FURTHER RESEARCH IN DOUBLE-INTERACTION: THE SIMULTANEOUS CONDUCT OF MAN-MAN AND MAN-COMPUTER INTERACTION

by

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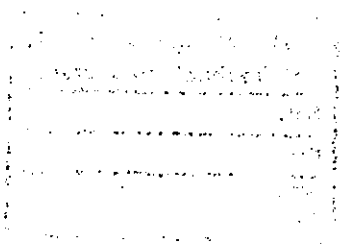
This thesis is dedicated to my father

Shree Raichand Ladhubhai Maldé

who, since the early sixties when he lost his eye-sight,

has been waiting all this time for the day

his only son is awarded a Doctorate.



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CHAPTER 1: INTRODUCTION

1.1 Double-interaction

Double-interaction is the abbreviation for the simultaneous conduct of man-man interaction on the one hand, and man-computer interaction, on the other. It is a recent development - certainly in this country - and roughly follows chronologically, the advent of the computer, and subsequently, the development of man-computer interaction.

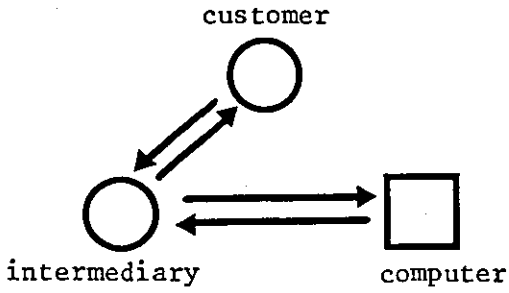


Figure 1: Double-interaction

A real-life example of double-interaction with which the reader may be accustomed, is computer-aided airline bookings and enquiries, normally found at airports and airline offices. The clerk seeks the aid of the computer to check flight dates or bookings to help an inquiring customer. If the customer then wishes to buy a ticket, the clerk proceeds to enter the relevant passenger information into the computer and the central bank records are subsequently amended to accommodate the new booking.

With ever-increasing availability of goods and services for the public, a host of double-interaction situations are beginning to appear. To exemplify the variety, below are two typical customer problems which may be served by double-interaction.

Example 1

A housewife in a city or a large town has a detailed shopping list of over 30 items. She knows that if she spreads her shopping over, say, half a dozen shops, she is likely to economise substantially. But prices keep changing, and this would mean first short-listing the shops she is going to concentrate on, then to scan through all these shops, and at each shop to note the prices of all 30 items, and finally to repeat the visit to all these shops, this time to buy the best bargain products. A clerk at a 'customer bureau' could enter the housewife's shopping list into a computer holding an up-to-date record of prices at local shops, and the computer could display the list of shops which collectively offered her the best way of spending on 30 items. She could even be provided with a computer produced hard copy bearing this information in a suitably organised form.

Example 2

A married couple living in a big city complex, are looking for a house, but with a substantial number of houses on the market, they are looking for ways of minimising the effort.

A statement of their needs could be compiled with the aid of a computer. This statement could then be matched, by the computer, against all the available houses, the details of which exist in its bank. A small list of probable houses could then be provided for the customers, on which to concentrate their efforts.

Various reasons justify research in double-interaction. Double-interaction is already beginning to occur, and is likely to be widely applied in the near future. However, this is taking place against a background of a lack of sufficient knowledge:

a) about the needs and aspirations of the public,

b) about the needs and aspirations of the intermediary,

c) about the extent to which a computer system could affect, beneficially or detrimentally, work and other satisfactions of the intermediary and the public.

d) generally, about the relationships between people, tasks and technology.

1.2 Plan for Thesis

The general concept of double-interaction is new and extends over a wide variety of situations. The objectives of research in this field are therefore necessarily different, from the painstaking systematic research devoted to a small component feature derived from a well established field, which one often sees in doctoral dissertations. For double-interaction, the lack of an established literature as well as far-ranging implications associated with 'too rapid' an application of a new technology, leads to a different set of objectives. The need here is for an outline of the major parameters relating to double-interaction over a wide variety of situations, how these parameters may inter-relate, and how one or more of these parameters may be exploited to give rise

to effective planning and application of double-interaction. The need therefore is more of a general nature, the overall objective being the provision of the means for understanding, designing, and implementing effective double-interaction situations.

A thesis must reflect an author's own philosophy on the topic. This philosophy may very briefly be stated as a belief in the anthropocentric principle, i.e. that everything is centred around Man. The corollary is that both the processes of problem-solving as well as evaluation of solutions, should be engineered in terms of how well these meet the needs and aspirations of people.

Specific to this thesis, we will attempt to pursue our main objectives by adopting the following set of practices, which are derived from a wide variety of practices commonly employed in the scientific world:

a) Attempting to understand a problem as it actually occurs in real-life. (This often means carrying out appropriate field studies.)

b) Attempting to solve a problem as it actually occurs in real-life. (This often means that where the necessary degree of control over derived parameters can only be facilitated in the laboratory, the laboratory setting should resemble the real-life setting as much as possible. This in turn means careful selection of situations,

tasks, technologies, and subjects, so that these resemble closely, their real-life counterparts.)

c) Attempting to evaluate the solutions by basing these evaluations on people who the solutions purport to serve in real-life.

The structure is as follows:-

Chapter 1 is devoted to the introduction of the subject, a brief examination of related issues, as well as earlier work carried out by the author on double-interaction. The chapter concludes with an outline of areas warranting research.

Chapters 2, 3, 4 treat each research area respectively.

Chapter 5 discusses the findings as a whole, while also attending to the wider issues surrounding the planning of double-interaction.

Chapter 6 provides a summary and conclusions.

The structure should become more clear and meaningful at the conclusion of this chapter (section 1.7.4, Figure 7).

1.3 People, Tasks and Technology

The foregoing explanation of the term 'double-interaction' suggests as a possible first step, an overall examination of the people-tasks-technology relationship.

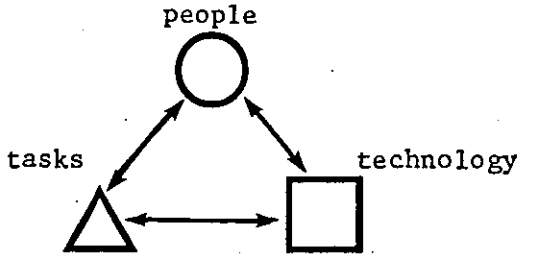


Figure 2: People-Tasks-Technology Relationship

If one has to rely solely on existing literature to meet this objective, the mission immediately becomes a difficult one. A chief reason for this is that whereas there is a large amount of literature on specific issues within the people-tasks-technology field, very little is offered which casts a wide enough net. We will proceed through three main stages, in order to reduce the complexity of the mission :

1. man-man interaction
2. man-computer interaction
3. double-interaction

Each stage will be reviewed under the headings of People, Tasks, and Technology. The aim will be to arrive at an appraisal of the state of knowledge, and to distil the most important issues in double-interaction, that demand investigations (see Figure 3).

Before going on to the review, a glossary of the main terms of reference employed in the thesis is presented in Appendix 1, which the reader may wish to scan through at this stage.

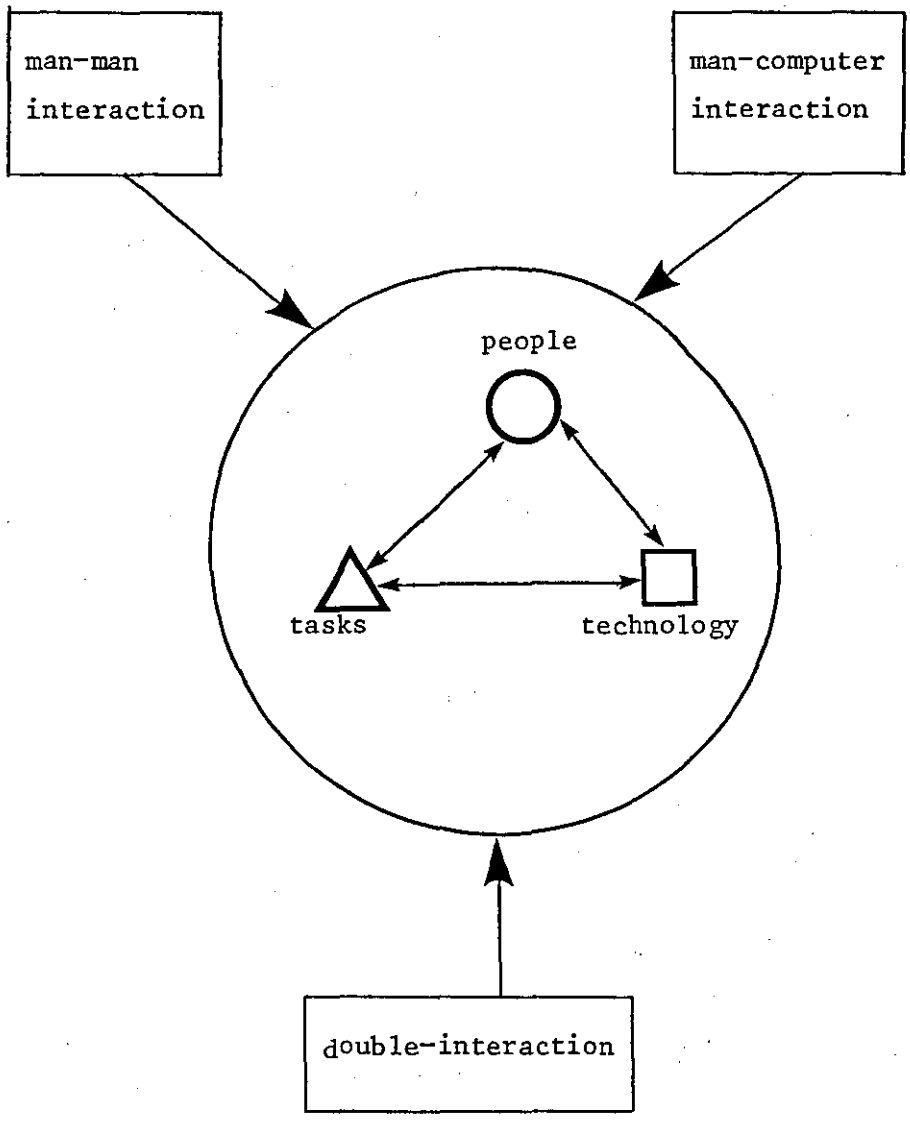


Figure 3: Plan for examining the state of art governing Double-interaction

1.4 Man-Man Interaction

Most of the literature on man-man interaction comes from social psychologists, and is, in the main, devoted to the social context of interaction.

1.4.1 People

Man communicates with man through both non-verbal and verbal means. Non-verbally, man interacts with man through a variety of ways, e.g. gesture, posture, expression, appearance, smell, touch, etc. (e.g. Argyle et al. (1965), Feldman (1959), Goffman (1967, 1972), Laing (1971)). Man communicates with man verbally through speech, the written mode, telephone, and now, also videophone.

A considerable man-man literature derives from the study of 'person-perception'. People construe others around them in various ways. De Charms (1968) argues the need for man to be on meaningful terms with his environment and suggests how he is forever gearing his efforts to be effective in producing changes in his environment.

The person-perceiver's fundamental task, according to Jones and Davis (1965) is to 'interpret or infer the causal antecedents of another's action. 'Action' is caused by the double influence of the 'effective environmental force' and 'effective person force' (Heider, 1944, 1958). People judge others' actions on the basis of 'correspondence' (Jones and Davis). Correspondence refers to the extent to which the other's intentions or dispositional properties describe the action. The extent to which the person may be held responsible for the actions he carries out may be influenced further by 3 principles.

Firstly, a perceiver's inferences about the other person are weak when he performs socially desirable or popular actions as these may be attributed to the environment, while novel and unusual actions lead to inferences of personal causality. Secondly, correspondence increases with 'personalism', i.e. the extent to which the other person directs his actions particularly at the perceiver. Thirdly, correspondence increases with 'relevance', i.e. the relevance that the effect of the other's action has for the perceiver. Judges display weak 'general evaluative sets', i.e. a generalized ability to judge people (Guildford, 1959). Bender and Hastorf (1953) talk about generalizing from one's self, or "attributing to others what the judge sees in himself". Gage and Cronbach (1955) suggest that people differ significantly in their judgement of the other person, while Dubin and colleagues (1954) have shown a consistency in the judges being either 'soft' or 'hard'.

At yet another level, literature refers to styles or orientations of people interacting with people. Horney (1945) has suggested the phenomenon of 'tripartite typology' in the interactive styles of behaviour of people. People fall into one of three categories in the way they relate to other people.

1) as moving towards others (e.g. "Will he like me?")
2) as moving against others (e.g. "How strong an adversary will he be?'
3) moving away from people (e.g. "Will he want to interfere with me?")

Kelley (1971) has demonstrated that some people persistently compete, while others persistently co-operate. An interesting corollary is that competitors drive the co-operators, consciously or sub-consciously, into competing as well.

There are various proponents of the Exchange Theory (e.g. Homans, 1961). Briefly, exchange theorists treat social interaction as a social market where people gather together to maximize their profits and minimize their costs.

1.4.2 Tasks

It can be seen that the latter coverage in the preceding subsection began to offer interaction that was task-related. For example, Kelley (1971) has demonstrated his competitor/co-operator dichotomy based on negotiation tasks.

However, in the main, social psychology literature is seldom task-specific, although indirectly, some useful general insight is offered by various theorists. For example Kelley (1948) highlights the nature of the interpersonal behaviour event as a major aspect of man-man interaction, and suggests that people judge according to role or context. The Exchange Theory implicitly reflects task behaviour, in the way it outlines maximization of gains and minimization of losses.

A noticeable emphasis of interest exists on negotiation behaviour, however. Partly the reason was wartime interest in strategic planning and manoeuvring while recently, laboratory fascination for its own sake, especially as related to Game Theory, also seems to have contributed. As a result there exists an abundance of research indirectly relevant to task-related interaction. Very little exists in task-specific form, although a significant amount of interest surrounds one type of task, namely negotiation behaviour.

1.4.3 Technology

Social psychologists offer even less on the issue of technology related behaviour. It is relevant to introduce here the concept of socio-technical systems, although doing so, would mean shifting the focus from dyadic man-man interaction to group, and even organisational, behaviour. The essence of socio-technical design is the joint consideration of the social system and the technical system to affect overall group or organisational effectiveness (e.g. Emery and Trist, (1960), Herbst (1974)). (This topic will be discussed more fully in Chapter 2.)

As if to highlight the general lack in the understanding of technology-related man-man interaction, Chapanis (1971, 1976), who is otherwise dedicated to man-computer interaction, has for some years engaged in painstaking research on man-man interaction as a first step to his mission. Chapanis' work will appropriately be dealt with in the man-computer interaction section.

1.5 Man-Computer Interaction

As one shifts the attention to man-computer interaction (MCI) work, the problem seems somewhat reversed, as will be seen. In the main, man-computer interaction literature represents the work of engineers, system designers, and recently, of experimental psychologist (e.g. Chapanis, 1971) and ergonomists (e.g. Shackel, 1969).

1.5.1 People

When MCI specialists talk of people, they mostly do so as 'users', i.e. users of a computer terminal or of a system. There is evidence that acceptance of a system is affected by prior attitudes of the user towards the system (Lucas, 1974) or towards the computer (Dawson, 1977). Eason and colleagues (1974), as a result of a major survey on the real-life applications of MCI in the commercial field, have made a number of important recommendations. One of the main ones is the need for greater 'user thinking' by planners and designers of MCI. They argue, for example, that system design should be undertaken differently according to the occupation of the user. For example, the needs of Clerks, Specialists and Managers call for different features incorporated in the system to be effective for each category of user. General to any user, Eason (1977) has

discussed the issue of user frustration and alienation as an outcome of systems not providing an adequate platform for meeting user needs.

1.5.2 Tasks

For a number of years, MCI researchers have talked of component tasks which are best served by a computer and those best served by man (Fitts, 1951; Berkeley, 1977). Recently Eason (1977) has summarised this approach of allocating task components, as outlined in Table 1.

