioned on packaging legislation	
Toner Recycling				Leonard Expressed some concern that this "customer" issue required greater attention			Leonard Expressed some concern that this "customer" issue required greater attention
General			Blue Angel article in measure		Cliff Bast rolling out product stewardship self assessment		Closing the recycling loop with Bayer
			Green Workstation				Green Workstation
Resource Conservation							
Transport impacts							
Water Consumption					Brunel SEE project		
Energy Conservation					Brunel SEE project		
Paper consumption							Xerox switching to recycled paper.

Appendix C

Action Research Matrices

Issue - Log Book Four	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General	Zoe assist harry in the development of sustainability TSP		CPO Article		EHS Assessment	New Academy - Social Responsibility Best Practice Network	Linking EHS and QMS maturity
	FEHSCO planning		Envronmental Program slides		Response from CPO article questionnaires	Statoil Benchmarking	
			UK hosts field EHS program meeting		RATER	IBM Benchmarking	
			Ian presents on HP culture at New Academy			Berkshire Environmental Forum	
						Scoping discussion with IBM	
Waste Management							
Office Waste Management			Waste Lunch day		TQC project - plan		TQC project
							Aluminium can recycling investigated
Hazardous waste management		haz waste co-ordinator required?					
Product Stewardship							
End of Life Mgt							
Packaging				Lots of packaging information requests			Article noticed in EBM Oct 96
							Initial discussion with Derren Biggart
Resource Conservation							
Transport impacts						Transport 2000	
Water Consumption							

Appendix C

Action Research Matrices

Issue - Log Book Five	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General		WW Sustainability meeting organised (and cancelled!)	Bracknell Environment Fair		RATER	British Quality Award submission	
		Environmental reporting group	More thoughts abour conservers at work		Environmental Performance measurement	Martin Charter	
			Following up the green day		EHS Audit		
					ISO style environmental impact analysis		
		Thoughts about eco-workers					Discussion with Richard Hanscott - comet advert
Waste Management							
Office Waste Management							Cardboard Recycling trials
Hazardous waste management							
Product Stewardship							
Ink cartridge recycling				Viking plastic bag issue			
Packaging	Clarify Irish Packaging situation	Identify UK division responsibilities	Presentation from HP to environment council			Presentation from HP to environment council	Pan European shipments
			Raise awareness of regulations withing HP!		Devising data collection system for submission		Valpak debate
Toner Recycling							
General							
Resource Conservation							
Transport impacts			National Press article included HP			Transport 2000 involvement	

Appendix C

Action Research Matrices

Issue - Log Book Six	Planning	Organisation Development	Communication	Customer Enquiries	Audit / Assurance / Measurement	Influence / Lobbying / Networking	General
General	Greater Focus on Environment - European plans	EHS in Infrastructure group	Country level EHS Web site	Thomas Bazlen and Bernd Osthage activity (PGE)	RATER (Al)	New Acdemy	Impact on Society with David Gee
	Lots of process management	Placement student	UK EHS Web activity	CARS (Al)		Mars Environment Award (excellence)	
	EHS QMS review	Future of REHSCO?	Readout article			British Quality Award	
	Ten-Step plan consultation process	Environment Grouop	Thomas Bazlen and Bernd Osthage activity (PGE)				
	QMS3 training	Tom European EHS Manager					
		BS Role as EHS manager Tv accelerated					
Waste Management							
Office Waste Management		Having the right people in the meeting for the first time!					Cardboard recycling now in building two
Hazardous waste management							
Product Stewardship							
End of Life Mgt			Channel 4 News item		Kierens research projects	EOL event hosted by HP for IT sector	
						Influence European and WW PTB statements	

Appendix C

Action Research Matrices

						HP BACK IN ICER	
						RELOOP	
Ink cartridge recycling			HP vs the people.com				
Packaging	Lots of activity	Lots of activity	Lots of activity	Lots of activity	Lots of activity	Lots of activity	Lots of activity
						Meeting in Grenoble - UK positioning	
			Tony Hince interested in talking to dealers re pack regs			Valpak debate	Irish Packaging Regulations
					PLANET development team	PLANET development team	
Toner Recycling		Andrew Perrins makes waves	Andrew perrins makes waves				
		CIC begin to own toner enquiry process					
			New Program emphasis				New Program emphasis
General			Product Environmental Profile sheets				
Resource Conservation							
Transport impacts						Transport 2000 meeting	
Water Consumption							
Energy Conservation							

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Submitted to Administrative Science Quarterly January 1999

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FROM ISSUES TO ACTIONS: THE CONGRUENCE OF ORGANIZATIONAL VALUES AND INDIVIDUAL CONCERNS IN FACILITATING ORGANIZATIONAL ADAPTATION

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FROM ISSUES TO ACTIONS: THE CONGRUENCE OF ORGANIZATIONAL VALUES AND INDIVIDUAL CONCERNS IN FACILITATING ORGANIZATIONAL ADAPTATION

ABSTRACT

This research investigates the conditions under which organizational issues evoke organizational actions. Using a longitudinal ethnographic methodology in Hewlett Packard and Rank Xerox, over the period of a year, we witness the development of organizational issues pertaining to the natural environment. We find that individual concerns interact with organizational values to influence the pace, scope and scale of organizational adaptation.

Keywords: Organizational adaptation, strategic issues, natural environment

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We are trying to demonstrate achievements and worth and recognition for the environment; so that people's personal values are nurtured and they are brought up higher; so that they can actually relate their personal values, which might have been in place at home, to their working environment; so that the corporate values are the same as their own personal values. — a member of Rank Xerox

Management theorists and practitioners have long been preoccupied with understanding organizational change and adaptation processes. To assist in this understanding, a robust theory of strategic issues has emerged. A strategic issue is a development, event or trend perceived as potentially having a significant impact on the organization's strategies (Dutton, Fahey, and Narayanan 1983). Strategic issues are complex, ill defined and interpretive (Dutton, Fahey, and Narayanan 1983). As a result, they influence organizational adaptation in two ways. First, the complexity and ambiguity of strategic issues permit numerous interpretations to be drawn. An issue's interpretation and label can influence the way the firm acts (Daft and Weick 1984; Jackson and Dutton 1988; Milliken 1990; Thomas and McDaniel 1990). Second, the complexity and interpretive aspects of strategic issues permit organizational members to push selected issues onto the strategic agenda and, therefore, organizational adaptation can be a consequence of successful championing (Dutton 1997; Dutton and Ashford 1993; Howell and Higgins 1990).

Empirical studies investigating the influence of strategic issues on organizational adaptation have two notable characteristics. First, most prior studies have been limited to a specific stage of issue development. In particular, the focus has been either on the cognitive or interpretive aspects of issue diagnosis or issue labeling (e.g. Jackson and Dutton 1988; Milliken 1990; Thomas, Clark, and Gioia 1993) or on agenda building (e.g. Dutton et al. 1997; Howell and Higgins 1990). Only a few exceptions have investigated issues as they have developed from the stage of identification to an organizational response (e.g. Dutton 1988a; Dutton and Dukerich 1991).

Second, prior studies have investigated issues defined as strategic prior to the investigation (e.g. (Dutton and Dukerich 1991; Ginsberg and Venkatraman 1992; Milliken 1990; Schneider and De Meyer 1991). However, the strategic importance of many issues is often not assessed until after the

consequences are observed (Mintzberg and Westley 1992; Weick 1989). When an issue is first identified, the strategic importance of an issue is often not known.

Given the emphasis of prior studies on specific stages of strategic issue flows and issues defined early as strategic, these studies have been biased towards issues that elicit a strategic response. However, there are numerous issues that are not strategic or that do not elicit an action (Pfeffer and Salancik 1978; Weick 1987). By directing research attention to successful or strategic issues, management theories may not capture fully the dynamics of organizational change and adaptation. For example, organizational routines (Nelson and Winter 1982) are more likely to play an important role in influencing issues that are deemed as strategic. Issues that are completely new, however, may not fit into existing routines. This project focuses on issue development, including both issues that evoke actions that those that stall. By stalled issues, we refer to issues that have not resulted in actions over the research period. These issues may never result in actions or they may result in actions beyond the research period.

The purpose of this project is to investigate the conditions that facilitate organizational adaptation; that is, to investigate the conditions that lead issues to actions. We observed the development of a set of issues within two organizations, Hewlett Packard UK (HP) and Rank Xerox[1] (RX), over the period of one year. We investigated issues pertaining to the natural environment with no *a priori* assessments of their strategic importance or their likely outcome. Three dimensions of issues were explored: their scale, scope and pace. An action is of large *scale* if it is strategic in nature. An action is of wide *scope* if it affects a large group of organizational members and processes. Finally, an action is of fast *pace* if the action succeeds shortly the issue diagnosis (Miller and Friesen 1982; Monge 1990).