The Computer is good at:	Man is good at:
Mass storage of information	Pattern recognition
Fast and Accurate retrieval	Goal Formulation
Fast and Accurate information processing	Identifying new issues
Following pre-defined instructions	Resolving ambiguity and uncertainty

Table 1: Allocation of Task components between Man and Computer (Eason, 1977)

This has formed the basis for recommending a highly advantageous working together of man and computer, euphorically referred to as 'symbiosis', (Licklider, 1960).

At another level, an insufficient or inappropriate task consideration gives rise to a poor match between task and system. A 'task-tool misfit' results (Eason, 1977) and the user enters into various ways of re-representing his task, in order to resolve the conflict. Freed (1961) seems to have demonstrated this effect in research with radar operators, who in their efforts to cope with the task-tool misfit, modified "procedures, positions, functions, communications, nature and number of interactions".

Another problem associated with lack of adequate task consideration is the inattention paid to various human operations that are necessary to goal-attainment. For example Freed (1962) classified these operations as adjusting, adapting, alerting, assisting checking, communicating, filtering, load-sharing, queuing, surveying, and supporting.

As in the case of negotiation and bargaining behaviour in man-man interaction, one task in man-machine studies too has received considerable interest, once again primarily for its wartime relevance: vigilance.

Chapanis (1971, 1976) has been pursuing a rigid programme of research on effective man-man interaction as a prelude to the establishment of effective MCI. It is interesting to note the nature of problem-solving tasks on which he has based his laboratory experiments. In the co-operative task, a pair of subjects work jointly towards achievement of a goal. In the conflicting type, subjects offer individual views on a set topic and use these as a basis for group discussion and argument. An example of his findings

which are generally of greater relevance to communication studies, is that both co-operative and conflicting problems are solved equally fast in voice-only and face-to-face communication.

1.5.3 Technology

This area has received perhaps the greatest attention of the three features that are being considered here. This imbalance has in part contributed to the problems that have arisen in the practice of MCI.

While the tremendous interest that hardware has created for engineers, and software for programmers, MCI specialists too have been active in the examination of system features in the behaviour of man-computer interaction. A considerable interest exists in the study of response time acceptable to the user (e.g. Miller, 1968). Recently, Innocent (1977) has produced doctorate work on the effectiveness of interacting with a computer terminal through various hardware mechanisms.

A lot of MCI research concentrates on the issue of communicating while until recently, when marketing interests have led various industrially based researchers into changing their orientation, user preferences had not received as much interest as the efficiency of different channels of communication. Comparing face-to-face channel of communication with the various existing technologies Chapanis (1971) has shown that problem-solving times increase as one shifts from free communication, through voice-only and handwriting,

to 'typewriting' by experienced and inexperienced typists. In addition, there are various indications of the effect of combining communication channels/technologies. For example, 'voice and video' is superior for solving problems to 'typewriting and video', as also is 'voice and handwriting' to 'handwriting and typewriting'.

1.5.4 Interim Conclusions

As will have been seen, literature on man-man interaction is rich in people issues, insufficient in task issues, while offering very little on system issues. In man-computer interaction, the situation is somewhat reversed. Until recently by far the greatest amount of knowledge existed in technology-oriented issues, with tasks receiving some interest, mostly at an indirect level, while people concern in terms of user satisfaction, and preferences have been, in the main, lacking.

Research Focus	Man-Man Interaction	Man-Computer Interaction
People concern	considerable	very little
Task concern	some	some
Technology concern	very little	considerable

Table 2: The focus adopted in literature relating to People, Tasks, and Technology.

There are various implications here for the planning of research in double-interaction. These form the essence of the early work carried out in double-interaction by the author at a master's level (Maldé 1975a), which is dealt briefly in the next sections.

Double-interaction, as a combination of man-man and man-computer interaction, clearly merits drawing from both the approaches seen in the foregoing literature. At another level, since literature directly concerned with double-interaction is almost completely absent, this means developing the concept from first principles.

This in turn reinforces the proposition set out under 'plan for thesis', for the need to examine the problem as it actually occurs in real-life. To elaborate, this research particularly merits the 'grounded approach' (Glaser and Strauss (1967). 'Grounded theory' is a term referring to theory that stems directly from real-life occurence of a situation, as compared to systematic testing of specific hypotheses which may be more appropriate to well established and well-advanced situations. To phrase it differently, where the understanding of the general concept is lacking, a study of component features can only be of limited relevance. On the other hand, this does mean steering the course somewhat carefully between micro and macro issues. A completely macro-approach may prove too general to be of any practical relevance. A completely micro-approach would also be defeating

for reasons outlined earlier. Research in double-interaction needs a selective drawing from both micro and macro issues. This gives rise to a difficult process of offering a combined focus on People, Tasks, and Technology in a way which defines the real-life occurrence of double-interaction.

On the people issue, there are two kinds of users on whom we need to concentrate. There is the end-user, who in this case, is the customer or the member of public. Secondly, there is the intermediary who in some ways may resemble the clerk that other researchers have discussed. On the task issue, rather than engage in micro-issues such as various component activities, we need to look at examples of 'total tasks' as they occur in real-life double-interaction. When field studies do not permit a desired level of control, laboratory settings need to employ real tasks for the customer. On the issue of technology, we need to look into how far technology assumes the role of the intermediary, and the needs of the customer. We also need to inspect the transfer of technology, from manual to computer, to assess the ensuing successes and failures.

Many of these issues will be dealt in the next section, which as was pointed out, examines preliminary work in double-interaction as carried out by the author at a master's level (Maldé, 1975a). A re-appraisal will be presented at the end of that section.

At this stage, we require a statement, however basic and elementary, that will serve as an overview of the relationship between people, tasks, and technology - a framework within which we may undertake to examine double-interaction.

People-Task-Technology Relationship

Man's existence on earth is characterized in one major way by a constant drive towards the satiation of a wide variety of needs (comfort, acceptance, advice, help, respect, security, etc.). In striving towards the satiation of these needs, man mobilizes available resources: human (himself and others around him) and technological (a wide range of tools, including computers).

1.6 Double-interaction

First, a comment on where we have reached in the introductory chapter. We adopted, as a structure for assessing the state of art in double-interaction, considerations of people, tasks, and technology, under the separate headings of man-man interaction, man-computer interaction, and double-interaction. We have covered man-man and man-computer interaction, and having appraised the implications thus far, we are now in a position to examine double-interaction. This we shall cover once again under considerations of people, tasks, and technology.

Before going on to the main findings, a mention is first made of other researchers on double-interaction, although there are only a few such researchers. This is followed by a broad outline of Malde's work, since this forms a considerable part of this section, so that the reader may be able to relate better the detailed considerations that follow under the sub-headings of people, tasks, and technology.

Double-interaction has received attention in the area of computer-aided library information retrieval for some years now (Carmon (1975), Baker (1977)). Some work has also been carried out in the area of telephone selling in Sweden (Istance, 1974; Ivergard, 1976), while Ivergard (1972) has also conducted a study based on supermarket checkout cashier systems. Recently, Dawson (1977) studied double-interaction as one of the 4 experimental situations involving computer-aided form-filling exercises. These researchers will be cited, where relevant, in the sections to follow.

Maldé carried out field studies of real-life double-interaction situations as offered by the computer-aided library information retrieval and airline enquiries and bookings. The former was mainly an observation study, while the latter was more complex, comprising observation, time and error analysis, and in-depth interviews with double-interaction intermediaries. In the latter, although observations were possible which related to the customer, the clerk, and the computer system, the conditions in which the study was permitted precluded interviews with the customers. As a result, clerk findings were directly derived, while customer findings were inferred.

The findings suggested that the effectiveness of double-interaction may be viewed through an interplay between:

1) characteristics of the human participants (intermediary and customer).
2) characteristics of the system.
3) characteristics of the task.

These findings will be taken up in greater detail in the sub-sections to follow, but one important discovery may be stated at this stage.

There seemed to be essentially two kinds of intermediaries. The person-centred intermediary saw the customer as a special dimension of his job. The efficiency-centred intermediary, on the other hand, was attracted to a highly efficient execution of a task. A review of the mismatch of expectations between intermediary and customer, in part pointed to a similar orientation for customers. For example, a person-centred customer may attach higher importance to a personal service offered by the intermediary. An efficiency-centred intermediary may however interpret his role to have clearly defined boundaries which exclude serving customers on a personal basis. (The issue of user-orientations will be examined in greater detail under the sub-heading of 'people'.)

The field findings led to a study in an experimental setting, of how the parameters user-orientation, type of task, and type of technology may inter-relate to produce different levels of customer-satisfaction.

The study was based on a computer-aided train travel information system, specifically designed for the experiment. The tasks in question were the 'simple' and 'complex' enquiries based on a sample of real-life train travel enquiries derived from a separate field study ('simple' and 'complex' tasks will be explained more fully under the sub-heading of 'tasks'). The technology consideration was based on a comparison between

manual and computer technologies, otherwise serving the same situation. (This will be treated in more detail under 'technology'.)

The intermediary-orientation was based on an intermediary adopting two orientations in her conduct with customers: person-centred and efficiency-centred. These orientations were induced by instruction to the intermediary, resembling two kinds of advice from management, that might occur in real-life:

a) Person-centred orientation, such as when management advises clerks to have special regard for, and take special care in, the affairs of the customers.

b) Efficiency-centred orientation, such as when management advises clerks to process customers much faster than they have been doing in the past.

Person or Efficiency orientations of customers were derived from the way customers ranked a set of person- and efficiency-qualities relating to the service they would ideally expect in real-life.

The experiment used 39 customers drawn from mixed occupations and representing the general public. Subjects were armed either with a selection of simple or complex enquiries, and each encountered 4 experimental situations, all representing possible train travel information procedures:

1. Person-centred intermediary, operating with manual technology.
2. Person-centred intermediary, operating with computer technology.
3. Efficiency-centred intermediary, operating with manual technology.
4. Efficiency-centred intermediary, operating with computer technology.

The detailed findings are now considered under the sub-headings of People, Tasks and Technology.

1.6.1 People

There are two kinds of users to consider - the intermediary and the customer.

1. The Intermediary

The intermediary serves an important function in double-interaction and Carmon (1975) has remarked on the indispensable role of the double-interacting intermediary in the library context.

Various kinds of pressures, readily visible and not so readily visible, play on the intermediary in the real-life occurrence of double-interaction. This emerged mainly from field studies of 2 double-interaction situations: the library, and the airline bookings and information.

a. The intermediary bears the brunt, on the one hand, of any translation difficulties that might arise between man-man and man-computer interaction.
b. On the other hand, and closely related, there is the problem of tackling simultaneously, two kinds of interaction and behaviours, which are often markedly different, and not always in concord.
c. The intermediary is often in a pressure environment created by the multiplicity of jobs to be carried out.

d. Some system features aggravate his work. (A detailed account follows appropriately under 'technology'.)

e. Some system features are not readily meaningful, nor readily communicable, to the customer. The intermediary accordingly has to tackle another aspect in his job; that of customer education and establishing rapport with, and relevance for, the customer.

At another level, an interesting feature emerged from the descriptions that the intermediaries offered about their ideal and non-ideal customers. There was a common feature to all intermediaries - one of 'serving the customer' or 'getting the job done'. Beyond this point however, there was evidence for a distinction between 2 types of intermediaries. The person-centred intermediary related himself to the personality, charm, friendliness, and interesting qualities of the customer. The Efficiency-centred intermediary on the other hand, related to the efficiency-aspects of the customer, i.e. whether he would express his needs well, make up his mind quickly, appreciate the intermediary's side of the job, and would not 'mess one about'.

There were also suggestions that to be in consonance in one direction, e.g. with the system, meant being dissonant in another, e.g. with the customer, and vice versa. It seemed that the system-design suited the efficiency-orientation, but not the person-orientation, of the intermediaries. The diverging orientations also manifested themselves through the differing views that the

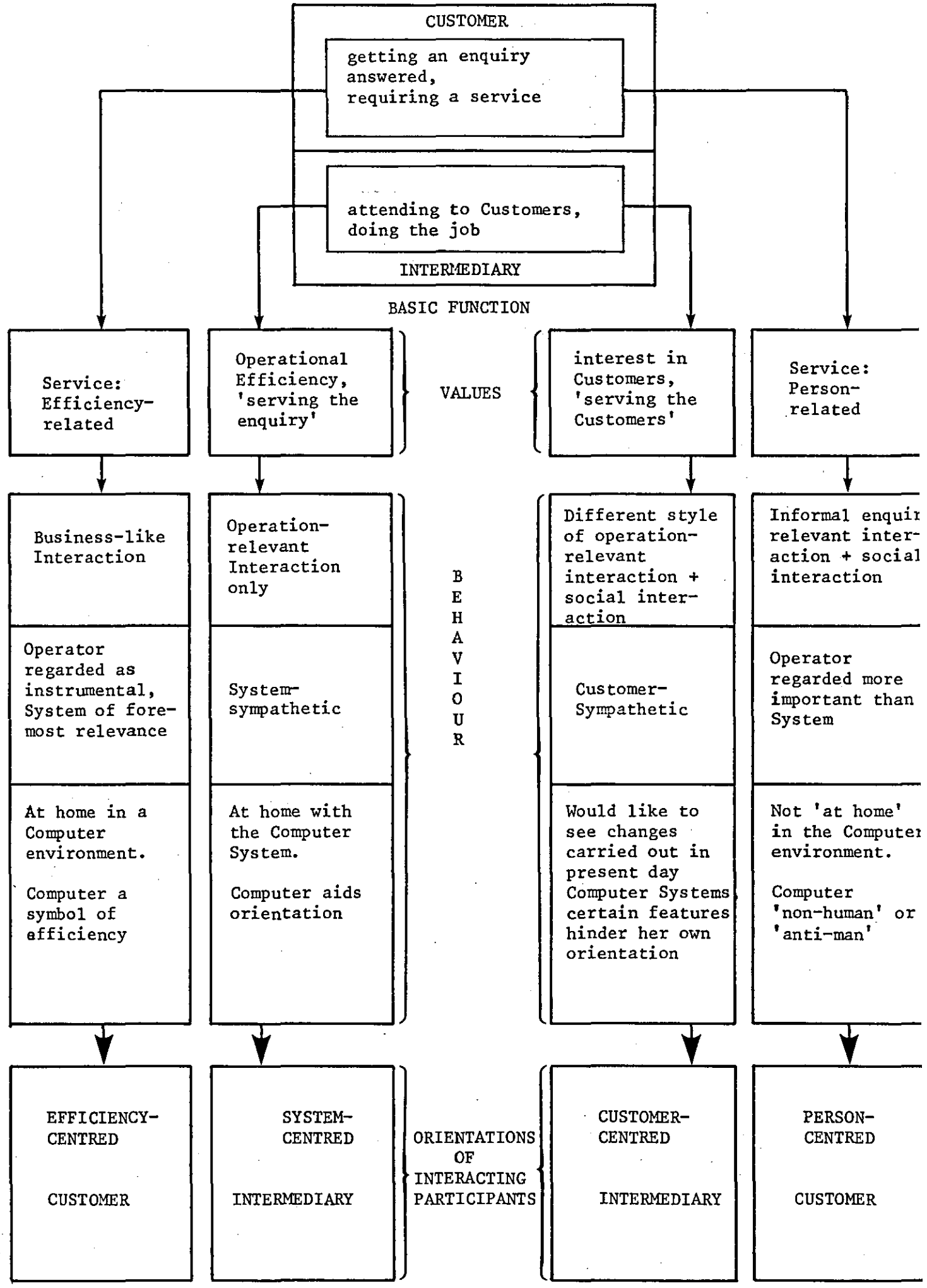
intermediaries had to offer for manual and computer technologies. The computer technology served as a boon for the efficiency-centred intermediary, while the counterpart manual technology was clumsy and time consuming. The person-centred intermediary on the other hand had a number of grievances against computer technology. She felt she could no longer extend a personal service to the customer and treat her customers on an individual basis, which the previous system allowed.

2. The Customer

One finding from the field studies related to the mismatch of expectations between double-interaction intermediaries and customers. A review of this mismtach led to the possibility that customers too may be considered along person- and efficiency-orientations. For example, a mismatch of expectations would arise between a person-centred customer and an efficiency-centred intermediary, as each would see differently the role expected of the other, in the double-interaction context. The issue of person- and efficiency-centred customers was studied as one of the important double-interaction parameters, in a laboratory setting.

There was evidence that the person-centred customers generally disliked being served by a computer-aided efficiency-centred intermediary. The efficiency-centred customer, by contrast, preferred meeting this situation over all others. In addition, certain characteristics of the person-centred customer, need to be noted in more detail. Generally the person-centred customer considered himself and his needs as unique. The expectations of this customer

Figure 4: Person- and Efficiency-centred Orientations of the Customer and the Intermediary



were such that none of the 4 situations in the experiment matched his ideal, a case not found for the efficiency-centred customer. It seems, that even in his daily encounters, he probably finds few encounters to his complete satisfaction.

Figure 4 outlines the issue of user-orientation for the intermediary and the customer.

1.6.2 Tasks

1. Real-life 'Total Tasks'. As remarked earlier, rather than focus on component tasks, there is a need to base studies on the real-life occurrence of tasks in a complete form. Below are some examples of double-interaction tasks studied in the field, or simulated in experiments.

a. Airline information and bookings (Field)

This consisted of a wide range of tasks from simple flight enquiries to chain bookings or implementing changes on existing bookings.

b. Library information retrieval (Field)

This entailed carrying out a literature search for the customer on the basis of keywords provided by him, and involved a range of activities such as: checking with him regarding relevance of material being output by the computer, widening focus by

combining keywords, and narrowing focus by choosing more specific keywords.

c. Train Travel Information (Field and Experiment)

A wide variety of enquiries, as in the case of airline information, from checking on a train time, to asking for recommendations regarding a route, a destination, or even alternative transportation.

d. Applying for a Driving Licence (Experiment)

Dawson (1977) used a form-filling task based on the real-life occurrence of driving licence applications in England.

2. Interaction Flow. It is possible to derive two kinds of interaction flow associated with real-life occurrence of double-interaction tasks. Certain situations have both kinds occurring (e.g. train travel, airlines), while others (e.g. library) are characterized mostly by the iterative version. The single-interaction flow is one which proceeds from the customer to the clerk and on to the computer. The flow subsequently reverses from the computer to the clerk, and finally on to the customer, which marks the end of transaction, or completion of task. The iterative flow is one which is characterized by a breakdown of this straightforward pattern. Repeated dyadic customer-intermediary or intermediary-computer interactions may occur during the transaction, for example, as a result of the response or reaction, of customer or computer, to preceding stages of transaction.

Figures 5 and 6 illustrate the two patterns of interaction.

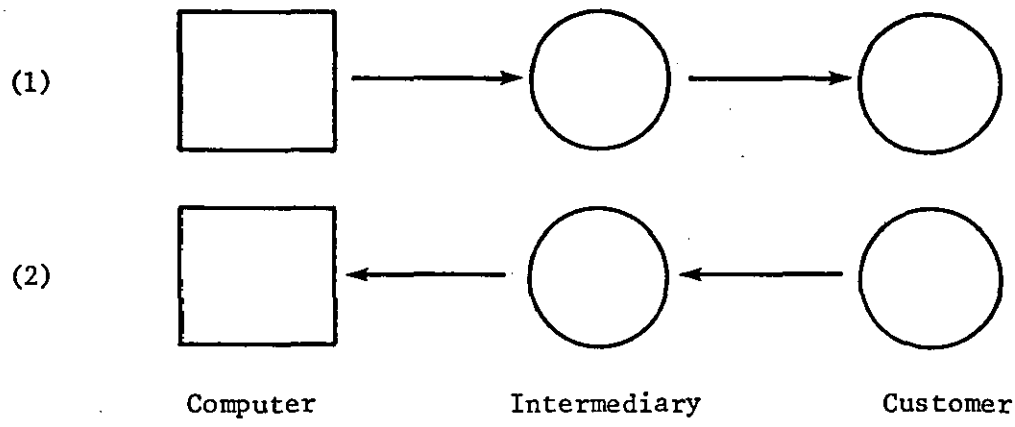


Figure 5: Single-interaction Flow

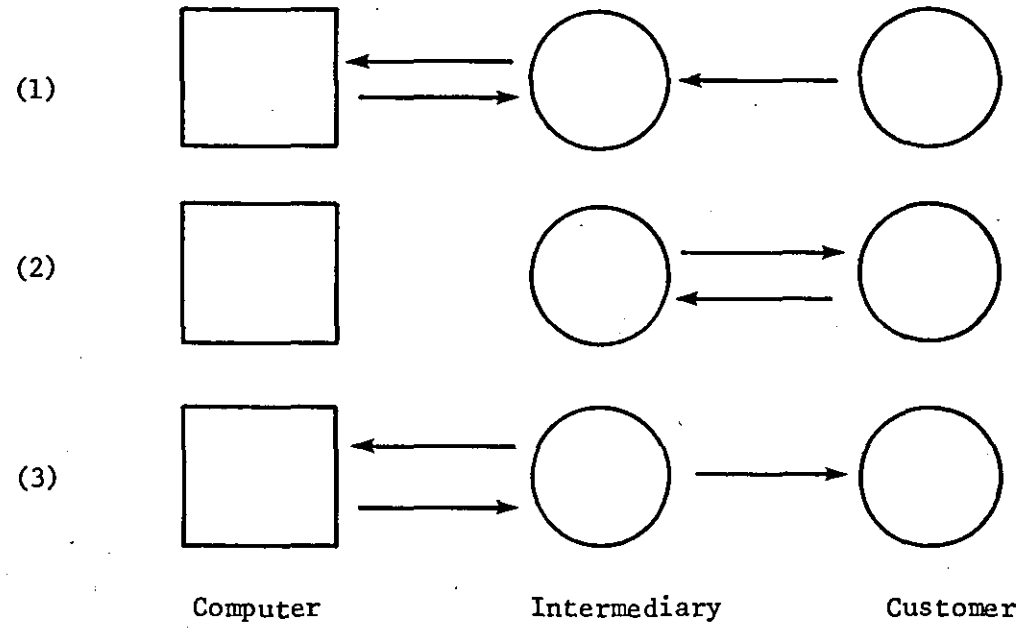


Figure 6: Iterative-interaction Flow

3. Level of complexity. Closely associated with the preceding classification is one which relates to the complexity of the task. Double-interaction tasks can be viewed to occur in 'simple' and 'complex' forms.

The simple task may be described as one which is quickly, readily and easily executed and one which is normally, wholly computer-compatible. The complex task, on the other hand, is long, not easily executed, involves various operations, and is generally of the kind which is only part computer-compatible or even not at all.

The interesting feature is that not all complex tasks may be complex inherently. For example, much of its complexity is derived from the failure of the system to accommodate sufficiently the nature of the task, and/or the nature of its human users.

4. Findings. Findings suggest that of the two kinds of tasks described above, the simple and the ones with single-interaction flows, present fewer problems to the smooth-running of double-interaction. In the laboratory study, there was a noticeable shift in the range of the reported difference between best and least preferred double-interaction situations, according to the type of enquiry undertaken. The range was low for the simple, and high for the complex task.

1.6.3 Technology

1. Manual and Computer Technologies

It was possible to compile differences in the 2 technologies derived from comments of the intermediaries, and from field observations.

Manual Technology	Computer Technology
Natural Interaction: Terms easily understood. Communication resembles form and structure of normal every-day conversation.	Unnatural Interaction: Fixed-order Man-Computer Interaction. Also, MCI otherwise in marked contrast to Man-Man Interaction.
May offer choice and discretion to intermediary	May not allow choice and discretion to intermediary
A familiar and meaningful environment for Customer. Customer can interpret and appreciate Operator's task and functions.	A novel and unmeaningful environment for Customer. Intermediary's task and functions are difficult to interpret and appreciate.
Slow.	Fast.
No quick or easy means of updating information.	Information can be easily up-dated.
'clumsy' and 'inefficient' attitudes attached to manual technology	'super efficient' attitude attached to computer
intermediary in control of technology	technology in control of intermediary

Table 3: A comparison between the impacts of manual and computer technologies

The experiment compared manual and computer technologies as they would affect a train travel information service. There were indications that the person-centred customer was drawn towards manual technology. More noticeably, he preferred least of all, the situation combining computer technology with an efficiency-centred intermediary. Whereas, the efficiency-centred custor was drawn away from manual technology and preferred over all others, the situation combining an efficiency-centred intermediary with computer technology.

2. System. Field observations revealed that some system features lead to strains in double-interaction.

1. Some systems may impose too many constraints and/or may demand a pronounced degree of dependence from the users. (For example, in the Library Situation, the system would often log itself out unexpectedly. The intermediary had to learn to be alert for the moment it would come back, and to catch it once more by furnishing a quick input and getting on with the job as quickly as possible. Such unexpected log-offs were sometimes prolonged and one would see the users gazing at the teletype for long periods of time just waiting for the system to connect again.)

2. Fixed order man-computer interaction has a carry-over effect on man-man interaction (e.g. the intermediary starts to take down details from the customer in the order the system accepts, or starts to use abbreviated terminology, which may be far removed from natural forms of conversation).

3. Some systems may impose implicit constraints on running time (including cost considerations). There were comments from some intermediaries of how they have become 'pace happy' after experience of the terminal. Intermediaries in this way may be led to expect the customer to be quicker than he can be.

4. Some systems seemed to affect the intermediary's expectation of the way the customer would conduct himself in a decision-making situation. This expectation may derive from ideas of the way decisions are taken when computers are involved, and may be far-removed from natural decision-making. The former may be quick and organised, the latter may be neither.

5. Some systems did not seem to accommodate certain kinds of tasks which went beyond the straightforward retrieval type. The decision-making type involved making a decision following a suitable review of alternatives. Some systems were not sufficiently adaptive to meet the variety of user needs that occurred in such situations.

6. When extra facilities were provided by the system, the customer was often not aware of them, nor were these fatures readily meaningful to him. The intermediary may expect the customer to appreciate the reason behind or even the nature of such facilities, which the customer may not. It may be that such facilities either do not stem directly from 'grounded' needs of customers or that if they do, insufficient measures are employed of making the customer more aware of what is being offered.

7. Some systems lead to unnatural explanations (e.g. the intermediary to customer: "The booking is not possible because the computer says 'No'").

8. Some systems seem to have taken over from the intermediary a degree of control affecting the latter's ability to serve the customer on an individual personal basis.

9. Some systems, and it is suspected that systems in general, suit the conduct of the efficiency-oriented intermediary, but not the person-oriented one. They would also seem to suit the efficiency-centred customer, but not the person-centred customer.

1.6.4 Combined Influence of People, Tasks and Technology

The laboratory experiment undertook to explore the interplay between people, tasks and technology, based on the simulation of a real-life application of double-interaction. The various findings have already been mentioned in the foregoing sections under the subheadings of people, tasks and technology.

However, this section leads us to what is perhaps the most important outcome of the experiment. Looking across the preferences of all parties over the 4 situations met, there were suggestions that a possible solution for satisfying both the person-centred and the efficiency-centred customer, lay in the exploitation of the situation combining a person-centred intermediary with computer technology. This situation, especially in the context of complex enquiries, was generally liked by all parties.

The reason why the efficiency-centred customers found this situation acceptable, though not ideal, lies chiefly in the computer-aided operation, which is a boon to their efficiency-centred values. The reason why the person-centred customers liked this situation is not all that straightforward, and seems to be due to a combination of issues :

a. A person-centred intermediary is highly suited to their own orientation.

b. Computer technology could prove superior at tackling complex tasks, than manual technology.

c. Certain features of the system used in the experiment were thought to be distinctly customer-centred. These features were:-

   i) the system would accept the enquiry in any order.

   ii) the system allowed a hard copy printout of the information required for the customer to take away with him.

   iii) the system automatically displayed a selection of trains 2 hours before, and 2 hours after, the departure or arrival time stated by the customer, to offer choice and discretion, as well as to allow for change of mind by the customer.

Hence, computer systems can take alternative forms: person-centred and efficiency-centred. It is possible that the combination of a person-centred clerk with a computer system that itself had certain customer-centred features, made this an attractive alternative for these customers. The single most important lesson learnt was the need, in the design of man-computer interaction situations in general

and double-interaction in particular, for joint optimization of person and efficiency thinking for maximal customer satisfaction. On the one hand, this means providing a customer-centred intermediary, and on the other hand, equipping the intermediary with a customer-centred computer system.

1.7 Appraisal

There has been considerable advancement in the understanding of the working of double-interaction, especially in the following areas:-

a. the real-life occurrence of double-interaction (field studies).
b. the pressures of the human intermediary (field and experiment).
c. the person- and efficiency-orientations of the human participants in double-interaction (field and experiment).
d. how people, tasks and technology may combine to influence double-interaction (experiment).
e. the adverse and beneficial effects of system design on the conduct and running of double-interaction (field and experiment).
f. the need for joint optimization of person and efficiency thinking in the design of double-interaction situations for maximal customer satisfaction. Particularly, the exploitation of pairing a person-centred intermediary with suitably designed computer technology (experiment).

A number of issues emerge which warrant particular attention, and which this thesis should attempt to address. The issues are examined, as before, under the sub-headings people, tasks and technology. The conclusions are cast in a summary, which provides the basis for the remaining chapters.

1.7.1 People

It is useful to examine the issue of user-orientation along the dimensions of 'person' and 'efficiency', in the way this relates to double-interaction. Whereas the nature of the intermediary's orientations was derived from their detailed comments in field studies, it was only possible to examine this orientation in customers in a laboratory context.

There is a need to investigate the customer's orientation in a wider context, particularly in the way it relates to his everyday task encounters.

The aim would be to check out the extent to which customers may be classified according to their person- and efficiency-values, and secondly, to attempt to derive an overall picture of the way they relate to their task encounters generally. This would then establish the context within which planning of double-interaction could be undertaken.

Secondly, the public represent a wide variety of people comprising a wide range of education and occupations. On the one hand, we need to base our explorations on a sample derived from mixed occupations, to aid our thinking on general design of double-interaction situations. At another level we need a separate study based on a sample of specialist users within the general public, to

assist the design of double-interaction situations that focus on a sub-population within the general public.

For the intermediary, the need for further research is less immediate for various reasons:-

a. a broad framework for the existence of intermediary pressures, has already been derived from past research.
b. the issue of person- and efficiency-centred intermediaries has been studied both in the field and the laboratory context. No field explorations have been possible on the customer viewpoint.
c. The need for focussing on the customer, arguably a very critical issue, is more often appreciated than attended to by researchers and practitioners alike. It seems that unless the issue begins to influence the selling of a product (e.g. Schoeffler (1977) on telephone marketing) customers' aspirations, preferences, and satisfactions remain a neglected issue. On the other hand, the intermediary is beginning to receive attention. Increasing demands of user-thinking in system design, is beginning to draw a number of researchers and practitioners into the issues of user-involvement of, and user evaluations by, intermediaries.
d. Some useful work is currently in progress based on the intermediary' work in the library context, which is expected to provided further insights on the issue (Baker, 1977).

There is a critical need on the other hand to alleviate intermediary's pressures, through better system design, which will be treated in fuller detail under technology. There is also a need for examining the work satisfaction of the intermediary as influenced by technology, which will also be considered under technology.

1.7.2 Tasks

While work of any magnitude or relevance is lacking on double-interaction tasks in general, it would be futile to plunge directly into an examination of component tasks. Arguably, we would serve better by continuing to focus our attention on 'total tasks' as described earlier.