We begin with an overview of the theory of strategic issues, which explains organizational adaptation. In keeping with the logic of induction, we then introduce the methods used to develop theory. The

data are presented next, based on a model adapted from Dutton and Duncan's (1987a) model of issue flows. We then develop the constructs and propositions that explain how individual concerns and organizational values interact to influence issue flows.

STRATEGIC ISSUES AND ORGANIZATIONAL ADAPTATION

Prior research into strategic issues provides two important links to organizational adaptation: through issue identification and through agenda building. We employ these concepts as a point of entry into investigating issue flows.

Issue Identification

Organizations are bombarded by issues that may or may not elicit an action (Daft and Weick 1984). The action is influenced partly by the way in which these issues are interpreted and subsequently labeled. Organizational members will place the signals associated with the issues in cognitive categories to assist in interpreting and remembering the signals (Dutton and Jackson 1987). Because these categories have pre-assigned attributes, the issue characteristics will shape organizational actions (Dutton and Jackson 1987; Gioia and Chittipeddi 1991). For example, issues labeled as threats have decidedly different characteristics than issues labeled as opportunities and are, therefore, likely to elicit different responses (Jackson and Dutton 1988; Mintzberg, Raisinghani, and Theoret 1976; Thomas and McDaniel 1990). These opportunity-threat labels may influence the level of risk managers will assume and their commitment and involvement in the issue (Kahneman and Tversky 1984). Also, Thomas, Clark and Gioia (1993) show that interpreting an issue as controllable, a characteristic of opportunities, is more likely to lead to a change in products or services. The ambiguity and complexity of strategic issues can lead to multiple interpretations and, consequently, alternative organizational outcomes (Dutton, Fahey, and Narayanan 1983; Thomas, Clark, and Gioia 1993).

[1] In October 1997, Rank Xerox became fully owned by the Xerox Corporation and is now called Xerox Ltd. As this purchase occurred outside of the research period, we will refer to the company as Rank Xerox (RX) in this paper.

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Agenda Building

A strategic issue agenda is the set of issues demanding the attention of top-level decision makers (Dutton 1997). The size of a strategic agenda is restricted by the limited resources of the organization and the limited cognitive capabilities of organizational decision-makers. The issues that appear on the organization's strategic agenda will influence strategic decision making. Only those issues that appear on the organization's agenda will draw top management team attention and be the target of organizational adaptation. These issues are influenced by existing organizational routines and the ability of organizational members to direct the attention of the top management team (Dutton and Penner 1993). Existing organizational routines include the way in which an issue can be raised, for example through the organization's budgeting or planning cycles (Dutton 1988a; Dutton 1988b). The organization's identity can also be considered an organizational routine, and the issues on the organizational agenda are shown to be consistent with the organizational identity (Dutton and Penner 1993; Elsbach and Kramer 1996; Meyer 1982; Milliken 1990). Organizational members may also influence the strategic agenda by selling the issue to top managers (Dutton and Ashford 1993; Howell and Higgins 1990).

METHODS

Given that the focus of this project is to investigate issues that stall and issues that evoke action, we chose a longitudinal ethnographic case study design so that we could observe issues in real time. In this way, we would avoid using the retrospective accounts of organizational members who would likely emphasize issues of importance and relevance to the organization and not those that did not gain organizational attention (Van de Ven 1988). Given the lack of theoretical development on stalled issues, we also chose an inductive methodology in order to allow the data to guide our insights.

The Issues

The set of issues observed within this research exercise is bounded by those related to the natural environment. These can include a wide range of concerns from recycling, energy and waste

management, product stewardship, pollution prevention, and sustainable development. We chose to observe the set of issues pertaining to the natural environment for two main reasons. First, the motivation of this study was to investigate the flow of issues, including those that stall, in order to understand organizational adaptation. This objective required that we observe a well-defined, complete, and bounded set of issues; otherwise, the number of issues included in this exercise would be unmanageable, the validity of the study compromised by having to choose an arbitrary set of issues, and the possible explanations explaining issue flow too numerous. This set of issues is well defined because an issue must be expressed as influencing or being influenced by eco-systems. For example, we disregarded issues pertaining to occupational health, employee safety, and total quality, unless they were expressed as relevant to eco-systems. Although it is possible to argue that every issue has an ecological aspect, the relative newness of corporate environmental concerns means that most issues are not couched in these terms. If we had chosen financial issues, the set would not be easy to bound because almost every organizational issue is framed as a financial issue. Ecological issues, in this context, were relatively small and bounded.

Second, it was important to study a set of issues for which there was no well-established routines and expectations by organizational members. Frequently occurring issues generate a set of organizational routines that influence their flow within the organization (Dutton 1993; Nelson and Winter 1982). Organizations prescribe routines to respond efficiently and effectively to recognized issues. Consequently, the range of actions associated with the issues is limited and predetermined. If we had studied well recognized issues, we would be investigating organizational routines rather than issue flows. Issues pertaining to the natural environment are relatively new and, therefore, have few associated routines. Dutton (1997: 81) writes: "In some organizations, in some industries, issues of sustainable development and the natural environment dominate the organization's strategic agenda. In other organizations, in the same or different industries, issues of the natural environment have never been broached or thought about by organizational members".

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The Sites

The data were collected from two organizations: the sales offices of Hewlett Packard (UK) Ltd., hereafter referred to as HP; and the regional head office of Rank Xerox, hereafter referred to as RX. The Hewlett-Packard Company corporate headquarters are located in Palo Alto, California. The company had over 20,000 products in the areas of measurement, computation and communication. The UK subsidiary of the Hewlett-Packard Company, the focus of this study, had manufacturing, research and sales operations spread throughout the UK. HP employed about 5000 people and had inventory turnover of approximately $3 billion in 1996. Its office was located in Bracknell, Berkshire.

Rank Xerox (RX) was formed in 1956 as a joint venture between Xerox Corporation of the US and Rank Organisation plc of the UK. The Xerox Corporation, headquartered in Stamford, Connecticut, owned the majority of RX but bought out the remainder in late 1997. Annual inventory turnover for RX exceeded $8 billion in 1996 and the company employed 24,000 people around the world. RX designed, engineered, developed, manufactured, marketed and serviced the widest range of document processing products and services in the industry. RX was based in Marlow in the United Kingdom.

The inclusion of two sites allowed for comparisons and contrasts, which helped to generate richer insights with greater confidence (Pettigrew 1985). The companies chosen, HP and RX, were particularly good sites because: 1) they had some overlapping products (eg. laser printers) so that comparisons could be made which would inform the analysis (Eisenhardt 1989); 2) they were located in similar industries so they confronted similar ecological pressures; 3) they were not direct competitors so limitations were not placed on the research project.

Data Sources

The data for this project were collected from three sources: (1) participant observations within the two companies over a twelve month period; (2) formal semi-structured interviews with senior decision makers towards the end of the research period; and (3) reports, memos and internal documents related

to the set of issues pertaining to the natural environment. Integrating and comparing these data permitted us to gain a wide range of insights that could be validated through triangulation.

Participant observations and corporate documents. The second and third authors were participant observers at the research sites. They were formally trained in environmental technology and research methods providing them with the necessary skills to perform the tasks required for this project. One researcher worked in the Environment, Health & Safety (EHS) Department of HP and the other researcher worked in the Environmental Affairs Department of RX. These departments were minimally staffed and were mandated to collect and disseminate information pertaining to the natural environment so that more informed decisions could be made in corporate operations. Organizational members would approach departmental members if an issue arose and departmental members would actively seek information pertaining to issues. As the participant observers were considered the first point of contact for natural environment issues, they had good exposure to the range of issues pertinent to the firm. In developing the research design, we were guided by Pettigrew's (1985) framework where the context, content and process of organizational change are observed.

We spent three months prior to the research period to refine the type of data that we would need to collect in order to monitor organizational change. The data collection period extended from September 1995 to August 1996. The data was collected systematically by using an electronic database. Both participant observers recorded characteristics of each issue including: a description of each issue, changes to the issue, the source of the original information, the names of key informants knowledgeable of the issue, an estimate of the number of people influenced by the issue, an estimate of the financial and human resources required to address the issue, the support given by top management, relevant contextual variables such as external or internal events that may influence the development of the issue, the events that may have precipitated the issue, and obstacles that may influence the development of the issue. An effort was made to record quantitative information, but often this information was not available or comparable because of the significant differences in the

characteristics of the issues. Much of this information was based on the observer's assessment of the issue, which was backed up by corproate documents and the accounts of other organizational members. If the issue developed, updates were made to the files. If the issue shifted or splintered, a new file was created. In total, 30 of these files were created in HP and 33 files in RX.

Validity was achieved in three ways. First, the research team would meet or speak by telephone every 6 weeks to discuss the issues identified. We drew on insights gained by the observers in both companies and were able to compare and contrast the observations. We were also able to overcome some of the myopic tendencies of participant observation methodology by involving a third independent member in the research team, the first author, who could point out inconsistencies or holes in the data that may have otherwise not been recognized. After each meeting, we would generate a list of questions that needed further investigation. Second, the participant observers validated their opinions by discussing them with other members of their respective organizations, particularly when challenges were raised by other members of the research team. Third, formal interviews were conducted towards the end of the research period by the independent member of the research team with organizational members to ensure that no significant issues were overlooked and to confirm the findings of the participant observers.

Formal interviews. The purpose of the interviews was threefold: 1) to corroborate the data recorded through the participation observation and ensure that no issues or actions were missed; 2) to identify those issues that had reached the organizational agenda; 3) to solicit formally the opinions of other organizational members of the factors that influence the scale, scope and pace of issues pertaining to the natural environment. Respondents were chosen from two groups: senior managers who would influence corporate environmental initiatives, and people familiar with environmental issues within the organization. Of the 13 interviews in HP, six were with senior managers. Of the 10 interviews in RX, five were with senior managers.

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Because the participant observers were already positioned well within the organization, a high degree of trust was afforded to the independent member of the research team. Interviewees were asked to identify their role within the organization, the natural environmental issues they felt to be the most important within the organization, the actions the organization had taken in respect to the natural environment, the priority of the natural environment in respect to other business issues, the forces that facilitated environmentally responsible actions by the organization, and the forces that may have stalled an action. The interviews lasted 30-60 minutes, and were recorded and fully transcribed.

Data Analysis

Step 1: Identifying issues and actions. The participant observers independently identified all the issues and associated actions based on the interview transcriptions, documents, and issue files. In developing the database we chose to err on the side of creating too many issue files rather than too few to allow the greatest flexibility in their tracking. However, in analyzing issue flows, it was necessary to develop a parsimonious set of issues. Through numerous iterations and discussions, we derived a consensus set of issues as shown in Table 1.

Insert Table 1 about here

Step 2: Identifying issue flows. We analyzed the issue flows by developing diagrams that depicted the path of each issue and their links to each other. We started with the strategic issue diagnosis model developed by Dutton and Duncan (1987a) and kept adjusting this model until it more accurately reflected the observations we had made. The development of the model was influenced partly by some of the comments made in the interviews and some of the theorizing that we had done during the year. This flow diagram provided a heuristic device that could assist in analyzing the scale, scope, and pace of issue flows. It was during this exercise that the role that the levels of analysis (individual and organizational) played in influencing organizational adaptation became evident.

Step 3: Explaining issue flows. The interview transcripts, issue files and corporate documents were coded by the first author and a research assistant who was not involved in the data collection. The codes were generated inductively from the data using Miles and Huberman's (1994) template for qualitative analysis. The codes labeled the issue and any information pertaining to the scope, scale, and pace of the action. Examples of the codes included: issue definition/identification, action, issue importance, obstacles, facilitators, corporate priorities, issue triggers, and the future of issue. The coding helped to explain why issues progressed forward and helped to develop theory. Involving an arms-length coder injected further objectivity and reliability into the research exercise. Had we relied exclusively on members of the research team, the data analysis would be biased towards the discussions we already had. The role of individual concerns and organizational values in influencing the pace, scope, and scale of the action became apparent in this stage of the data analysis.

Step 4: Identifying organizational values. Once the importance of organizational values to the model was recognized, the documents and interviews were content analyzed with the express purpose of identifying the organizational values - a technique recommended by Rokeach (1979), Hinings, Thibault, Slack and Kikulis (1996) and Kabanoff, Waldersee, and Cohen (1995). The documents were coded by two raters: the first author and a research assistant. Each rater independently identified a set of values that was revealed in the corporate documents and interview data. Once completed, the raters discussed the values identified in each company. Given the interpretive nature of determining the codes, the two raters often used different labels to identify similar values. For example, one rater used the following adjectives to describe a value which was labeled eventually as 'pro-active': at the forefront of some of the product activities, leadership in introducing technology and processes, leader in the global document market, largest and most profitable in the document markets, deliver excellence in all we do, innovation, change products through changes in design, superior technology, innovative management approaches, technology to develop market leadership, initiative. The second rater used similar adjectives: be an industry leader, be on the forefront of the industry in product development, be a leader in business procedures and environmental issues, market leadership, being

proactive, to be on top of things. The subsequent discussion between the two raters ensured that the final set of organizational values for HP and RX reflected what was observed in the data by the two raters. By referring back to the original documents, consensus on many of the codes was achieved easily. The values for which there was less agreement were used infrequently in the documents so they were omitted in the final analysis. As a final validity check, the participant observers of HP and RX reviewed the codes to ensure that they accurately reflected their company. They made no adjustments to the codes.

Step 5: Evaluating the pace, scale, scope of the action. The participant observers independently identified the pace, scale, and scope of the actions based on their knowledge of each issue and based on agreed upon *a priori* definitions. They used the references in the issue database to resources required, the number of people involved, the level of management support, and the dates made in the issue database to support their assessments. They then discussed their assessment of each issue within their own organization to ensure that there was internal consistency in the interpretation of the definitions. The first author also independently assessed each issue for the pace, scale and scope based on the coding of the issue files and interview transcripts. The few discrepancies that resulted were discussed among the research team and consensus was achieved easily.

ISSUE DEVELOPMENT

Building on the prior work of Dutton and Duncan (1987b) we employ an issue flow diagram to illustrate the development of issues within the two organizations (Figure 1). We have deviated from previous research on strategic issue management (Dutton, Fahey, and Narayanan 1983) in three important ways. First, we include all identified issues and actions, not only strategic ones. Second, we employ two levels of analysis in our model, the organization and the individual, which better describes what we observed and assists in later theory development. Finally, we include a stage of issue development, the issue pool, which had not previously been used by Dutton and Duncan (1987a). This stage of development is important in explaining where an issue may stall.

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Insert Figure 1 about here

Before we describe the model, we offer some qualifiers. These stages are constructed for the purpose of this present research. They were not defined explicitly by organizational members, and each stage is not always observable. Instead, this model is a heuristic device by which to explore the issue development process. It serves three purposes: first, to identify the stages at which an issue can stall; second to permit an analysis of the scale, scope and pace of organizational adaptation; and, third to explore differences in organizational and individual level actions.

In its depiction, the issue flow appears linear; issues are identified, receive attention, and then initiate an action. However, the actual process was not always linear. In some cases, the organization would become aware of an opportunity or a potential activity on which it would act immediately. Hence, the issue identification process, agenda building and action could occur simultaneously.

The actions discussed in this paper are delimited by the research period; actions occurring before or after the research period are not included. Furthermore, the issues identified are specific to this research context. Issues that did not elicit a response may have done so after the research period. It would be erroneous to infer the environmental performance of either firm based on the data presented here.

Issue Identification

In the first stage of the model, issues lie in an issue pool and are recognized and labeled. The issues identified were generated from two sources: through individuals who brought their personal concerns to the organization such as concerns about recycling or office waste management, and through organizational activities such as the intention to move into new markets such as environmental services. The issues were identified by both organizational members and organizational outsiders such as the government, local community, and special interest groups. The children of employees also

influenced organizational members in the issue identification process. For example, a manager of RX said, "When my son asks 'Dad, do you work for an environmentally conscious company? What does Rank Xerox do?', I want to say 'Oh yes we are, we do...'".

At the early stages of issue identification, the issues are not evaluated or analyzed, merely identified. Some of the issues identified in this first stage of the issue life cycle included energy management, office waste recycling, product stewardship, eco-labelling, and sustainable development. In this stage, issues are assigned words and associated meanings. Sometimes the same issue had multiple expressions. For example, the following expressions all seemed to address a similar issue of corporate citizenship: "company makes a positive contribution to every community and society"; "corporate respect"; "the corporation's public face"; "ensuring that employees, customers, suppliers and so on are afforded a safe, nice, place to do business"; and "socially responsible". In addition, the ambiguity of the issue and its definition were apparent in the data. Interviewees, when asked to define natural environmental issues, would sometimes include issues pertaining to the office environment such as occupational health and safety and building aesthetics, whereas others included only those issues pertaining to the earth's ecology. This ambiguity in the definition and meaning of natural environmental issues suggested that an issue could be assigned several labels. Consistent with cognitive categorization theory and strategic issue identification theory (Dutton and Jackson 1987), multiple expressions for an issue co-existed and alternative expressions developed until one gained sufficient gravity worthy of pushing the issue forward.