It is not that taxonomies of tasks do not exist. The problem is more of relevance of the ones that do exist. As Conrath (1977) has pointed out

> "Despite the significant number of task taxonomies, a thorough search of the literature yielded none that were relevant to the interpersonal aspects of tasks."

While there remains a lack of an adequate taxonomy for tasks, a focus on examples of real-life total tasks executed by double-interaction situations, offers an attractive solution.

On the other hand, we can begin to shift our focus towards what may be described as complex tasks, where the influence on double-interaction and the impact on its human participants, is especially critical, as seen earlier. Next, basing studies on a simulation of real-life total tasks, essentially requires the task selected to incorporate various elements which are common to other double-interaction tasks. Therefore we need special care in deriving the real-life task on which to base double-interaction studies.

As has been pointed out, there is also the need to examine the way in which people relate to their task encounters generally.

Finally, we need to meet the pressing need to investigate the relationship between task and technology, which directly or indirectly affects the conduct and satisfaction of the customer and the intermediary. Particularly, we need to examine the system design that presupposes and imposes a certain structure on tasks, versus one which allows the customer-intermediary unit to structure the task in ways that is suitable to the customer.

1.7.3 Technology

Having examined a comparison between manual and computer technologies in the field and experimental settings, we can now concentrate on the issue of system design underlying computer technology.

The first need, here, seems one of understanding the nature of the user-technology relationship, particularly in the impact that technology has on the quality of working life of the users. If we are to be successful in planning the future course of double-interaction situations, we need to understand the impact that technology produces on work satisfaction.

The second need brings us to a critical area not only affecting double-interaction, but also accounting for inadequate planning of MCI situations generally.

It was seen earlier how certain customer-centred features of the system were thought to have complemented the customer-centred orientation of the intermediary, and how the combination may have influenced the overall satisfaction that both kinds of customers registered for this situation. However, much of current system design practice runs contrary to this behaviour, as outlined earlier (latter part of section 1.6.3).

We need a demonstration of how system design based on one interpretation of a real-life task (a somewhat mechanical interpretation based on one or more operational components, as seems to be currently the case), will differ in the impact it has on the running of double-interaction, from another kind of interpretation of otherwise the same task, but this time incorporating a wider awareness of the task (one that includes in its considerations, human elements of the task). We need to compare the kind of system that presupposes and imposes a structure on tasks, with one that allows the task to be structured in a way that suits the customer. Perhaps the most important contribution required of further work on double-interaction is an address to the differing philosophies incorporated within system design. This would then provide a basis for the intermediary-system unit to work in consonance towards the achievement of the needs and aspirations of customers.

1.7.4. Conclusions

Variables under study and the extent to which they may be exploited

Section 1.7.3 outlined the issues that dictate research in double-interaction. What must this thesis undertake to do? Let us start by stating our primary objective , which is to provide a framework for undertaking an effective design of double-interaction. By 'effective' is meant simply 'that which answers to the needs and aspirations of the interacting participants'. Hence if the thesis can show how this effectiveness can be achieved, then it will have rendered a service to the customer and clerk directly, and the system designer and management less directly. The interacting participants are the customer and the intermediary and therefore our major dependent variables may be stated as 'customer satisfaction' and 'intermediary satisfaction'.

The independent variables may be considered, then, as 'people', 'tasks' and 'technology'. What variable(s) should we exploit, and to what extent, in order to achieve the broad goals of the thesis?

People: Let us accept that since we are attempting to answer to the needs and aspirations of people, we should therefore treat the people-variable as given and least subject to manipulation. It will be seen that this is particularly true for the customer, as the member of public who forms a substantial sector of society. (The intermediary has a little more room for manipulating, in this respect. For example, if a certain way of executing a task is thought critical to customer satisfaction, then this way of

operating may have to be achieved through suitable selection/ training processes.) We would serve the objective better by attempting to understand people's needs and aspirations, rather than to seek ways of manipulating these. This we shall undertake mainly in chapter 2, while chapter 3 will be devoted to the customer's orientation in his task encounter.

Tasks: If we accept the needs and aspirations of people as given, and also, that tasks arise out of the needs and aspirations, the tasks too should be treated as given. However, whereas control may not or should not be exercised on the task -variable thus derived, control does need exercising on the associated variable of 'task-interpretatio In helping people meet their needs and aspirations, a primary qualification may lie in a correct interpretation of their tasks. (Chapter 4 will address the issue of task-interpretation.)

Technology: As a tool at Man's disposal, Technology is almost by definition the most controllable variable and one which offers maximum grounds for exploitation. Technology must come under greatest pressure for meeting as fully as possible the needs and aspirations of People. The solution lies, therefore, in a correct system design (we shall address this issue in chapter 4.)

Hence we move from most to least controllable, as we move through the variables People, Tasks and Technology. This we shall adopt as a basis to meet the objectives of this thesis.

Summary

I. General Aim

To provide a framework within which double-interaction can be undertaken with a view of providing effective encounters for customers, intermediaries, system designers, and management.

2. Issues needing investigation

a) The impact of technology on work satisfaction (Chapter 2).

b) The way the public relate to their task encounters (Chapter 3).

c) The Customer and his Task (Chapter 4).

d) System design that would serve the overall philosophy of meeting the customer's needs and aspirations (Chapter 4).

e) Appraisal of results and a discussion of issues considered central to the provision of effective double-interaction (Chapter 5).

f) Summary and Conclusions (Chapter 6).

Figure 7 outlines the plan of the thesis.

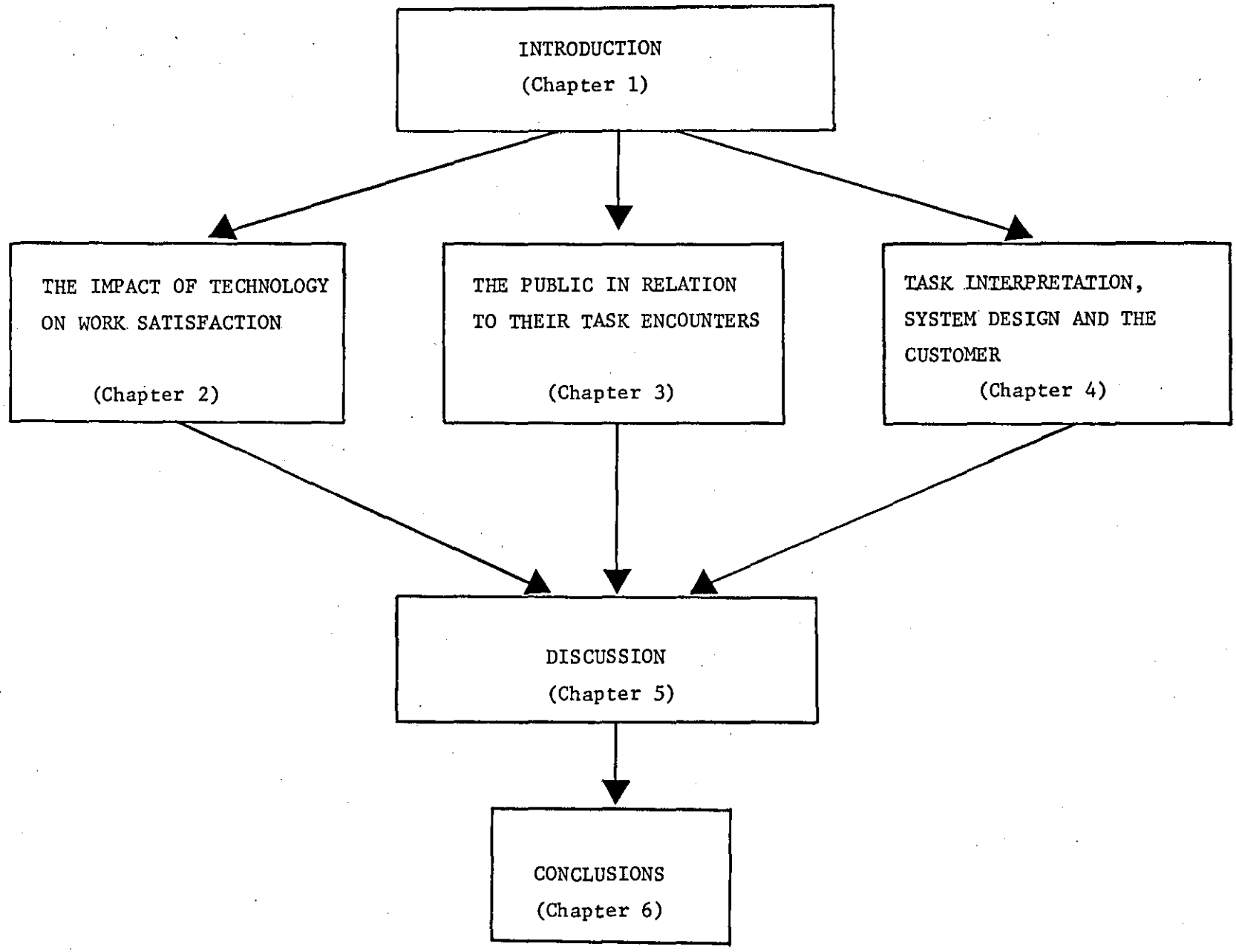


Figure 7: Plan for Research in Double-Interaction

Plan for Thesis

1 Introduction
2 Impact of Advanced Technology on Work Satisfaction
3 The Public in relation to their Task Encounters
4 Task Interpretation, System Design, and the Customer
5 Discussion
6 Conclusions

Plan for Chapter 2

2 IMPACT OF ADVANCED TECHNOLOGY ON WORK SATISFACTION
2.1 People's needs and aspirations in Life and Work
2.2 The extent to which Technology has met People's needs and aspirations
2.3 Appraisal of the People-Technology Fit
2.4 Conclusions
2.5 Where have we reached?

CHAPTER 2 :

IMPACT OF ADVANCED TECHNOLOGY ON WORK SATISFACTION

We set up as our goal in Chapter 1, the need for a framework which would provide for maximal satisfaction of all parties in the design of double-interaction, especially the intermediary and the customer. One of the prerequisites of this mission is the need to assess the existing state of knowledge about the impact of advanced technology on people's work satisfaction. Our overall objective then is to attempt an answer to the question: What should the Role of Technology be in the context of double-interaction work satisfaction? The aim of this chapter is to conclude with a 'formula', if at all this is possible, that would provide the general context in which a system designer can undertake the design of a double-interaction situation that aims to promote optimal satisfaction for all parties concerned.

Two main terms of reference that need clarification are 'technology' and 'work satisfaction'. Technology, in the main, will refer to 'advanced technology' embracing the concepts of automation and computerization. Wherever necessary, the focus will be less restrictive to include telecommunications, and even more traditional technologies. Work satisfaction is to refer loosely to all aspects of work that provide for the fulfilment of the participants' aspirations. 'Work', additionally, may embrace aspects which the conventional usage of the term may not include. This is especially so in the case of the customer's usage of telecommunication devices, and some aspects of customer-intermediary encounters, which may be more closely associated with 'day-to-day living' than with 'work' in the conventional sense. In addition, in view of the lack of knowledge specific to the intermediary, we

shall draw from a near-equivalent category on whom some literature does exist - the Clerk. The Customer, in this chapter, shall be the consumer, or a member of the public. Wherever 'needs' and 'aspirations' appear together, 'needs' refer to a person's requirements relating to immediate context and relevance, commonly recognised as 'necessities'. 'Aspirations' refers to a person's requirements of a higher level, relating to a long-term context and relevance, and requirements that are not commonly recognised but may be unique to each individual.

Structure

One or two points need to be made very clear at the outset. Work Satisfaction is a highly complex subject. In our mission to understand the state of art generally, and to draw implications for double-interaction, it is important that we do not get entangled in this complexity. We shall attempt, therefore, to simplify the process as much as possible. To this end, we shall need a simple structure. For a reader who is a serious student of Work Satisfaction, he must recognise the limitations of this outline. The author's objective is not to offer an expert opinion on the topic, but to distil the essence from the existing evidence and thinking which he could then recommend to intending designers of double-interaction situations. Secondly, this chapter is a part of a larger thesis. The considerations in this chapter will be confined, in content and coverage, to those that lie well within the context of the overall thesis.

The literature relating to this chapter diminishes from considerable to scanty, as one moves through the following topics:

a) Work Satisfaction.

b) Impact of technology on work satisfaction.

c) Impact of technology on double-interaction work satisfaction.

We shall therefore draw support to our task from evidence on Work Satisfaction generally, and then move towards examination of whatever evidence there exists specific to the Clerk and the Customer. (Figure 8 illustrates the plan and aims of Chapter 2.)

Beginning from an outline of what people's aspriations are in life and work evidence will be examined on how far technology has succeeded in meeting, or at not interfering with these needs and aspirations. An appraisal will then be presented of the extent of fit between Technology and People, leading finally to conclusions for future planning of double-interaction situations.

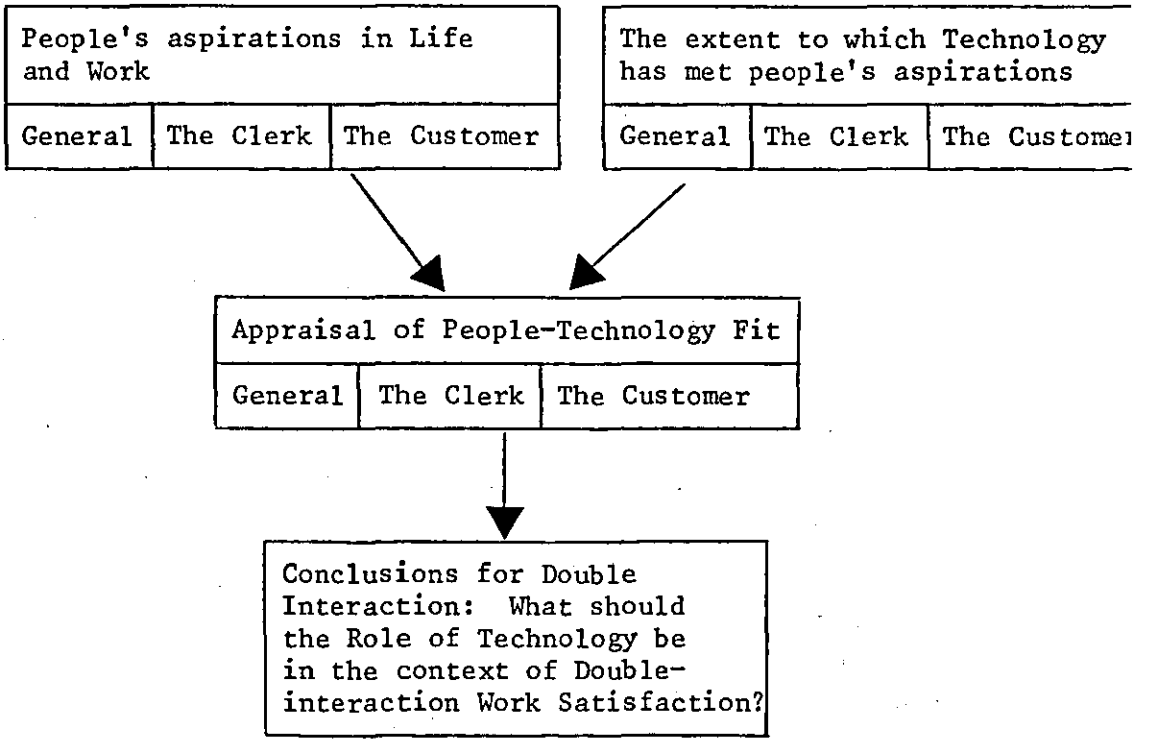


Figure 8: Plan for examining the impact of Technology on People's Aspirations

2.1 PEOPLE'S NEEDS AND ASPIRATIONS IN LIFE AND WORK

Let us first remind ourselves of the statement we arrived at in chapter 1. Man's existence on earth is characterized in one major way by a constant drive towards the satiation of a wide variety of needs (comfort, acceptance, advice, help, respect, security, etc.)