These issues remain in the pool until their meanings became relevant to individual or organizational interests. Either an individual had to have sufficient interest in the issue to champion efforts to develop it, or organizational members had to recognize its relevance to the organization and place it on the organizational agenda. Some issues did not proceed to the next stage of the issue flow and remained in the issue pool. Issues that remained in the issue pool at the end of the research period included the benchmarking of sustainable development issue at RX and the marketing of a Green

Workstation issue at HP. In the case of the sustainable development issue at RX, the issue was identified by an outsider to the environmental department of RX. The issue that was labeled 'sustainable development', did not elicit any attention by organizational members, likely because it did not bear any organizational relevance. In HP, the same issue also seemed to have little organizational relevance but developed further because it was championed by an individual. This observation is consistent with Howell and Higgin's (1990) notion of champions of technological innovation and Andersson and Bateman's (1998) notion of environmental champions.

The marketing of the Green Workstation at HP also remained in the issue pool. This workstation, developed by the German sales office, was offered to the UK office for marketing in the UK sales region. A HP employee who was first made aware of the Green Workstation described the situation like this: "I asked my boss if it would be viable in the UK. He said no. Just because there is a market there [in Germany] doesn't mean that there is a market for it here. The things that help him decide whether there is a market is (a) do customers ask for it and we certainly haven't been told that there are customers asking for it and (b) go to the field [and ask customers and vendors through the sales rep]."

Agenda Building

Because we examined all issues in this study, not only strategic ones, it is relevant to draw attention to the agenda of senior managers and individual organizational members. Although the two agendas interact, their composition and associated actions are sometimes different.

The individual agenda is the set of issues important to the individual. They include issues relevant to the individual's assigned responsibilities as well as issues of personal interest. The organizational agenda are the issues that receive collective and coordinated attention and are legitimated by senior managers through the allocation of organizational resources. It differs from the individual agenda in that it requires the commitment of resources beyond the individual's discretion.

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The agendas of senior managers may mirror the organizational agenda because of the ability of senior managers to influence what appears on the organizational agenda. The agendas of individuals further removed from senior management are less likely to resemble that of the organizational agenda unless organizational goals are embedded in individual performance. Furthermore, the agendas of individuals may be similar to those of members of the top management team if the individual is able to influence the agendas of members of the top management team or if there is high congruence between individual and organizational concerns.

Individual agenda. As we probed into issue flows, we were able to identify the issues that were on individual agendas. Issues appearing on individual agendas at HP included: the recycling of fluorescent tubes, visitor badges, and office supplies; the use of recycled paper; and benchmarking. The individuals who raised the issues of recycling tubes, badges, and supplies worked closely with these items. For example, an individual who was in charge of facility maintenance was concerned about the recycling of fluorescent tubes, a receptionist was concerned about the recycling of visitor badges, and an employee who was moving her office and had excess supplies was concerned about the recycling of office supplies. These individuals brought the issue to the attention of the Environmental Health and Safety Department of HP. In the case of the fluorescent tubes and visitor badges, agenda building activities went only as far as the Environmental Health and Safety Department. Initial discussions with departmental members did not lead to the issues' placement on the organizational agenda. The individual concerned about recycling office supplies, on the other hand, was able to successfully initiate an action in response to the issue through her discretionary resources.

Within RX, the issues appearing on individual agendas included end-of-life, energy management, internal awareness, and middle management commitment. As in the case of HP, individuals who cared about the environment because of their organizational task requirements or because of their personal beliefs would push the issue forward. In the case of energy management, a few individuals

seemed to advocate to others the importance of shutting down computers and lights. In the case of the end-of-life issue, a representative of Fuji Xerox[2] had identified the issue and assessed the feasibility of Fuji Xerox 's response. For internal awareness and middle management commitment, an environmental manager within RX took leadership of this issue placing it high on her personal agenda. The issues of internal awareness and middle management commitment moved with rapid pace once the environmental manager took the responsibility. In the latter case, significant commitment was required by the individual.

Organizational agenda. The issues appearing on HP's organizational agenda included general energy and waste management, product stewardship, the firm's corporate environmental reputation, customer satisfaction/concerns, compliance to the corporate environmental policy, environmental strategy development, and maintaining citizenship. Senior management endorsed these issues. At RX, the issues which appeared on the organizational agenda were energy management, office waste recycling, product stewardship, corporate environmental reputation, customer satisfaction, competitor benchmarking, certification, eco-labeling, and continuous improvement. Both organizations valued their relationships with their stakeholders and put all environmental issues that threatened this relationship, such as issues pertaining to corporate reputation, on the agenda.

In RX there was significant overlap in individual and organizational agendas; for example, issues pertaining to energy management and office waste recycling/reduction seemed to appear on numerous agendas. One of the reasons for this partial alignment was likely attributable to the XMM (Xerox Management Model) model. The XMM was a set of issues that were considered a priority within RX such as quality management. RX dedicated significant resources to raise the awareness of senior managers and employees of XMM issues, and in doing so, ensured that organizational members internalized the same values. Other organizational efforts such as the extensive annual 'Earth Day'

[2] A Xerox joint venture company with Fuji Photo Film

activities also helped to align organizational and individual agendas, so that employees voluntarily participated in energy management and office waste recycling reduction.

The use of recycled paper and product stewardship did not elicit actions in HP during the research period. Product stewardship, packaging, end of life, environmentally sound buildings, and eco-labeling did not elicit actions in RX. In the case of recycled paper in HP, a viable solution that met operational preferences was not found. At the time, all options for the use of recycled paper would have meant higher costs to the organization or the loss of printing performance. The product stewardship issue did not receive collective action because of the seemingly high costs of the coordination and disposal of HP products. RX, on the other hand, did not feel that the product stewardship issue required immediate attention because some actions had been taken prior to the research period.

Organizational adaptation

Whereas agenda building activities exchange information and build support, actions resolve the issue. For example, assessing the feasibility of using recycled paper is an agenda building activity while using recycled paper is an action. Adaptive actions require changes to the firm's products, processes or policies in order to address the issue (Bansal 1997).

There are individual and organizational levels of actions. Individual actions involve only the individual and his/her discretionary resources, whereas organizational actions involve organizational members, processes and resources. For organizational actions members would say, for example, 'HP has an environmental and waste management initiative', for individual actions members would say 'John recycles his coffee cups'.

Individual actions. Within HP, the most apparent individual action was the setting up of a recycling table. The recycling of office supplies began in the issue pool, was adopted onto an individual's agenda, and that individual had the discretion to follow it through by setting up a recycling table to

which all organizational members could donate or pick up used office supplies. This issue was of small organizational scale in that it had few strategic implications, was of medium scope in that it involved many HP staff, and was of fast pace in that it elicited a fast response. It was also received well by senior management because it reduced the costs of office supplies and it demonstrated responsiveness to employee concerns.

In RX, several individual actions resulted from issues pertaining to internal awareness: a case study of RX conducted by a British university for an MBA program, the development of a slide show addressing the environmental management activities of RX; corporate wide communications of the firm's environmental strategies, activities centered around Earth Day celebrations, emphasis of issues of the natural environment in the Foundation Workshop given to managers, the cascade of communications pertaining to environmental management within RX, and coverage of natural environment issues in the Executive Development Program (EDP). All of these actions were initiated and executed largely by two individuals: the environmental manager and the corporate communications manager. Both individuals had significant individual discretion, valued issues pertaining to the natural environment, and had tasks that accommodated the advocacy of environmental issues within RX. Their combined interest in the area appeared to propel the issue. The corporate communications manager said of the environmental manager, "She is very much of the world, of the Rank Xerox world, and quite evangelical and passionate. She is expressive about what she does. And I thought that it was an opportunity to tell people something good about Rank Xerox." The level and position of these two individuals within the organization provided them sufficient discretion that they were able to move the initiatives quickly, influence a wide number of RX employees, and engage the interest of senior management to sponsor their initiatives so that the initiatives were perceived to have strategic implications.

Organizational action. Within HP, most actions pertaining to the natural environment were at the organizational level. For example, an initiative expressly sanctioned by the senior management team

in an effort to address the environmental issues of energy/waste management, environmental compliance, sustainable manufacturing, and the development of an environmental policy/strategy was an environmental "Hoshin". Hoshins are a limited set of tasks in which HP seeks to achieve substantially superior performance over prior years. The environmental Hoshin articulated the environmental strategy of HP.