2.1.1 General

The author had difficulty deriving from the literature an overview that would serve a basis for the study of man's needs and aspirations. The view of Kelly (1955) comes nearest to performing this function. Kelly has postulated that man is forever attempting to understand the complexity of the world around him, in order to be able to anticipate events. This he does by representing his world along a model of his own making, which he then tests, for fit, against each event taking place. The model, hence, undergoes a constant refinement as he continues in his efforts to establish better meaning of his environment in relation to himself. Three concepts are important here. One is the implicit suggestion of the need for man to relate to his environment and for the environment to provide meaning for the individual. The second one is that this is a dynamic on-going process, linked to the concept of 'time'. Thirdly, the way of representing this environment may be unique to each individual. He applies his own meaning structure, his own terms of reference, for representing his environment.

Let us now turn to the more specific issue of man's needs. It is generally believed that the wide variety of needs possessed by man may be classified along a hierarchy going from primary needs, which when met are short-lived, to the secondary needs, which mark a gradually increasing degree of permanence. According to Maslow (1954), the hierarchy is summarized as in the following list, which is also a useful summary for the content of the various needs of Man:

a) The physiological needs (e.g. hunger and thirst).
b) The safety needs (e.g. avoidance or elimination of threat and danger).
c) The belongingness and love needs (e.g. affiliation and acceptance).
d) The esteem needs (e.g. achievement, status, prestige).
e) The need for self-actualization (e.g. self-fulfilment, realization of potential).
f) Cognitive needs (e.g. the need to know and understand, curiosity).
g) Aesthetic needs (e.g. the need for symmetry, order, and structure)

What about the role of Work in people's lives? The research of Goodale and colleagues (1975) with Canadians drawn from wide-ranging occupations, has shown that work is ranked very high in people's lives. Work comes third, after the family, and personal relationships. There seems to be a variety of ways in which work provides significance for Man. According to Klein (1977), work provides for Man, a forum for establishing and maintaining the reality of his existence and of his environment. Klein draws

support from Jahoda (1966) to outline the various ways in which work provides this forum:

a) People without work lose sense of time.

b) Work provides for dynamic aspects of reality.

c) It permits pleasurable experience of competence.

d) It adds to individual's store of conventional knowledge.

e) It enriches 'immediate experience' (the satisfaction stemming from the direct consequences of performing a task).

f) Work permits regulation of adult behaviour via the mutual reinforcement of pleasure and reality principles.

There are a number of points to note. One is the link between work providing a forum for establishing and maintaining the reality of Man's existence and of his environment, with the view of Kelly (1955) outlined earlier, that Man is forever striving towards conceptualizing his environment. It seems that work provides a major force to facilitate the context in which Man may relate to his environment. The second point emerges as one reads down Klein's list. For example, one can think of a kind of work which does <u>not</u> permit, say, pleasurable experience of competence, nor enrich "immediate experience". This then seems to suggest that at a very basic level, work of <u>any kind</u> may be important to Man. At a higher level, it is work of <u>a particular kind</u> that offers significance to Man.

What, then, are the features that one may incorporate into the design of a work situation that would be of maximal satisfaction to the worker? According to Emery and Thorsrud (1969), an ideal work situation should provide the following features:

a) The content of job to be sufficiently challenging.

b) An optimal amount of variety.

c) Being able to develop, and go on developing, on work-related issues.

d) Some decision-making that the individual can call his own.

e) Social support and recognition.

f) Being able to relate what he does and what he produces to his social life.

g) Feeling that the job leads to some sort of desirable future.

We may summarize our position on Life and Work thus: Man is constantly striving towards a better understanding of his environment. His existence on earth is characterised in one major way by a constant drive towards satiation of a wide variety of needs. These may be classified along a hierarchy ranging from primary needs, which are short-live when met (hunger, thirst and safety) to the more permanent secondary needs (belongingness and love, esteem, self-actualization, cognitive, and aesthetic). Work is important in people's lives. A considerable part of life is spent in work, and work provides a forum for establishing and maintaining reality of life. It is not so much work of any kind, as work which incorporates certain features, that serves a basis to provide the ideal to which a worker may aspire.

2.1.2 The Clerk

There is surprisingly little work devoted to the needs and the aspirations of 'consumer clerks'. What little there is seems to suggest that the Customer forms an important dimension in the way clerks evaluate their work. A study based on the computer-aided service at the Electricity Council (WRU, 1976) suggests that clerks aspire to offer a satisfactory service to the Customer. In a study in the area of telecommunications, Youngs (1977) found that the pressures and pleasures of working with customers form an important part of the clerks' evaluation of their jobs.

Some evidence also exists on the kinds of customers that the clerks like to deal with. Youngs (1977) makes the following observations on this subject. Clerks like customers who act according to expectations, are unusually helpful, and are particularly appreciative. Clerks dislike customers who cause delays and who engage in fraud. Maldé's work (1975b) with airline booking clerks also addressed this issue. His findings were that the 'ideal' customer was described as one who:

a) knew what he wanted and/or "appreciated our side of things".
b) was pleasant, polite, well-mannered, and/or patient.
c) was interesting.

The 'anti-ideal' customer, on the other hand, was one who:

a) was arrogant, dominating, a talking-down, know-all type.
b) was unreasonable in his demands.
c) was impatient.
d) was stereotyped, cold and dull.
e) was unsure of his needs.

It seems that there is another issue behind the clerk's overt statements about customers. Maldé's findings outlined above were difficult to interpret as they stood. However, an individual analysis of clerk's reactions across other issues suggested that the clerks depict two kinds of orientations: person-centred or efficiency-centred. The person-centred clerk prefer dealing with friendly, interesting customers. The efficiency-centred clerks, on the other hand, prefer dealing with the quick and concise customers. Youngs' (1977) observations also seem to suggest a similar framework. He suggests that clerks evaluate their work in terms of speed, errors and courtesy, and pleasures and pains of dealing with customers. However, since Youngs does not go into an individual analysis but seems to deal only with aggregate results, we do not know whether each clerk depicts a joint person/efficiency orientation, or whether clerks seem to favour one or the other of the person and efficiency parameters.

2.1.3 The Customer

Evidence is scanty on the subject of the customer's needs and aspirations, but there are suggestions that it may be wrong to presume that all a customer wants is his basic needs met as efficiently as possible.

For instance, let us consider the 'basic need' in the relatively simple matter of placing a phone call ('simple' in comparison to other customer activities such as house-hunting and job-hunting). One may argue that all the customer is interested

in, is to contact the person he is phoning, regardless of the means by which he achieves this 'basic need'. This is to say, that given a choice between being able to dial directly, or to be connected by the operator, customers would prefer the former. However, Youngs (1977) concluded that although customers generally accept automated operator service,

> "many of those we have interviewed stated strong preferences for operator service".

Unfortunately, Youngs does not go into percentages, but we may interpret 'many' to mean, at least a substantial minority.

Detailed explorations into customers' aspirations are few and far between, but there are suggestions that customers, like clerks, may be considered to lie along person or efficiency orientations.

The issue lies implicit in one aspect of the work by Miller and Rice (1967), which also seems to suggest that it may be wrong to think that all a customer wants is the service. Customers, who were interviewed in a laundry service study, praised a local laundry offering a valeting service. They knew that the cleaning was carried out by a larger parent company, but this they chose to label as "cheap and garish" or that "they never get things properly clean". Even when evidence was offered to the contrary, or the logical discrepancy was pointed out in labelling one as "clean" and the other one as "dirty", they would persist with their original evaluations with comments such as "but the clothes have such a beautiful appearance when you collect them". "The idea

of individual personal service went so far with some customers that they displayed manifest guilt if they used more than one shop, or if they changed cleaners. Quite clearly, the feelings being expressed were about something other than a convenient utilitarian service" (underlining added by the author). The first underlined phrase may be interpreted as a typical disposition of a person-centred customer, while the second as that of an efficiency-centred customer. More detailed observations have been possible in this area, in Maldé's work (1976). Malde found that the efficiency-centred customer, although influenced mostly by technology, was particularly attracted by the combination of an efficiency-centred clerk and computer technology. The person-centrec customer, on the other hand, was generally attracted by the person-centred clerk.

2.1.4 Summary

We will summarise the needs and aspirations of customers and clerks as:

1) a shared desire to resolve a task.
2) to have pleasurable experience of task-resolution either
   a) by person-related qualities of the encounter, or
   b) by efficiency-related qualities of the encounter, or
   c) by both person- and efficiency-related qualities of the encounter.

2.2 THE EXTENT TO WHICH TECHNOLOGY HAS MET PEOPLE'S NEEDS AND ASPIRATIONS

Let us accept the proposition that:

a) Technology should attempt to meet people's needs and aspirations.

b) Technology performing any other function, should not interfere with people's needs and aspirations.

The previous section introduced us to what these needs and aspirations are to which technology should answer. Hence, the last section could be taken as a basis for 'what should have happened'. This section will look at evidence on 'what actually happened'. We shall confine ourselves in this section to the actual evidence; an appraisal of the evidence will be presented in the next section.

2.2.1 General

In most developed societies the primary needs of people seem to be well-met. A wide variety of jobs exist, while the society attempts to take care of the jobless through welfare schemes. In the meeting of health and safety needs, technology has provided a particularly efficient solution in protecting the individual, where possible, from demanding and detrimental aspects of physical work. In addition, 'clean technology' is expected to provide for pollution-free environments, in the years to come.

On the negative side, there has been substantial evidence of redundancies brought about by automation, through the years down to the present day (e.g. C.I.S., 1976).

The success of technology at meeting people's secondary needs, on the other hand, has not been all that promising.

Withers (1976) makes several observations on this subject. Modern technology has produced various kinds of human costs:

a. work is de-humanized.
b. advanced technology, has created "an intense centralization of control". This makes "the victim powerless even to state a case or convey his feelings".
c. pace accelerates.
d. scales (including time scales) enlarge far beyond comfort.
e. "people become lost in organisations".
f. meaningful concrete tasks have become meaningless, because they are fractionated or purely symbolic.

Withers notes, particularly as applies to the process operator, that modern technology has produced the following effects:

a. the lack of physical contact with the process.
b. workers reduced to mere watchers of dials and pressers of buttons.
c. "stressful occupation" and boredom of operators in central control rooms.

There is evidence to suggest that many of the repercussions are not purely technological, but more technological/organisational. Examples of such effects, derived from Withers' (1976) observations are:

a. "people become lost in organisations".

b. "intense centralisation of control makes the victim powerless even to state a case or convey his feelings".

c. remoteness between affectors (central design team) and those affected (operators).

d. social divisiveness, "particularly in respect of the very sharp boundary between the process worker and those few at the top ..."

With large organisations, besides the problems associated with dealing with large numbers, there are also the problems associat with tackling an organisation's complexity. To this end, the mis-application of present day technology may be attributed to attending to only one piece of a large and complex jigsaw. For example, commenting on a Steel Industry case-study (Bibby, 1976), Schuh and Sprague (1976a) interpret the failure of technology thus:

> "the application of technology ... is inefficient, even absurd, when problems of competence, communication, job design, and job satisfaction have not been recognised and/or solved beforehand".

2.2.2 The Clerk

Whereas a lot of the preceding evidence could be regarded as true for the blue-collar worker, some observations also extend to the case of the white-collar worker which is the class of workers to which the clerk belongs.

For example, there is some evidence of the issue of job-reduction. There is a considerable effort currently devoted to

the removal of the intermediary altogether, for example, in the area of telecommunications (e.g. Youngs, 1977 and Strasser, 1977). Increased possibilities provided by advanced technology is making this replacement possible, and the reasons are mostly commercial and seldom humanitarian. As Karlin (1977) has noted, the shift to automated operator services is primarily "to offset sharply rising labour costs".

On the other hand, Withers (1976) has noted, as applies to the white-collar worker the creation of 'office factories' where the number of clerks, has increased rather than decreased. However, according to many clerk-researchers (e.g. Mumford, 1965), 'office factories' of the kind to which Withers refers are characterised by the creation of boring and monotonous jobs such as data-handling. Youngs (1977) seems to be predicting clerk dissatisfaction in another way. According to him, automation will:

a) remove from the clerks, short, trouble-free kinds of enquiries, which the clerks like at the moment.
b) leave the clerks with the more difficult kinds of enquiries, which the clerks do not like at the moment.

On the positive side, computers seem to be providing for satisfaction for the white-collar sector, mostly through the prestige associated in working with advanced technology. According to Withers (1976), the computer has, on the whole, provided for work satisfaction. Another report (WRU, 1976) concludes that the satisfaction of consumer clerks in an Electricity Board case-study,

has improved with computerisation. The clerks find that:

a. they are better able to tackle problems of the customers.

b. there is a new and increased prestige in working with the computers.

There is little in literature that addresses the issue of clerk satisfaction/dissatisfaction associated directly with the shift from manual to computer technology. Maldé (1975b), in a field study of airlines intermediaries comes closest to this address. The intermediaries under study had work-experience in 3 situations,

a) manually-operated counter.

b) computer-operated counter.

c) telephone-selling.

(a and b were face-to-face encounters; c involved dealing with the customer through the telephone.)

Three main findings were that:

a) the clerks unanimously disliked telephone selling.

b) most clerks were happy working with manually operated counters.

c) the computer-aided counter received mixed views. The person-centred clerk preferred working with manual technology. The efficiency-centred clerk, especially when customer frequency was high, preferred working with computer technology.

Drawing on both field and experimental findings, there were also suggestions of how computer technology is general, and the underlying values governing system design in particular, seemed to suit the efficiency-centred clerks and customers alike more than the person-centred clerks and customers.

2.2.3 The Customer

Evidence on customer satisfaction, in the main has been lacking. There is a noticeable emphasis in the research on customers towards commercial objectives such as those of market researchers. The few studies which refer to the customer's viewpoint, and which are motivated by objectives other than commercial, offer evidence that is derived more from assumed or inferred premises, than by more direct methods.

Literature offers mixed evidence on the topic of technology and customer satisfaction. According to Withers (1976), while computers have meant job creation and job-enrichment to the white-collar sector, customer satisfaction has generally decreased. Another study (WRU, 1976) takes the opposite view. It concludes from an Electricity Board case-study, that the introduction of the computer has meant "a vast improvement in customer service".

Fewer studies still, address the issue of 'technology that is a pleasure to work with'. One piece of research comes closest to this issue (Schoeffler, 1977). Schoeffler's work on the effect of type of telephone on the customer's annoyance when placing a telephone call, suggested that the customers generally favoured the push-button type of telephone over all others.

We shall treat the evidence presented in this section as a basis from which to draw implications, generally and specifically, for double-interaction.

2.3 APPRAISAL OF THE PEOPLE-TECHNOLOGY FIT

The fit may be assessed with the conclusions of section 2.1 serving as a basis for people's needs and aspirations, and the preceding section (section 2.2) as the evidence for the extent to which technology has met these.

Table 4 summarises the implications of this evidence especially as relevant to double-interaction.

2.3.1 General

Technology seems to have provided, or seems well placed to provide in the recent future, for the primary needs of people in mos developed societies. Its success has been limited however to one area which may be interpreted as a 'primary need' - this is the need for man to be employed.

Its success has been more limited in meeting various secondary needs of people.

Two points are important to note. The design of technology does not seem to stem directly from the needs and aspirations of people. Secondly, technology seems to be growing more and more complex. Although addressed to telecommunications technology,

Table 4: An Appraisal of the People-Technology Fit

People's satisfaction:	Evidence/Indications		
	for the better	for the worse	mixe
General			
1. Primary needs	✓		
2. Secondary needs		✓	
3. Man's links with environment		✓	
Clerk			
1. Job creation		✓	
2. Job enrichment			✓
3. Prestige	✓		
4. Clerk's individual aspirations:			
general			✓
person-centred		✓	
efficiency-centred	✓		
5. Clerk's relation with customers:			
general			✓
person-centred			✓
efficiency-centred	✓		
6. Clerk's power over technology		✓	
7. Clerk's relation with technology:			
general			✓
person-centred		✓	
efficiency-centred	✓		
Customer			
1. Customer's aspirations:			
general			✓
person-centred		✓	
efficiency-centred	✓		
2. Customer's relation with clerk:			
general			✓
person-centred			✓
efficiency-centred	✓		
Clerk-Customer			
1. Clerk's and Customers' pleasures at working with technology	neglected issue		
2. Customer satisfaction generally	neglected issue		
3. Clerk-Customer encounter	neglected issue		

Conrath (1977) could have been referring to present-day applications of advanced technology in general , when he remarked:

> "technology is increasing in complexity. Significantly a rapidly growing number of options are being made available to the commercial customer, but without an adequate basis for determining whether or not these really meet his needs".

In the planning of effective double-interaction, we also need to be aware of a critical implication for present-day society. We saw in section 2.1 the paramount need for Man to relate to his environment. Conrath's statement (see above) points to the feature that technology is ever-increasing in complexity. Few people seem to be concerned about the extent to which this may lead to a complex environment for an individual to exist in, and how this could strain his need to relate to his environment and to draw meaning from his environment.

2.3.2 The Clerk

The only way that technology may interfere with a clerk's primary need, is through the possibility of lost jobs. The intermediary in double-interaction is likely to face the danger of redundancy as more and more ways are found of exploiting advanced technology (e.g. Karlin, 1977).

If it is important for Man to relate to his environment, and if work offers a major platform for Man to meet this objective (section 2.1), then the removal of the intermediary may not be a desirable prescription. Indeed, much more may be lost. There is a unique role that the intermediary can play in meeting the needs of the public - not the least being one of dealing with a wide variety of people having a wide range of individual needs. Whereas the primary function of an intermediary may be transferred to advanced technology, there are limits in its capacity to deal with many of the secondary functions (personal and human interaction, discretion, accommodation, etc.) that an intermediary almost automatically performs and is often naturally suited to performing. If management and system designers aim to provide the customer with a service that is as complete as possible in meeting his needs as well as his aspirations, they may draw a great deal of support in their objectives from an intermediary-computer unit rather than a computer on its own.

Apart from the possibility of jobs being lost, technology seems to provide well for the primary needs of the clerk in double-interaction. In the case of the secondary needs, evidence is not as clear-cut and technology seems rather to create a lot of adverse effects.

Let us first consider briefly the issue of work satisfaction. There is some evidence that computers do provide for work satisfaction in the form of increased prestige associated with working with computers. For other aspects of work satisfaction, there is a danger of intermediaries being reduced to mere watchers of dials and pressers of buttons, such as Withers' (1976) process controllers. On the other hand, there are pleasures associated with dealing with customers, and WRU (1976) particularly highlight a case where technology has actually provided for work satisfaction as the clerks now find that they are better able to help their customers. Hence, the point to note is that computers do have the potential to provide for work satisfaction that goes beyond the provision of increased prestige, but that it is the application of technology that is a critical factor. This is one of the major areas needing very careful considerations in all future design of double-interaction situations. The issue is one of allocation of functions. Increased possibilities of what technology can do may tempt the system designer to pack his piece of technology with a multitude of facilities and features such as characterize, for example, some word processing technologies that have begun to appear on the market. Such a design of technology may pay little regard to some of the aspects of the word processing operator's work that he found particularly interesting, and which the previous technology allowed him to perform, but which was now 'taken over' entirely by the new technology. If one treats the intermediary only as an 'operational component' then this would justify technology performing as many functions as possible, and

the intermediary being reduced to a mere watcher of dials and presser of buttons. We could rest easy if the intermediary was indeed just an 'operational component'. But as we saw in section 2.1, the intermediary, as a member of the human race may be a great deal more. Once the novelty of the new technology is over, the intermediary may soon begin to be affected by the restrained variety offered by the prasent work. Secondly, and more importantly, he may soon find himself to be highly dispensable. Hence, technology does have the basis for providing work satisfaction, but it is the way it is applied that will finally dictate how much satisfaction an intermediary will derive from his work.

It was seen under the 'general' consideration, that the development and application of technology may be outpacing the needs and aspirations of people. There is another possible repercussion of advanced technology which is more directly related to a clerk's work. Evidence suggests that often, the clerk has limited power over the behaviour of technology. It is not simply that computer technology is advanced, but it is also complex, and its working is not always entirely clear. If something goes wrong, or if the clerk desires his technology to behave in a certain way, he is normally restricted in being able to do anything about it. Systems designed on a system-first principle may be particularly prone to such effects, while a more user-centred thinking employed in system design should, it is thought, lend considerable support to the clerk in his work. To this end, double-interaction situations should aim at providing the kind of technology that the clerk can control, rather than for technology to control the clerk.

This brings us to the clerk's pleasures with dealing with his customers and the extent to which technology promotes or interferes with these pleasures. There is evidence to suggest that clerks aspire to provide a satisfactory service to the customer (Youngs, 1977; WRU, 1976). There are some positive signs that advanced technology can provide the clerk with the means of providing a better service to his customer (e.g. WRU, 1976). However, design of current systems seem to be guided efficiency-related principles only and therefore seem to suit the efficiency-centred clerks more than the person-centred clerks (Maldé, 1975b). Hence it seems that if the system has been designed to meet a primary objective of fast and accurate execution of task, then it will suit the clerk who shares and is naturally suited to this objective. But there is the other kind of clerk whose person-centred values seem little reflected in the design of such systems. Hence the pleasures associated with working with modern technology are different for different clerks. The efficiency-centred clerk finds the computer a boon to his own orientation, the person-centred clerk has reservations about advanced technology. Once again, the solution seems to lie in a joint person- and efficiency-thinking underlying the design of technology. If the technology is designed to be customer-centred, so as to provide various ways to support the customer-centred role of the intermediary then it is thought that such technology would go a long way to winning both parties. The efficiency-centred clerk seems to be

attracted primarily to computer technology per se, for its capacity to process efficiently. The person-centred intermediary would begin to derive pleasure from using technology that supports, rather than interfere with, his conduct with customers.

As for the problems of large size and complex inter-relationship between parameters from which many organisations seem to suffer (e.g. Bibby, 1976), double-interaction seems to a large extent to be free from these. This is mainly because the double-interaction clerk mostly exists in small working units, at times even single-person units, in sharp contrast to the factory floor situation or even the white-collar 'office factory' situation.

However, there are two ways in which this aspect may still affe the work satisfaction of the clerk and the customer. Centralised data banks have led to the notion of centralised control from a distance, and the clerk may find himself restricted and helpless in the way technology is affecting his work and conduct with the customer. The second feature, and closely related, is linked to the large distance between affectors and affected, that Withers (1976) points out. If the design team is far-removed from the actual work station, their task interpretation may also be far-removed from the 'grounded' task, and subsequently the system design may succeed in meeting some other task or a set of needs and aspirations which are not necessarily those of the clerk and the customer. An example is presented that may illustrate, although simplistically, both the implications of centralized control and inadequate task interpretation. A customer cannot find out, from

a bank in Loughborough, whether certain amounts of money have been credited to his account a few days earlier by a company, without first having to wait a few more days, because only the central base can provide a statement that would answer the query, and this would have to be posted to the customer.

This brings us to the implications as regards the double-interaction customer.

2.3.3 The Customer

Withers (1976) notes that customer satisfaction has generally decreased, with the introduction of advanced technology. In contrast, another report (WRU, 1976) seems to suggest an improvement in customer satisfaction. An important contributor here may be a case of systems answering more to one kind of customer only. Systems designed on efficiency lines will suit the efficiency-centred customer. The same system may fall short of meeting the aspirations of the person-centred customer who may be concerned, for instance, with the accelerated pace of transaction or with a transaction reduced to meeting only the primary function. Customer-centred technology, i.e. technology specifically designed to serve the customer, seems the required solution for meeting the needs and aspirations of both person-centred and efficiency-centred customers. However, in the light of the lack of guidelines that literature offers, we need a more detailed account of a customer's orientation to his task, and in particular, whether his person/efficiency orientation is a joint or a partisan orientation. Chapter 3 shall attempt to address these issues. Chapter 4, on

the other hand, shall attempt to deal in greater detail, with the subject of 'customer-centred technology'.

We may finally note the general lack of evidence on three topics:

a) clerk's and customer's pleasures at working with technology.

b) customer satisfaction generally.

c) clerk-customer encounter.

This constitutes evidence that the objective of management and manufacturers seem to be related to efficiency and cost-saving, which does not permit consideration of 'soft' issues such as those outlined above. However, if society is to meet its overall needs, as well as the needs and aspirations of its individual members, technology and services designed on solely efficiency-thinking may fail to address a host of other kinds of aspirations, which also exist.

2.4 CONCLUSIONS

At this point, it may be relevant to outline the kind of conclusions that QWL theorists and practitioners reach in their recent appraisals of the QWL state of art.

Davis and Cherns (1975) list as the critical issues facing the seventies:

a. the view of "men as spare parts in dead-end, locked-in jobs, or as operating units, to be adjusted and used for the industrial needs of Society".
b. Industrial culture encroaching on workers as well as clients.
c. "The spreading of advanced technology is absorbing routine activities giving rise to fears over availability of jobs, since men are still seen as competing with, rather than as being complementary to, machines".
d. "Accelerating change in technology raises questions of how to develop flexible people and organisations".

Shuh and Sprague (1976b) summarise the need to shift from a strategy in which we:

> "introduce technology for productivity/efficiency reasons, and then observe and attempt to deal with Social and Human consequences".

to a strategy in which we:

> "introduce technology for human, social, reasons, and then observe and attempt to deal with the productivity/efficiency consequences".

They also make the following detailed recommendations. It may be noted that the term 'control engineer' could apply equally well to 'system designers' and 'management'.

"a. In designing automation systems, the control engineer should consult with and encourage the active participation of all people who are or will be involved in the system.

b. In designing automation systems, the control engineer should not restrict the amount of information about the system; on the contrary, he should provide all people involved in the system with as much information as possible.

c. In designing automation systems, the control engineer should consult and co-operate with suitably qualified social scientists and trade union representatives in order to produce more effective systems from a human standpoint.

d. In designing automation systems, the control engineer should be encouraged to take advantage of the unique capabilities of man, to enrich man's role in the system. An important objective of the system should be greater humanization and opportunity for human self-actualization and growth.

e. The control engineer should give serious consideration to re-orienting and re-shaping his profession and its educational base to include exposure to economic, social, and psychological factors; failure to incorporate such aspects in his thinking and activity will severely limit the effectiveness of his designs."

(Schuh and Sprague, 1976c.)

There seems to be a general feeling that present-day applications of technology and work design principles seem to be based on an over-reliance placed on 'hard measures' (e.g. output, time taken, errors, etc.), and at the neglect of 'soft measures' (e.g. pleasure, motivation, interest) which may be equally, if not more important. Primary reasons for this imbalance are the measurability and predictability issues associated with hard and soft measures. (The former are easily and readily measurable and predictable, the latter are neither.) As Davis et al. (1955) put it:

> "Since motivation cannot be relied on, management depends upon technical improvements for improving performance".

And again, Klein (1977) remarks on system design generally that,

> "... the less easily measurable aspects of human behaviour create anxiety for engineers, who have therefore tended to make use in their design thinking of only those human characteristics to which engineering type measures could be applied".

It is clear that QWL is a complex state of affairs and there exist no easy answers. There cannot be 'easy answers' if one recognizes the magnitude of the question 'what makes Man tick?' which continues to be an unresolved issue for theologians and metaphysicists let alone scientists. As Schuh and Sprague (1976a) remark:

> "... there is no simple formula for evaluating these consequences and no uniform answer to the relationship between new technology and work changes".

If we are in the business of creating technology and environments that answer to the needs and aspirations of people, we must accept that this is a challenging mission and one must not expect, nor even look for, 'easy answers'. A healthier attitude to take would be not to aspire towards a 'simple formula', but to look for guidelines instead. It may be more important to recognize the primary parameters at work and to consider the ways in which these may be worked upon to enhance work satisfaction. This kind of awareness, more than anything else currently in existence is likely to take one nearer the 'solution'.

What then are these primary parameters? From the foregoing evidence, it is evident that most of the conclusions point towards considerations of both social and technical kinds. This is the approach of the socio-technical theorists (e.g. Herbst, 1974) who base their thinking on the principle of joint optimization of technical and social systems in the successful achievement of organisational goals.

This prescription is a general prognosis i.e. true for work design in general. In the context and scale of double-interaction, this principle has interesting links with the joint optimization of person- and efficiency-considerations, a theme that was developed in the previous sections. One prescription by the socio-technical

theorists is the need to make sure that as organisational goals and values change, so do those of the workers of the organisation. In the double-interaction context, it is interesting to note the parallels with the need for consonance between the values of the management and system designer, and those of the intermediary and the customer.

2.4.1 Guidelines for the application of technology and design of double-interaction situations, aimed at promoting work satisfaction

We may note the guidelines as suggested by Emery and Thorsrud (1969) presented on page 52, to stand for general recommendations for work design.

In the specific context of double-interaction, we may add the following points derived from the evidence and discussions of sections 2.1, 2.2 and 2.3.

a. to employ a joint person- and efficiency-thinking in the design of double-interaction technology and work situation.

b. to recognise that the presence of a human intermediary between the computer and member of the public may be an essential ingredient for achieving the desirable balance between person- and efficiency-considerations.

c. to attend to intermediary's and customer's needs for power and relevance by encouraging smaller autonomous working units.

d. to design and evaluate success of technology based on both the acceptance by the intermediary and the customer, as well as on overall organisational objectives.

e. to involve the intermediary and the customer in design and evaluation process.

f. to design technology from which its users can derive a distinct sense of pleasure. To attempt to build into technology, the basis for an enjoyable task.

2.4.2 Summary

The need for and design of technology in the double-interaction context, must stem directly from the needs and aspirations of people: society at large, and in particular, the general public and the intermediary. It must attempt to promote, or failing this, to be free from interfering with, the needs and aspirations of the general public and the intermediary. In particular, it must attempt to provide for both customer and intermediary:

a. a basis for a desirable level of task resolution.

b. a basis for a pleasurable experience of task resolution.

c. a basis for fostering, without straining, man's links with his environment.

2.5 WHERE HAVE WE REACHED?

It may be remembered that we concluded at the end of the introductory chapter, with a number of issues ranging from general to specific, that warranted research. It is hoped that this chapter and chapter 5 (discussion) will provide the general context in which the design of double-interaction may be undertaken. In particular, we have attempted to establish the meaning of the basic relationship between design of technology and work, and people's needs and aspirations. In the course of this chapter, we came across certain issues for which literature can provide few answers, if at all. Particularly when addressing the needs and aspirations of customers, there was little in the literature that could assist us with the nature of the relationship between customer and his task encounter. We shall attempt to explore this in Chapter 3. Chapter 4 will address the issue of the kind of technology needed in double-interaction context that would be of optimal satisfaction to customers. Finally, in chapter 5 we address a few related issues in greater detail, including the significance of the human intermediary in the public use of computers, an issue which was also of concern to us in this chapter.

Plan for Thesis

1 Introduction
2 Impact of Advanced Technology on Work Satisfaction
3 The Public in relation to their Task Encounters
4 Task Interpretation, System Design, and the Customer
5 Discussion
6 Conclusions

Plan for Chapter 3

3 THE PUBLIC IN RELATION TO THEIR TASK ENCOUNTERS
3.1 Introduction
3.2 Method
3.3 Treatment of Data
3.4 Results
3.5 A Supporting Study
3.6 Discussion
3.7 Summary and Conclusions

CHAPTER 3: THE PUBLIC IN RELATION TO THEIR TASK ENCOUNTERS

3.1 INTRODUCTION

We set up at the end of Chapter 1 (sections 1.7.1 and 1.7.4, and Figure 7), as one of the goals, a need to examine in detail, the nature of the relationship between the public and the task encounters in which they engage with members of service giving organisations.