Within RX, many organizational actions were matched by individual actions. As in the case of organizational and individual agendas within RX, the alignment between the two levels of actions was facilitated by senior management's efforts to communicate their values to individuals. Furthermore, organizational members had opportunities to speak to senior management to facilitate an organization wide action. For example, the corporate communications cascade and the environmental section of the Executive Development Program were both individual initiatives, but they worked together to reinforce the importance of issues of the natural environment at the organizational level. The environmental impact assessment of an old site at RX was another organizational action. An article in the local newspaper criticized RX's clean up of the site in the 1970s. The bad publicity associated with this report generated an immediate action by the firm. RX issued a press release indicating that they had employed the best available technologies at the time and immediately commissioned an environmental impact assessment.

THEORY BUILDING

This research aimed to explain why some issues resulted in actions, whereas others did not. This section will identify and describe the constructs of individual concerns and organizational values and detail how the congruence of these constructs influences the pace, scale and scope of the issue. Propositions are provided which articulate the relationships.

Appendix D

Conferences and Papers

Individual concerns

Individuals are concerned about a wide range of issues, from very personal issues such as the size of their waste basket to very community oriented issues such as social security programs. In the domain of the natural environment, individuals could be concerned about the air they breathe, global warming, or biodiversity. Consequently, individuals will often act on these concerns by car pooling to work, by recycling their waste paper, or by encouraging their employer to show greater environmental responsibility. An individual's concerns reflect those issues of importance to him/her.

Although closely related, concerns are different from values in two significant ways. A value is an "...enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach 1973: 5). First, values are passive or latent attributes of an individual. Concerns, on the other hand, usually arise out of cognitive dissonance, where the status quo is different from what is desired or expected by the individual. As a result, concerns are more closely linked to actions than values which tend to be dormant until they become a concern. Second, Rokeach (1973) and Schwartz (1992) argue that people have a core set of finite stable values. Because concerns are anchored in the person's surroundings, these concerns are likely to change with changes in environmental conditions. Researchers in environmental sociology and psychology have suggested that individual values are associated with social change (Dunlap and Van liere 1978; Post and Altman 1994; Stern and Dietz 1994), however, we argue that values are more likely to lead to change if they are expressed as concerns. Although concerns may be more fleeting than values, they are also more likely to initiate actions.

Issues pertaining to the natural environment often generate concerns because they are often valued. Hence, the role of the individual in issue development is evident in the study of natural environmental issues. The role of the individual was made clear throughout the interviews, "People are doing it. People are turning off lights, personal computers. People are making an effort. When we bring it down to the individual then it makes a lot more sense, doesn't it? People will make a contribution to

the environment. I think they want it quite naturally" (RX member) . A similar remark was made by a member of HP, "Within HP I am very happy to align my personal commitment with our objectives on environmental management and put all my energies into making them really happen". Specific individuals had an instrumental role in shaping organizational adaptation not only because of their organizational role, but also because of their own concerns. This point is supported by the following comment, "He [Director of Environment] says it [environment] is important, and he says it with a passion, and he says it consistently. ... He feels quite strongly about it, I think both personally and socially" (RX member) .

Individual concerns influence the flow of issues at all three stages of the issue development process: the issue identification, agenda building, and organizational adaptation. In the first stage, people identify issues partly because of concerns that arise at home and at work. As one member of HP indicated, "If you recycle in the home you will recycle in the office". If the natural environment is of concern, the organizational member will be more receptive to environmental signals and more likely to have the needed vocabulary to label the issues. Consequently, individual concerns will be important in identifying and labeling issues.

In the second stage, an individual may select issues from the issue pool if (s)he is sufficiently concerned. When individuals are bombarded by a diverse and large set of signals, such as the wide range of issues in the pool, then the individual will communicate and participate in issues of greatest concern to him/her (Ackerman 1975; Hage and Dewar 1973; Hambrick and Brandon 1988). Individuals who are higher in the organizational hierarchy are usually afforded greater discretion and can devote more energy to agenda building activities (Finkelstein and Hambrick 1990). They wield the authority to ensure that the issue is analyzed and can spend more resources convincing others of the importance of the issue (Hambrick and Brandon 1988). For example, an HP manager was able to elevate the importance of sustainable manufacturing within HP. Howell and Higgins (1990: 336) state that "by appealing to larger principles or unassailable values about the potential of the innovation for

fulfilling the organization's dream of what it can be, champions capture the attention of others". Some members may only be able to communicate their concern to others and hope that those in the appropriate organizational role will respond to the issue, as in the case of the receptionist who raised the issue of visitor badges.

If an individual has concerns that (s)he would like to see addressed on a wider scale or scope, to an organizational level, the individual must sell the issue to the top management team (Dutton and Ashford 1993). Individuals may have sufficient authority to influence the organizational agenda. Because an individual has the attention of senior management, an issue previously only on the individual's agenda may be placed on the agenda of the top management team and receive more considered analysis (Dutton and Ashford 1993). For example, the Executive Development Program in RX adopted a segment involving environmental issues within RX. The manager who spearhead this initiative was able to move this issue from her own personal agenda to that of senior management by presenting a convincing and appealing case to senior management.

When the organizational agenda differs from the individual agenda, it is difficult to effect organizational change. Individuals are less willing to engage in activities the top management team dictates and, similarly, the top management team is less willing to mobilize the resources to gain wide-scale buy-in among organizational members. The impediment created by the incongruence between the organizational and individual agendas is reflected in the following comment, "I do remember the recycling of the cups. I remember the site facilities staff even saying pile up the cups on the edge of your desks, don't chuck them away. People still threw them away" (HP member).

In the third stage, individual concerns can be instrumental in leading to individual or organizational actions. If the individual's role in the organization affords sufficient discretion, the individual may be able to respond to the issue. This action can be as small as putting waste paper or cups in the recycling bin or turning off computers and lights at the end of the day. If the individual has more discretion, the

action can even involve organizing Earth Day activities. The individual role in this stage is made in the following comment, "Throughout the organization their individual initiatives and commitment will ensure that RX continues to find new and better ways to conduct business in harmony with the environment" (RX member). This influence of individual concerns on the flow of issues suggests the following:

> *Proposition 1a: The less the individual concern for the issue, the greater the likelihood the issue will stall.*
>
> *Proposition 1b: The greater the consistency of the issue with individual concerns, the greater the scope of organizational adaptation.*

Organizational values

We argue that organizational values are important in influencing the development of issues within an organization. An organization's values affects which issues are identified, which issues appear on the organizational agenda, and which issues result in actions. Organizational values are "socially shared cognitive representations of institutional goals and demands" (Rokeach 1979: 50). They provide a set of rules by which to interpret the complex and numerous signals within an organizational environment (Ranson et al. 1980; Rokeach 1973). They influence organizational culture structure, and decision processes: "I think there needs to be some sort of rules, some sort of organization around which the other things can be fitted. It is like a skeleton or like a framework " (HP member) .

Organizational values provide the decision premises that may influence the way issues are addressed (Rokeach 1979). Managers have assumptions and beliefs that shape the way they assess an issue. The organization's belief system and values also contribute to selection process. Issues perceived as important, legitimate and feasible likely end up on the agenda. Empirical studies show how organizational beliefs influence the way issues are interpreted which can affect an issue's survival or death (Thomas, Shankster, and Mathieu 1994). Where an issue is believed to be tied to the organization's beliefs, it is likely to be favored for selection (Dutton 1997). A study by Dutton, Ashford, Wierba, O'Neill, and Hayes (1997) shows that in the telecommunications industry, for an

issue to be sold, there exists a recipe that fits issues with organizational norms. Finally, an organization's external context can screen the issues that capture management attention by defining which issue sellers have currency and which issues are legitimate.

Table 2 documents HP's and RX's values that were extracted from their respective corporate documents and interviews. The firm's mission statements, internal planning documents, human resources policies, executive communications, newsletters, decision making process, organizational structure all helped to reveal the firm's values (see Stage 4 of data analysis).

Insert Table 2 about here

There was significant overlap in the values of HP and RX. Not surprisingly, a profit motive emerged as a value critical to both companies. Whereas HP expressed this profit motive in terms of added value and cost reduction, in RX discussions centered around market share and return on assets. Other values shared by both firms included the concern for organizational image, corporate citizenship, concerns about employee satisfaction, and customer satisfaction. There were also important differences in the organizational values of both firms. For example, HP staff discussed the importance of risk management and asset protection, whereas RX employees did not mention risk management in the context of environmental management and dwelled extensively on communications. We are not suggesting that HP did not care about communicating issues or that RX was assuming more risk, but that these values were not as often articulated.