The relevant task encounters from which all present and future double-interaction encounters are likely to derive, may be illustrated by the following:
Information seeking, advice seeking, problem-solving or financial dealings with:

The Bank

Insurance

Employment Exchange

Citizens Advice

Recreation Centres

Purchase of items

The Doctor

3.1.1 Background

The need for an exclusive examination of how the public relate to such task encounters may be justified as follows:

First, the user viewpoint is one of the primary pre-requisites of any ergonomic design. If we are to provide for task encounters that would be meaningful and suitable to the public, we need to know what the public expect from such encounters. This can be undertaken by a review of the constructs (to be explained) they attach to such encounters.

Secondly, while the theme that the interacting participants in double-interaction orient themsleves to person-centred or efficiency-centred values has already been developed to an extent, hitherto, research has focussed mostly on intermediary orientation. Similar evidence on Customer orientation in other field studies does exist, but only in the form of secondary findings, which are only briefly mentioned (e.g. Miller and Rice, 1967).

Thirdly, the elicitation of customer-orientation in the experiment by Maldé was based on a self-report questionnaire. There was the danger here, however, as is common with most other questionnaires, of imposing a structure on the subjects and of using terms not necessarily meaningful to their own frame of reference. There was a need to test this theme on an open-ended basis.

Fourthly, the most closely approximating work in this area, is too general to be of any useful significance to the understanding of task encounters. Little (1969) has observed that people construe their world either in terms of physical properties or in terms of psychological properties. He projects this as a general theory of how people construe other people and objects comprising their world. However, Little has not developed this theory in a way which allows us to predict how it will apply to specific task encounters. Additionally he does not address the

issue of a person's need for efficiency, and we can only hypothesise that an object-centred person is also an efficiency-centred person. There is also a fallacy in the interpretation of Little's work. Some observers have interpreted Little's theory to mean that people are either 'people-centred' or 'thing-centred'. Taking it further, they have begun interpreting that given a choice between people and objects, people-centred people would choose people while 'thing-centred' people would choose objects. This is an erroneous interpretation, and Little makes no such claim in his theory.

Fifth, Maldé's earlier work was associated with a specific encounter - train travel enquiries. There is a need to explore whether person-centred and efficiency-centred orientations reveal themselves in the context of general task encounters.

Sixth and finally, besides the need for a broadly hypothesis-testing purpose even more important is the need for an exploratory study. To meet the aims of the thesis, we need to examine the model of person- and efficiency-centred orientations, in greater detail, as well as to tackle other issues relating man with his task encounters. Before summarising the aims of the study, let us briefly look at what we already understand about person- and efficiency-orientations. This has been developed from Maldé's earlier work (1975a) which has been described in some detail in the first two chapters.

We may summarise the portions relevant to this chapter in the following way. Most customers participating in task encounters commonly share, at least to a degree, the aspiration of task resolution, some knowledge of the task at hand, and the priority in which the task is held. Beyond this however, the expectations seem to vary. The person-centred customer looks for the person-related aspects in the encounter: such as, for example, his own feelings and disposition, the appearance and personality of the other person, aspects relating him and the other person, the novelty of the encounter, etc. The efficiency-centred customer on the other hand, looks for the efficiency-related aspects in his encounters: such as, for example, the time taken and speed of executing the enquiry, the distance travelled to accomplish the task, the ease of execution, and the convenience.

3.1.2 General Hypothesis

It is possible to classify the customers along person-centred or efficiency-centred orientations by a review of the prominent constructs they attach to their task encounters.

3.1.3 How can we test the hypothesis?

Explanations of the term 'construct' followed by the description of the repertory grid technique (Kelly, 1955) should demonstrate the suitability of the technique to the nature of hypothesis-testing being undertaken here.

A 'construct' is basic to Kelly's (1955) model of man. Simply put, it is a term of reference, of an individual's own making, by which he attaches meaning to aspects of his environment. A 'prominent construct' is one which has prominent strength, or one which offers strong meaning, to the representation of the environment by the individual.

The repertory grid technique is closely linked to the theory of George Kelly (1955), and was developed by Kelly and his disciples (e.g. Bannister and Fransella, 1971). The essence of the theory has already been covered (Chapter 2, section 2.1.1). It is more important, here, to understand the role of the repertory grid technique. The technique provides one with a way of gaining some insight into the meaning structure a person employs in interpreting his environment. The mechanism with which one can do this, is to provide a set of 'elements' (objects, people, pictures, statements, etc.) for the person to compare and to suggest how all elements or different sub-sets of elements, may be linked together. He does so by eliciting 'constructs'.

The technique may be used for many kinds of research. Marketing researchers, for example, have used as elements, a range of products or brand names. In the present study, we may use as elements some examples of task encounters, each represented by a brief description.

The elements in a repertory grid exercise, may either be imposed or elicited. The aim here is to leave the customers as unrestrained in their task as possible. Similarly, some researchers have found it suitable to impose constructs. However, the needs of this study clearly justify constructs to be elicited. By adopting the less restrictive option, we may have greater confidence in the findings than in the case where elements were imposed, or where constructs were presented to the customer.

We come to the question of how we may interpret the constructs thus elicited. This may be based on our current ideas on the nature of person/efficiency orientations as summarised in the latter part of section 3.1.1. A more detailed treatment of the classification of individual constructs will be given under 'Treatment of Data'.

We are now in a position to outline the full set of aims that the application of the repertory grid technique should enable us to pursue.

3.1.4 Aims of the Study

To attempt to obtain answers to the following questions:

a. How valid is it to classify the customers' orientations along person- and efficiency-lines, or are there other interpretations of the evidence?

b. To what degree does the nature of their prominent constructs suggest a partisan (person or efficiency), or conversely, a joint (person and efficiency) orientation?

c. Are there any aspects of the person/efficiency model that need refinement?

d. Are there any noticeable similarities, or dissimilarities, in the use of the constructs?

e. Are there any similarities/dissimilarities in the types of task encounters, that people do, or do not, enjoy?

f. The general public represent a wide variety of people. Are there any similarities within sub-groups derived from the general public?

3.2 METHOD

Twenty subjects, hereafter referred to as Customers, from the Loughborough population (10 University students of mixed disciplines, 10 non-students of mixed occupations; see Appendix 2) formed the experimental sample.

Each was asked to suggest 5 recent encounters in which he as a customer, was involved in an enquiring, purchasing or a negotiating activity. The five examples were represented as 'elements' on five cards. The customer was then presented with 3 of these, which he was asked to study in order to 'suggest one major way in which he thought two were more alike and different from the third' in keeping with the classical repertory grid

approach. The customer was asked, on producing a construct, to rate all the 5 elements along the elicited construct on a scale of 1 to 5. The test was extended to 10 triad presentations which is the maximum number that can be derived from 5 elements. As a final instruction, and in order to obtain the customer's evaluation of the task encounters, he was asked to rate all the 5 elements on a construct of his choice such as 'enjoyed - did not enjoy' or 'liked - disliked'. This was done whenever such a construct had not already been elicited from the customer. The constructs, as well as the elements, could then be reviewed in the context of this rating.

3.3 TREATMENT OF DATA

The data was processed in the following stages:

3.3.1 Development of Subject Construct Matrix

Each customer's recording sheet (see Appendix 3) typically contained a 5 x 10 (or 5 x 11) matrix with elements A to E as the columns, and 10 (or 11) constructs as the rows. After each triadic presentation, a construct was elicited and the 5 elements were rated alongside the construct in the 5 cells of the attached row. Thus, the recording sheet when complete, would have 50 (or 55) cells consisting of values from 1 to 5.

The recording sheet was converted into a construct matrix by a computer program. Briefly, the program obtains the correlation between each pair of constructs, by calculating the absolute difference between ratings for the 2 constructs. An

integer value is thus obtained which represents the correlation between this pair of constructs. It repeats this for all the possible pairs of constructs, for each customer in turn. The comprehensive results for each customer are then cast in a 10 x 10 construct matrix (or 11 x 11, if there are 11 constructs).

The construct matrix thus displayed the association values for all the pairs derived from the 10 (or 11) constructs. (Each customer record in Appendix 4, bears the associated construct matrix.)

The lowest value (0) constitutes the highest correlation.

3.3.2 Derivation of Prominent Constructs

Each construct elicited in a grid can be examined in terms of the strength with which it influences an individual's meaning structure. Hence, the constructs for each individual may be seen as comprising 'prominent' and 'weak' constructs. The data gathered from each customer was reviewed for its prominent constructs, that is to say, those that were of greater importance to his meaning structure. This was done by examination, primarily of

a) dominant constructs, and supported by

b) sensitive constructs.

3.3.3 Dominant Constructs

The 'dominant' constructs, are the one(s) which match most strongly with all other constructs, and hence may be interpreted as constructs with the greatest influence, over the entire system of constructs. In the construct matrix, the dominant construct is depicted by the lowest column or row total.

3.3.4 Sensitive Constructs

The preference rating of each customer was examined and the most and the least preferred encounters were singled out. The elicited constructs were then examined for their relationship with the most and the least preferred encounters. The constructs with the largest swing as they moved from the most to the least preferred encounters were singled out from the rest as 'sensitive constructs'.

The prominence was derived jointly from dominent and sensitive constructs except for the case where the number of dominant constructs alone was considered sufficiently large (3 or more) to attempt to classify the customer.

3.3.5 Derivation of Customer-orientation

The constructs were examined and classified according to the guideline in Table 5, which is developed more fully in the next paragraph. The dominant and/or sensitive constructs regarded as the strongest indicants of the customer's orientation, were reviewed as a whole, for each customer, to depict his orientation. This classification was further substantiated by

cross-referring with the associated cluster graph for the customer. (A cluster graph is simply a graphical representation of the relationship between constructs as depicted numerically by the construct matrix.)

The existence and the nature of person- and efficiency-orientations has been described at various stages of the thesis. Here the characteristic differences of these orientations may be considered in some detail, so as to assist with the classification of constructs for each customer.

We may summarise the 'basic function' that unites both person- and efficiency-centred customers as consisting of the type of task and the priority attached to the task. (These appear as B2 and B1 respectively in Table 5.)

The person-orientation is characterized by a marked affinity with the person-aspects of the transaction and the situation. With 'person' as the focus, we may develop the orientation, by elaborating on the word 'person'. Hence, person-aspects may range over the customer's own feelings, his impressions about the other person, and the relationship with the other person. These appear in Table 5 as P1, P2 and P3. P5 is introduced to denote a multiple classification of two or more aspects of P1, P2, and P3, or to represent a construct relating to the Person, but which is not clearly classified by the first three categories. Some of the person-centred intermediaries in the field study

B = Basic function: the task at hand B1 = Priority B2 = Type of Task
P = Person P1 = the Self, the way I felt P2 = the Other Person P3 = relationship between the Self and the Other Person P4 = novelty of event or encounter P5 = to do with the person
E = Efficiency E1 = time taken, speed E2 = distance E3 = convenience E4 = ease of execution E5 = to do with the transaction
X = unclassified

Table 5: A framework for reviewing the Personal Constructs to derive Customer Orientation

(Maldé, 1975b) enthused over another kind of person-aspect. This is the interest or the novelty element of the encounter (P4). This construct highlights one aspect of person-orientation, that the situation receives a subjective evaluation extending much beyond 'the task at hand' as the latter is understood to mean conventionally.

This brings us to the efficiency-orientation, where the reliance is much more directly related to 'the task at hand'. Efficiency may be considered in one major way as the least effort expended to meet a set of objectives. Effort-saving considerations may thus include time taken and speed (E1), the distance travelled (E2), the closely related aspect of convenience (E3), as also the ease of execution (E4). This leaves one finally with the characteristic which is somewhat opposite to the last point considered under person-orientation. This is that the person-centred seemed to be attracted by subjective aspects other than aspects purely to do with the 'task at hand'. The efficiency-orientation on the other hand seems predominantly concerned with the task at hand and hence E5 may stand for all such aspects regarding the transaction which other categories cannot clearly account for. This may comprise various kind of transaction requirements including the precision with which the objectives are interpreted and the precision with which the service is provided.

Finally, we may denote all those constructs which lie outside the range developed so far, as 'X' to stand for 'unclassified'.

Having classified each customer's prominent constructs in this manner, we may then interpret from the preponderance of one kind of construct whether the orientation of the customer is:

a) person-centred,

b) efficiency-centred,

c) mixed, or

d) neither.

3.4 RESULTS

Table 6, gives the breakdown for each customer and his orientation. Table 7 summarises the distribution of customer orientations. (The reader may wish to refer to individual data on customers which appears in Appendix 4. This consists of a list of elicited constructs, the associated dominance and sensitivity of each construct, a construct matrix, and a cluster graph of the constructs.) It can be seen from Table 7, that there were approximately equal numbers of customers with predominantly person-centred orientations (55%), and efficiency-centred orientations (40%).

Customer Number	Prominent Constructs															Conclusion
	Basic Function		Efficiency-related					Person-related					Unclassified			
	B1	B2	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	X1	X2	X3	X4	
1	1	2,4						6,8				5					P
2		3	9			1,7	5										E
3		8,9	2		7												E
4		10						6,9		7,8							P
5	1	2							5,8		3,7						P
6		6						1,2									P
7								8		4,7	2		3				P
8		1,2,3					6,9	7	8						10		mixed
9			2				5,9										E
10		1				8	7										E
11					9		6									7	E
12						2,4				3						7	E
13		10					5,8,9										E
14		3							4,10								P
15	1	2						5,8,11									P
16					6		2,9			8							E
17						3		1	7,9	2			8				P
18									3,5				6,10				P
19								5,7				9					P
20										3	8,9						P

Notes

Cell Values: reference numbers of the individual constructs as they appear for each customer in the Customer File in Appendix 4.

Prominent Constructs: dominant and/or sensitive constructs (see text).

Customers 8 & 13: no clear dominance existed, hence only sensitive constructs were considered.

Construct Codes: the nature of constructs B,E,P is outlined in Table 4; the nature of the unclassified construct X is outlined in Table 7.

Conclusion Column: E = Efficiency-centred Customer
P = Person-centred Customer
mixed = mixed orientation

Figure 9 sets out more clearly the content of this table.

Table 6: Breakdown for each Customer: his constructs and orientation

Customer Orientation	Frequency	%
Person-oriented	11	55
Efficiency-oriented	8	40
Mixed	1	5
Total	20	100

Table 7: Distribution of Customers

Figure 9 is a more detailed graphical translation of Table 6. For each customer it depicts the classification of all the constructs together with their relative strengths (i.e. dominant, sensitive or weak). Table 8 lists a few examples of the constructs in the way they were actually phrased, and the way these were classified. Appendix 4 contains the data for the entire sample.

3.4.1 Person-centred and Efficiency-centred Customers

It is useful to note at the outset, the nature of constructs which bring out, vividly, the essential difference between the two types of customers. The Self (including sensitive judgements regarding the emotional state of the customer during the encounter), the Other Person (including personality characteristics) and the Relationship between the 2 participants (including the existence, or facilitation, of social interaction) seem the exclusive realm of the person-centred customer. In addition, this type of customer also remarked upon the novelty of the encounter (e.g. 'novel', 'memorable', 'interesting', 'lively', etc.), as a good example of the P4 construct.

Customer Number	Nature of Elicited Construct	Interpretation	
5	"high priority v low priority"	B1	Basic Functio
1	"high priority v low priority"		
2	"purchase v information"	B2	
5	"necessity v pleasure"		
6	"feeling absolutely hopeless v extremely optimistic"	P1	P E R S O N
7	"made to feel at ease v not"		
5	"very friendly v not friendly"	P2	
18	"person I was dealing with most interested v not interested"		
20	"personal relationship v impersonal"	P3	
20	"energetic (lively, novel, humorous, etc.) v static (plastic, filling in forms, facts only)"	P4	
19	"I felt I was in control v I felt I wasn't in control"	P5	
3	"maximum time taken v least time taken"	E1	E F F I C I E N C Y
16	"pretty long length of interview v short interview"		
3	"maximum no. of visits v 1 visit involved"	E2	
3	"most v least convenient"	E3	
16	"had to wait a long time to see somebody v didn't have to wait"		
2	"complex because it was made out to be v complex because it was"	E4	
9	"I had to accept their terms v terms did not exist"	E5	
8	"I do the work v they do the work"		

Notes: 1. the unclassified constructs (X) are presented in Table 8.
2. comprehensive data for each customer is presented in Appendix 4.