In stage 2 of issue development, organizational values influence which issues appear on the organizational agenda. Progression from the issue pool to organizational agendas is contingent on the labels used to identify the issues. Dutton and Jackson (1987), for example, suggest that if an issue is labeled as a threat, it will be treated as a problem, if it is labeled as an opportunity, it will be treated as positive. In our analysis of this data, we found that the same issue may be labeled as a threat or as an

opportunity by different people. Issues, then, will be assigned many different labels as they sit in the pool, finally being given a label that moves them out of the pool because of its fit with organizational values. For example, Dutton, Ashford, Wierba, O'Neill and Hayes (1997) show that issues bundled in quantitative data are more likely to elicit a reaction. Their findings were confirmed by our own, particularly within HP where quantitative data is used extensively to support the value it places on planning. While the labeling of an issue governs how the issue is treated, its fit with organizational values governs whether or not it will even be treated.

Within HP and RX, the issues on the organizational agenda were congruent with HP and RX value structures. Almost all the issues on the organizational agenda were framed by interviewees in the language of organizational values. In particular, organizational members often spoke of natural environmental issues in terms of corporate citizenship and employee concerns. HP placed all office waste management issues on their organizational agenda. These issues were identified as being relevant to the 'added value', 'corporate citizenship' and 'quality' values and immediately achieved high scale. Two senior managers of HP said that an issue was more likely to be endorsed by senior management if it fit within the slogan, "orders up, cost down, people happy, business clean." If an issue challenges or confronts the values that the organization holds, it was also placed on the organizational agenda and elicited an organizational action. If no appropriate label could be found that spoke to the organizational values, then the issue remained in the issue pool.

Organizational values also influence the likelihood that an issue moves from the organizational agenda to elicit action. Organizational values guide actions (Akaah and Lund 1994) by suggesting types of preferred behaviors (Rokeach 1973). They also provide a means for interpreting actions (Ford and Baucus 1987; Ranson et al. 1980). Earlier, we argued that at the level of the individual we chose to use individual concerns over values as the preferred construct because values are passive attributes. At the level of the organization, the organization is not the agent of change but the target of change, so organizational values is the relevant construct. People change organizations, and organizational

structures impede, shape and filter the change process. Organizational values also provide a means for reinterpreting actions later (Rokeach 1979).

For an issue to be strategic, that is, of large scale, it must appear on the organizational agenda. For an issue to elicit an action, it must fit with at least one organizational value. If it does, then issue advocates have a context within which to talk about the issue and draw management attention. The greater the number of values the issue embraces and the greater the support for any specific value, the greater the likelihood that the issue will grab management attention and, therefore, become a strategic issue. An issue that supports more values can be framed in different ways and is likely to appeal to different audiences. Hence, at least part of the management team will endorse an issue response. An issue that supports strongly some values is more likely to have a few strong advocates who could potentially diminish some of the negative associations with the issue. If the issue does not fit with any value, the issue will not be noticed, filtered out, or evaluated unfavorably. For example, the recycling of fluorescent tubes in HP and the sustainable development issue in RX were expected to incur costs, and did not appear to support the other values. Hence, these issues had no associated actions.

> *Proposition 2a: The less the relevance of the issue to organizational values, the less the likelihood of organizational adaptation.*
>
> *Proposition 2b: The greater the consistency of the issue with organizational values, the greater the scale of organizational adaptation.*

Issues are more quickly addressed by the organization if the lack of response is an affront to the organization's values. When the issue cannot be expressed in terms of organizational values, it does not receive a response. When it can be expressed in terms of organizational values and is found to challenge them, it receives a rapid response. RX, for example, was accused by a local newspaper of contaminating a retired manufacturing site. This threat to their value of corporate reputation was met with an immediate response. Issues that confront organizational values are placed on the agenda immediately. The greater the evidence that an issue poses a threat to the organization's values and the more widespread the threat, the more likely that the firm will respond quickly. Organizational values

serve as glue for the organization and shape its culture, identity, structure and strategy. When an issue confronts an organizational value, it weakens the binding agent of the firm, and therefore, weakens its attempts at building an identity, culture, structure, and strategy. As with threats to personal values, threats to organizational values are likely to elicit a rapid response.

> *Proposition 2c: The greater the degree to which the issue confronts organizational values, the greater the pace of organizational adaptation.*

Individual concerns and organizational values

Organizational values provide the framework for acceptable actions or behaviors and individual concerns provide the impetus to ensure that the issue is championed. When an issue aligns individual concerns with organizational values, it is more likely to result in an action. Prior studies have supported the view that the alignment between organizational and individual levels of analysis is important for organizational outcomes. For example, the congruence between individual and organizational values has been shown to influence employee satisfaction (Meglino, Ravlin, and Adkins 1989), corporate social responsibility (Balazas 1990; Leidtka 1989), departmental power (Enz 1988), culture (Howard 1990; Trice and Beyer 1984) and organizational identification (Dutton, Dukerich, and Harquail 1994). This need for alignment between the individual and organization was expressed by an RX employee, "Again that is part of the organizational value system - the conscience of the organization if you will ... I am assuming that people that sign up to come to the company, normally will support the value system over time. If not they should leave, or they do leave".

> *Proposition 3: The greater the congruence between organizational values and individual concerns the greater the likelihood of organizational adaptation.*

CONCLUSION

In this project, we investigated the flow of natural environment issues within two major organizations in the UK, Hewlett Packard (UK) Ltd. and Rank Xerox Ltd. We evaluated the conditions under which issues were associated with organizational adaptation. To do so, we applied a longitudinal ethnographic case study method aimed at developing theory. This permitted us to address prior

criticisms of organizational research being "ahistorical, acontextual and aprocessual" (Pettigrew 1990: 269). The data revealed the importance of organizational values and individual concerns in explaining the scale, scope and pace of organizational adaptation. The key proposition forwarded in this study is that organizations are more likely to act on issues when individual concerns are congruent with organizational values.

The theory developed in this project makes several contributions. First, we explored different levels of influence and interaction in the adaptation process: the individual and the organizational levels. In doing so, we respond to Mintzberg and Westley's (1992: 56) call for greater "conceptual clarity concerning the level where the change originates or is focused" and Fox-Wofgramm, Boal and Hunt's (1998) request for "future studies [to study] organizational change at multiple levels". This goal was facilitated by the use of longitudinal comparative ethnographic data that permitted us to "examine continuous processes in contrast and to draw in the significance of various interconnected levels of analysis" Pettigrew (1990: 271). Although prior research on strategic issue management recognizes the role of the individual in organizational adaptation processes, it has generally been limited to the application of cognitive categorization theory. In this study, we extend this work to integrate more fully the different and yet complementary roles played by the individual and the organization. The added complexity of this model provides a fuller understanding of the processes that explain the scale, scope and pace of organizational adaptation.

Second, this project provides insights into organizational adaptation processes by relying on both stalled and completed actions. Prior studies of issue development have investigated primarily strategic issues that lead to action. In extending this study to a wider set of issues, we uncovered a potentially important finding. Prior research in issue management has emphasized the instrumental aspects of issues such as their urgency and feasibility (Dutton and Duncan 1987a), controllability (Thomas, Clark, and Gioia 1993), and their likelihood of posing an opportunity or threat (Jackson and Dutton 1988). This research, on the other hand, emphasizes the normative aspects of issues. Our research

suggests that issues with high normative value and low instrumental value may also lead to organizational adaptation. This implication may be particularly important for firms confronting completely new issues for which issue labels are not readily available. Indeed, the normative aspects of an issue may be more relevant than the instrumental aspects since the latter are more difficult to define for completely new issues. The normative aspects of issues, reflected in individual concerns and organizational values, have received little research attention and could forward our understanding of organizational adaptation.

Our research also has managerial implications in the area of organizational change. We show that radical organizational change associated with punctuated equilibria (Tushman and Romanelli 1985), transformations (Fletcher 1990), and revolutions (Miller and Friesen 1982; Mintzberg and Westley 1992) is facilitated by the congruence of organizational values and individual concerns. Consequently, managers will be more effective in their change efforts if they ensure that organizational values are consistent with their proposed changes and that the changes are framed in a way that is palatable with individual concerns. The failure to align organizational values with individual concerns may jeopardize organizational transformations.

Finally, not only have we made an effort to inform theory on organizational adaptation, we also hoped to highlight some of the processes pertaining to issues on the natural environment. In our research, organizational members often offered seemingly contradictory explanations for the same action: "we did it because it pays" versus "we did it because it is the right thing to do". The arguments in this paper suggest that they may be a manifestation of the competing issues and agendas between the individual and organization. This contest between the individual concerns and organizational values may generate multiple explanations for the same phenomena and prove to be an obstacle in building corporate environmental responsibility.

Two limitations, however, could affect the implications arising from this study. First, the study investigated only natural environment issues, so that the importance of organizational values and individual concerns may have been heightened by the issue's characteristics. In particular, issues pertaining to the natural environment clearly have strategic (Shrivastava 1995) and normative aspects and, therefore, individual and organizational relevance. The concepts and constructs developed in this research, however, are not necessarily limited to natural environment issues. New insights are often exposed by studying extreme cases where new situations reveal new theory (Eisenhardt 1989). If we had studied issues which normally demand organizational or strategic attention, say those pertaining to product innovation or technology, the role of organizational values and individual concerns in facilitating issue progression may have been equally as relevant but muted. It would be helpful if future research tested the generalizability of these findings to a different set of issues.

Second, in spite of our efforts to capture information pertaining to all issues of the natural environment, there is still a tendency to identify those issues demanding attention. Consequently, it may appear that most of the issues identified evoked actions, when indeed there may have been issues that were not identified. Through our longitudinal ethnographic research design and the involvement of participant observers and an objective researcher on the team, we have been successful at capturing data pertaining to some stalled issues. Investigating the absence of an issue presents many more challenges than investigating its presence. Inevitably, some stalled issues have been likely missed. In spite of the difficulties in capturing data on stalled issues, our study suggests that this type of research has the potential to inform organizational adaptation processes.

The study of organizations and the natural environment is an emerging discipline gaining widespread interest among researchers. Not only is there a need to build theory specific to the study of the natural environment, there is also an opportunity to have the study of the natural environment inform existing theory. This paper bridges the study of issues related to the natural environment to that of organization and management theory and informing organizational adaptation.

Appendix D

Conferences and Papers

REFERENCES

Ackerman, R.W.
1975 The Social Challenge to Business. Cambridge, MA: Harvard University Press.

Akaah, Ishmail P., and Daulatram Lund
1994 "The influence of personal and organizational values on marketing professionals' ethical behavior." Journal of Business Ethics 13:417-430.

Andersson, Lynne M., and Thomas S. Bateman
1998 "Championing Natural Environmental Issues in Business Organizations": Saint Joseph's University, Working paper.

Balazas, A.L.
1990 "Value congruency: The case of the 'socially responsible' firm." Journal of Business Research 20:171-181.

Bansal, Pratima
1997 "Business strategy and the environment." In Business and the Natural Environment, ed. Pratima Bansal, and Elizabeth Howard. Oxford: Butterworth-Heinneman.

Daft, Richard L., and Karl E. Weick
1984 "Toward a model of organizations as interpretation systems." Academy of Management Review 9:284-295.

Dunlap, Riley E., and Kent D. Van Liere
1978 "The "new environmental paradigm"." The Journal of Environmental Education 9:10-19.

Dutton, Jane E.
1988a "Perspectives on strategic issue processing: Insights from a case study." In Advances in Strategic Management, ed. P. Shrivastava, and R. Lam. 223-244. Greenwich, CT: JAI Press.

Dutton, Jane E.
1988b "Understanding strategic agenda building and its implications for managing change." In Managing Ambiguity and Change, ed. Louis R. Pondy, Richard J. Jr. Boland, and Howard Thomas . 127-144: John Wiley & Sons Ltd.

Dutton, Jane E.
1993 "Interpretations on automatic: A different view of strategic issue diagnosis." Journal of Management Studies 30:339-357.

Dutton, Jane E.
1997 "Strategic agenda building in organizations." In Organizational Decision Making, ed. Zur Shapira. 81-105. Massachusetts: Cambridge University.

Dutton, J.E., and S.J. Ashford
1993 "Selling issues to top management." Academy of Management Review 18:397-428.

Appendix D

Conferences and Papers

Dutton, J.E., S.J. Ashford, R. O'Neill, E. Hayes, and E. Wierba
1997 "Reading the wind: How middle managers assess the context for issue selling to top management." Strategic Management Journal 18:407-423.

Dutton, Jane E., and Janet M. Dukerich
1991 "Keeping an eye on the mirror: Image and identity in organizational adaptation." Academy of Management Journal 34:517-554.

Dutton, Jane E., Janet M. Dukerich, and Celia V. Harquail
1994 "Organizational images and member identification." Administrative Science Quarterly 39:239-263.

Dutton, Jane E., and Robert B. Duncan
1987a "The creation of momentum for change through the process of strategic issue diagnosis." Strategic Management Journal 8:279-295.

Dutton, Jane E., and Robert B. Duncan
1987b "The influence of the strategic planning process on strategic change." Strategic Management Journal 8:103-116.

Dutton, Jane E., Liam Fahey, and V.K. Narayanan
1983 "Toward understanding strategic issue diagnosis." Strategic Management Journal 4:307-323.

Dutton, J.E., and S.E. Jackson
1987 "Categorizing strategic issues: Links to organizational action." Academy of Management Review 12:76-90.

Dutton, Jane E., and Wendy J. Penner
1993 "The importance of organizational identity for strategic agenda building." In Strategic Thinking, Legitimacy and the Management of Change, ed. J. Hendry, G Johnson, and J. Newton. 89-113: John Wiley & Sons Ltd.

Eisenhardt, Kathleen M.
1989 "Building theories from case study research." Academy of Management Review 14:532-550.

Elsbach, Kimberly D., and Roderick M. Kramer
1996 "Members' responses to organizational identity threats: Encountering and countering the Business Week rankings." Administrative Science Quarterly 41:442-476.

Enz, Cathy A.
1988 "The Role of Value Congruity in Intraorganizational Power." Administrative Science Quarterly 33:284-304.

Finkelstein, Sydney, and Donald C. Hambrick
1990 "Top-management-team tenure and organizational outcomes: The moderating role of managerial discretion." Administrative Science Quarterly 35:484-503.

Fletcher, Beverly R.

Appendix D

Conferences and Papers

1990 Organization Transformation Theorists and Practioners: Profile and Themes. New York: Praeger Publishers.

Ford, J.D., and D.A. Baucus
1987 "Organizational adaptation to performance downturns: An interpretation-based perspective." Academy of Management Review 12:366-380.

Fox-Wolfgramm, Susan J., Kimberly B. Boal, and James G. Hunt
1998 "Organizational adaptation to institutional change: A comparative study of first-order change in prospector and defender banks." Administrative Science Quarterly 43:87-126.

Ginsberg, Ari, and N. Venkatraman
1992 "Investing in new information technology: The role of competitive posture and issue diagnosis." Strategic Management Journal :37-53.

Gioia, D.A., and K. Chittipeddi
1991 "Sensemaking and sensegiving in strategic change initiation." Strategic Management Journal 12:433-448.

Hage, Jerald, and Robert Dewar
1973 "Elite values versus organizational structure in predicting innovation." Administrative Science Quarterly 18:279-290.

Hambrick, D.C., and G. Brandon
1988 "Executive values." In The Executive Effect: Concepts and Methods for Studying Top Managers, ed. D.C. Hambrick. 3-34. Greenwich, CT: JAI Press.

Hinings, C. R., L. Thibault, T. Slack, and L. M. Kikulis
1996 "Values and organizational structure." Human Relations 49:885-916.

Howard, R.
1990 "Values make the company: An interview with Robert Haas." Harvard Business Review 68:132-144.

Howell, Jane M., and Christopher A. Higgins
1990 "Champions of technological innovation." Administrative Science Quarterly 35:317-341.

Jackson, Susan E., and Jane E. Dutton
1988 "Discerning threats and opportunities." Administrative Science Quarterly 33:370-387.

Kabanoff, Boris, Robert Waldersee, and Marcus Cohen
1995 "Espoused values and organizational change themes." Academy of Management Journal 38:1075-1104.

Kahneman, D., and A. Tversky
1984 "Choice, values, and frames." American Psychologist 39:341-350.

Leidtka, J.M.

Appendix D

Conferences and Papers

1989 "Value congruence: The interplay of individual and organizational systems." Journal of Business Ethics 8:805-815.

Meglino, B., E.C. Ravlin, and C.L. Adkins
1989 "A work values approach to corporate culture: A field test of the value congruence process and its relationship to individual outcomes." Journal of Applied Psychology 74:424-432.

Meyer, A.D.
1982 "Adapting to environmental jolts." Administrative Science Quarterly 27:525-537.

Miles, Matthew B. , and A. Michael Huberman
1994 Qualitative Data Analysis: An Expanded Sourcebook. Newbury Park: Sage Publications.

Miller, Danny, and Peter H. Friesen
1982 "Structural change and performance: Quantum versus piecemeal-incremental approaches." Academy of Management Journal 25:867-892.

Milliken, F.J.
1990 "Perceiving and interpreting environmental change: An examination of college administrators' interpretations of changing demographics." Academy of Management Journal 33:42-63.

Mintzberg, Henry, Duru Raisinghani, and Andre Theoret
1976 "The structure of "unstructured" decision processes." Administrative Science Quarterly 21:246-275.

Mintzberg, Henry, and Frances Westley
1992 "Cycles of organizational change." Strategic Management Journal 13:39-59.

Monge, Peter R.
1990 "Theoretical and analytical issues in studying organizational processes." Organization Science 1:406-431.

Nelson, Richard R., and Sidney G. Winter
1982 An Evolutionary Theory of Economic Change. Cambridge, MA: Harvard University Press.

Pettigrew, Andrew M.
1985 "Contextualist research: A natural way to link theory and practice." In Doing Research That is Useful for Theory and Practice, ed. Edward E. III Lawler, and et al. San Francisco: Jossey-Bass Publishers.

Pettigrew, Andrew M.
1990 "Longitudinal field research on change: Theory and practice." Organizational Science 1:267-291.

Pfeffer, Jeffrey, and G.R. Salancik
1978 The External Control of Organizations: A Resource Dependence Perspective. New York: Harper & Row.

Post, James E., and Barbara W. Altman

Appendix D

Conferences and Papers

1994 "Managing the environmental change process: Barriers and opportunities." Journal of Organizational Change Management 7:64-81.

Ranson, S., C.R. Hinings, R. Greenwood, and I.C. Walsh
1980 "Value preferences and tensions in the organization of local government." In The International Yearbook of Organization Studies, ed. D. Dunkerley, and G. Salaman. 197-221. London: Routledge and Kegan Paul.

Rokeach, Milton
1973 The Nature of Human Values. New York: Free Press.

Rokeach, Milton
1979 "From individual to institutional values: With special reference to the values of science." In Understanding Human Values: Individual and Societal, ed. Milton Rokeach. 47-70. New York: Free Press.

Schneider, Susan C., and Arnoud De Meyer
1991 "Interpreting and responding to strategic issues: The impact of national culture." Strategic Management Journal 12:307-320.

Schwartz, S.H.
1992 "Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries." In Advances in Experimental Social Psychology, ed. M.P. Zanna. 1-65. Orlando, FL: Academic Press.

Shrivastava, Paul
1995 "Environmental technologies and competitive advantage." Strategic Management Journal 16:183-200.

Stern, Paul, C., and Thomas Dietz
1994 "The value basis of environmental concern." Journal Of Social Issues 50:65-84.

Thomas, James B., Shawn M. Clark, and Dennis A. Gioia
1993 "Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes." Academy of Management Journal 36:239-270.

Thomas, James B., and R. McDaniel
1990 "Interpreting strategic issues: Effects of strategy and the information processing structure of the top management team." Academy Of Management Journal 33:286-306.

Thomas, J.B., L.J. Shankster, and J.E. Mathieu
1994 "Antecedents to organizational issue interpretation: The role of single-level, cross-level and content cues." Academy of Management Journal 37:1252-1284.

Trice, Harrison M., and Janice M. Beyer
1984 "Studying organizational cultures through rites and ceremonials." Academy of Management Review 9:653-669.

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Tushman, Michael L., and Elaine Romanelli
1985 "Organizational evolution: A metamorphosis model of convergence and reorientation." Research in Organizational Behavior 7:171-222.

Van de Ven, Andrew H.
1988 "Review essay: Four requirements for processual analysis." In The Management of Strategic Change, ed. Andrew M. Pettigrew. 330-341. Oxford: Basil Blackwell.

Weick, K.E.
1987 "Organizational culture and high reliability." California Management Review 29:112-127.

Weick, Karl E.
1989 "Theory construction as disciplined imagination." Academy of Management Review 14:516-531.

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TABLE 1
Issues and Actions

	ISSUE	ACTION	Scale	Scope	Pace
HP	• energy and waste management	• environmental Hoshin (office waste recycling)	Medium	Wide	Medium
HP	• office waste recycling/reduction	• recycling table	Small	Narrow	Fast
HP	• sustainable manufacturing	• SQF sustainability Hoshin	Large	Narrow	Slow
HP	• use of recycled paper				
HP	• product stewardship				
HP	• corporate environmental reputation	• HP way content	Large	Wide	Medium
		• DeskJet 400 product release statement	Small	Narrow	Slow
		• CPO newsletter (reference to Blue Angel)	Small	Wide	Medium
		• SHEIIBA	Small	Narrow	Slow
HP	• Customer satisfaction/concerns	• CPO business plan	Medium	Narrow	Medium
		• call handling	Medium	Narrow	Fast
HP	• marketing of Green workstation in UK				
HP	• benchmarking	• SHEIIBA	Small	Narrow	Slow
HP	• Compliance to corporate environmental policy	• EHS audit preparation	Small	Medium	Fast
		• EHS environmental Hoshin	Medium	Wide	Medium
HP	• Environmental policy/strategy	• EHS environmental Hoshin	Medium	Wide	Medium
		• CPO business plan	Medium	Medium	Medium
HP	• Maintaining employee citizenship	• HP way content	Large	Wide	Medium
RX	• Energy management	• energy policy	Large	Wide	Medium
RX	• office waste recycling/reduction	• waste free office	Large	Wide	Slow
		• Paper group WGC	Small	Narrow	Medium
RX	• Product stewardship				
RX	• Packaging				
RX	• end of life				
RX	• environmentally sound buildings				
RX	• sustainable development				
RX	• corporate environmental reputation	• environmental report	Medium	Wide	Medium
		• MBA study	Small	Narrow	Fast
		• discussion with EE reporter	Small	Narrow	Fast
		• tender documents	Large	Narrow	Fast
		• EBEAFI publicity	Small	Narrow	Medium
		• Environmental impact assessment commissioned	Large	Narrow	Fast
RX	• Customer satisfaction/concerns	• voice of the customer database	Small	Narrow	Fast
		• corporate refocus	Large	Wide	Fast
		• environmental report	Large	Wide	Fast
		• certification	Large	Wide	Fast
		• proposal for EBEAFI	Small	Narrow	Fast
		• tender documents	Large	Wide	Fast
		• WGC	Small	Narrow	Slow
RX	• Competitor benchmarking	• product range changes	Large	Wide	Fast
RX	• Certification	• BS7750 at Mitcheldean	Large	Wide	Fast
		• EMAS application, Mitcheldean	Large	Wide	Fast
RX	• Benchmarking	• Environmental report			
RX	• eco labelling	•	Large	Wide	Fast
RX	• continuous improvement	• certification	Small	Narrow	Fast
RX	• internal awareness	• MBA study	Small	Narrow	Fast
		• environmental slides	Medium	Medium	Fast
		• Corp Communications coverage	Medium	Medium	Fast
		• Earth Day	Large	Medium	Fast
		• Environment in Foundation workshop	Large	Medium	Fast
		• Group Resources Communications Cascade			
		• Environment in EDP	Large	Medium	Fast

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RX	• middle management commitment	• Foundation workshop	Large	Medium	Fast
		• XMM	Large	Wide	Fast
		• Group Resources Communications Cascade	Large	Medium	Fast
		• inclusion of environment in EDP	Large	Medium	Fast

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TABLE 2
Organizational Values

HP Organizational Values

Added value: profits, cost reduction, hard data, better data

Image: maintaining a good image within the community, public face

Corporate citizenship: makes a positive contribution to every community and society in which it operates, integrity, philanthropy, ethical

Sales focus

Employee satisfaction

Quality: total quality commitment

Risk management: minimize unnecessary risks, internal audits.

Planning: careful planning, better data

RX Organizational Values

Profits: premium return on assets, resource utilization, market share

Image: Maintaining a good and high profile in the community.

Corporate citizenship: Taking care of people and the working environment.

Customer focus: having loyal customers, customer satisfaction.

Employee satisfaction

Quality: providing external and internal customers with innovative products and services that fully satisfy their requirements

Communication: good communication cascading internally and externally

Proactive: leader in the document markets, excellence in all we do

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FIGURE 1

Issue Flows