Table 8 : Examples of elicited Constructs

Customer Number	NATURE OF CONSTRUCTS																	Orientation of Customer
	Basic Function			Efficiency					Person					Unclassified				
	B1	B2a	B2b	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	X1	X2	X3	X4	
1	◐	◐	◐○				○		●◐				◐		○			P
2			◐○	◐			◐◐	●○○		○								E
3			◐◐	◐	○○	●○			○		○			◐				E
4	◐	●	○○						●●○		●●				○			P
5	●○	●	○○					○		◐◐		◐◐						P
6			●○					◐○	●●◐◐		○	◐						P
7			○○○					○	●	◐	●●	●		●				P
8		○	◐◐					○○	○	○○						○	○	M
9	○			●◐				●●◐◐ ○○○										E
10	○	◐	●○				●	●◐◐○	○									E
11			○○			◐			○	○	○	○					●	E
12		○	○○○				●●◐		◐		◐○							E
13			◐○○	○				◐◐◐	○○	○								E
14	◐◐		●○		○					●●○○				○				P
15	◐○	●○	○	○					●◐◐○			○						P
16			◐○○○	○		◐		●◐			◐				◐			E
17			○○				●	○	●	◐○○	◐			◐				P
18	○		○○	○					◐	●●◐				●●				P
19		◐							●● ◐	◐◐○○			●			○		P
20			○○					○○	◐	◐	●	●●◐						P

Key: ● dominant construct ◐ sensitive construct ○ weak construct

Breakdown of B, E, and P in Table 4.

X1 = Success

X2,X3,X4 : See Table 8

Figure 9: Graphic illustration of the Nature of Contructs, their relative strengths, and Customer-orientation: Version A

By contrast the efficiency-customers had a selection of characteristic constructs, which were rarely mentioned by the person-centred customers. These were mainly the time and speed aspects, the convenience aspects (e.g. waiting, queuing, distance travelled) aspects relating to ease of execution (e.g. simple, straightforward) and transaction-specific aspects of the encounter (e.g. terms of agreement, credit).

The above, then, are the constructs which characterise the person-centred and the efficiency-centred customers.

In contrast to this distinction between two types of customers, there were certain features and constructs held in common by both parties.

3.4.2 The Basic Function associated with Customer-orientation

The construct marked B is thought to be the 'basic function' to which both the person- and the efficiency-centred customers subscribe.

B1 refers to the construct that typically indicates the priority that the customer attaches to the intended encounter. The reasons why a person may attach importance to an encounter may be different for person- and efficiency-centred customers, however, each has some notion of the importance of the task at hand.

This is not to suggest that every customer, person- or efficiency-centred, will necessarily produce this construct amongst

the constructs that he attaches to task encounters. Indeed, no more than 9 out of 20 customers (45%) produced this construct.

The other area, within the basic function, is the Type of Task (B2). This, however, is of lesser significance. Although there is a substantial number elicited, these constructs are mostly of a weak nature. This construct will be taken up more fully as a separate issue, to examine an interesting aspect of the way it affects the two kinds of customers.

3.4.3 The End Function

It may be seen in Table 6, that there were a small number of unclassified constructs (marked X) also elicited, this is to say, constructs which the preliminary framework for examination did not provide for. The nature of these constructs is described in Table 9.

It may be seen from Figure 9, that the X1 or the success construct, although cited only by a small number of people, is a very strong construct for some. In contrast, the rest of the X constructs are fewer and weak.

It seems acceptable to incorporate the X1 construct in the conceptual framework for understanding man's relationship with his task encounter.

Code	Nature of Construct	No. of times elicited	No. of customers eliciting
X1	Success/Satisfaction	6	5 (25%)
X2	Who approaches/goes to/gets to Whom?	3	3 (15%)
X3	Thought processes	2	2 (10%)
X4	Surroundings and Atmosphere	2	2 (10%)

Table 9 : The nature and frequency of unclassified constructs

Additionally, it makes a logical extension of the basic function remarked on earlier. Customers, at the culmination of a task encounter, may have some notion of success, satisfaction, or an answer to 'did I get all I want?', although once again, the underlying nature may be specific to their own terms of reference.

3.4.4 Updating the framework

It is the 'Means Function' which seems to bear the characteristic differences of person- and efficiency-orientations.

The relationship between man and his task encounter enters through a Basic Function and climaxes with the End Function. Between these two lies the Means Function. If the Basic Function unites both kinds of customers in their shared desired to attain a 'satisfactory level of task resolution', then the Means Function brings out the different manner in which person- and efficiency-centred customers aspire to achieve this objective. The former seem to interpret the adequate means to resolve a task as person-related, the latter as efficiency-related.

The Means Function is also the region which manifests the most powerful constructs ruling a man's relationship with his task encounter, as we shall explore in the next section.

Figure 10 summarises the basic nature of this framework, which will be developed more fully at the end of the chapter.

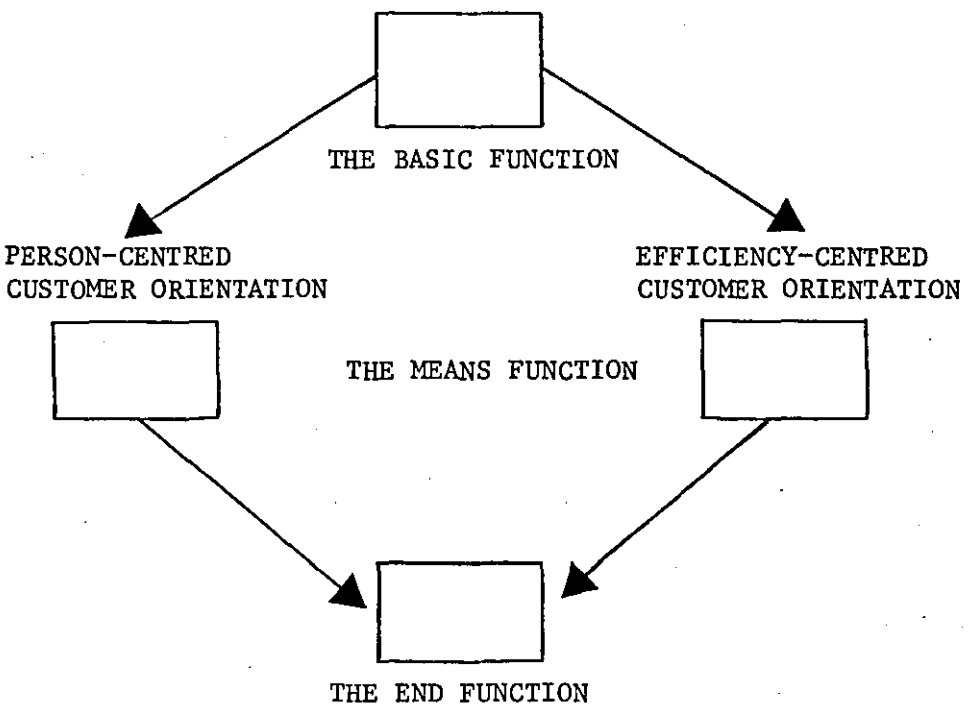


Figure 10; The Basic, the Means, and the End Functions in Man's Relationship with his Task Encounters

3.4.5 Explorations

There are a number of features of considerable interest. These will be considered roughly in the order in which the exploratory aims were outlined in section 3.1.4.

3.4.6 Validity of Classifying Customers along Person/Efficiency Lines

We shall undertake here an examination of the extent of fit of the person/efficiency model to the elicited constructs. Secondly, we shall attempt to address the issue of whether individuals depict person OR efficiency-orientations, or whether they depict joint person AND efficiency-orientations.

Figure 11 is introduced here as the support for the various arguments to follow. It contains the same data as Figure 9 presented a little earlier. Although it may be considered as repetition, it does have a function and the reader need only note that rather than presenting customers in the order in which they participated in the study, they are here presented from 'very' person-centred to the 'very' efficiency-centred.

It can be noted that there is a marked lack of prominent constructs in the Efficiency-region for the Person-centred, and the Person-region for the Efficiency-centred. (Look above and below, using Customer 8 as a rough cut-off point, in Figure 11.)

Secondly, even with the customers ordered in this way, there is quite a reasonable shift, rather than gradual transformation as one moves the focus on prominent constructs from customer 1 to customer 11, who are otherwise closest to each other's orientations.

Customer Number	NATURE OF CONSTRUCTS																Orientation of Customer
	Basic Function			Efficiency					Person					Unclassified			
	B1	B2a	B2b	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	X1	X2	X3	X4	
19		◐							●●◐	◐○○○			●			○		P
18	○		○○	○					◐	●●◐				●●				P
7			○○○					○	●	◐	●●	●		●				P
4	◐	●	○○						●●○		●●				○			P
20			○○					○○	◐	◐	●	●●◐						P
6			●○					◐○	●●◐◐		○	◐						P
5	●○	●	○○					○		◐◐		◐◐						P
15	◐○	●○	○	○					●◐◐○			○						P
14	◐◐		●○		○					●●○○				○				P
7			○○				●	○	●	◐◐○	◐			◐				P
1	◐	◐	◐○				○		●◐				◐		○			P
8		○	◐◐					○○	○	○○						○	○	Mixed
11			○○			◐		●○	○	○	○	○					●	E
12		○	○○○				●●◐		◐	◐○								E
13			◐○○	○				◐◐◐	○○	○								E
16			◐○○○	○		◐		●◐			◐				◐			E
3			◐◐	◐	○○	●○			○		○			◐				E
2			◐○	◐			◐◐	●○○		○								E
10	○	◐	●○				●	●◐◐○	○									E
9	○			●○				●●◐◐ ○○○										E

Key; ● dominant construct ◐ sensitive construct ○ weak construst

Figure 11: Graphic illustration of the Nature of Constructs, their relative Strengths, and Customer-orientation: Version B

Next, there was only one customer, out of 20, who could not be portrayed as having either a person- or efficiency-orientation (Customer 8). Although he was classified as being 'mixed oriented' this was at least partly because of the lack of any clear dominance in his constructs (Customer details in Appendix 4).

As for the individual constructs, except for the success-construct remarked on earlier, there were very few constructs of any reasonable strength that the classification did not provide for (i.e. constructs S2, X3, and X4).

Table 10, summarises the validity of classification, by outlining the significance testing (as detailed in Appendix 5). Basically, it examines the distribution of prominent constructs (i.e. dominant and sensitive), in the way the three types of constructs (Basic Function, Efficiency, and Person) are distributed over the 2 types of customers (Person-centred and Efficiency-centred). (The End Function is excluded as the small number associated with it does not permit statistical testing.)

It may be noted, and as a summary to this section:

a) there is no significant difference in the way the person- and the efficiency-centred customers attach constructs within the Basic Function. The Basic Function is common to both Person- and Efficiency-centred customers.

Factor	Data		X^2 Values	Significance	Interpretation
Distribution of Prominent Constructs	Appendix 5		57.45	S 0.001	The prominent constructs are significantly distributed over person- and efficiency-centred customers
Distribution of Weak Constructs	Appendix 5		1.95	NS 0.6	The weak constructs are not distributed significantly over person- and efficiency-centred customers.
Distribution of Prominent Constructs within Basic Function Region	Customer classified as	Basic Function Constructs	0.20	NS 0.4	The presence of Basic Function constructs is common to both person- and efficiency-centred customers.
	person-centred	14			
	efficiency-centred	7			
Distribution of Prominent Constructs within Efficiency Region	Customer classified as	Efficiency Constructs	37.49	S 0.001	There is a significant lack of efficiency constructs for the person-centred customers.
	person-centred	2			
	efficiency-centred	27			
Distribution of Prominent Constructs within Person Region	Customer classified as	Person constructs	19.76	S 0.001	There is a significant lack of person-constructs for the efficiency-centred customers.
	person-centred	46			
	efficiency-centred	3			

Table 10: Checking the Validity of Customer Classifications

b) There is a significant difference in the way people either elicit person-constructs or efficiency-constructs. The vast majority of people seem to orient themselves to either person- or efficiency-values.

c) There is no significance in the way weak constructs are distributed generally. The majority of them probably represent 'noise' picked up from the environment, as is often reported in other grid studies. This kind of construct reflects a marked difference in the external attributes of the elements, rather than reflecting the important attributes of the individual's cognitive structure. For example, if one is asked to review a triad of cars of different colours, one might report, "A and B are blue, while C is red". This does not necessarily suggest, "A are blue, while C is red, and this is an important feature for me".

We may conclude that the Person/Efficiency model offers a reasonable framework in which to represent people's orientations to task encounters and that people in the vast majority of cases are either predominantly person-centred, or predominantly efficiency-centred and seldom with mixed orientations.

3.4.7 Constructs of Interest

There are a number of constructs which are particularly interesting. Bearing in mind the overall aims of the thesis, we will reserve our focus primarily to issues which will sharpen our model of man's relationship with his task encounters. Secondly,

the numbers in most cases are too small for statistical validation, but the exploratory nature of the study should permit qualitative examinations.

Figure 11 on page 103 will form the basis for the main considerations in this section. The constructs considered, in the order in which they appear, are:

a) Duration of Transaction

b) Type of Task

c) The Self and the Other Person

d) The Necessity Construct

e) The Priority Constuct

3.4.8 Duration of Transaction (E1)

This construct was elicited by 7 customers (35%), 2 of these being person-centred (18%), and 5 efficiency-centred (53%), as may be seen in Figure 11. Table 11 summarises the findings.

It may be noted that the efficiency-centred customer has no uniform preferences for the short, or the long, polarity of transaction. It is possible, however, that the explanation for this may still be efficiency-related. The shorter would mean 'efficient execution' while the longer would mean a 'thorough job'.

Customer No.	Class	Preferred Polarity	Strength of Construct
9	E	slower and longer	dominant
3	E	shorter	highly sensitive
16	E	shorter	sensitive
13	E	longer	sensitive
18	P	longer	sensitive
15	P	neutral	weak

Table 11 : Duration of Transaction as a Construct

For the person-centred customer, there is greater interest in the degree of absence, than the presence, of this construct. There is a parallel here with earlier evidence. In the experiment by the author (Maldé, 1976), it was found that the impact of the shorter, simple transaction was not significant to customer satisfaction, in the case of the person-centred customer. The impact of the same type of transaction, however, was significant in the case of the efficiency-centred customer. It seems that the full appreciation of an encounter by this customer, or the nature of his aspirations described in the Means Function, can only be facilitated by an exposure of a suitably long duration. This may explain the preference of customer 18. In contrast, either the duration is of no significant importance to customer 15, or all the elements lie more or less within a similar duration.

3.4.9 Type of Task

The Type of Task appears in Figure 11 as a B2b construct. This construct is one of the more interesting features of this part of the study. Some examples of the Type of Task are:

financial vs non-financial

enquiry vs purchase

buying vs selling

The construct was elicited 40 times in all and by 18 of 20 customers (90%). Table 12 summarises the findings. (Customer 8 of mixed-orientation is excluded for simplicity and the total number of constructs is thus reduced to 38.)

The points to note are that:-

a. this construct attracts a considerable membership from both person- and efficiency-centred customers.

b. for 82% of person-centred customers (9 out of 11), the effect of this construct, is at most, weak. In contrast, the construct has at least a strong level of influence for 63% of efficiency-centred customers (5 out of 8).

Explanations

There are suggestions here that this construct is being used as a ready means of comparing between encounters. This is specially the case since the elements were true events for the customer, and the test required him to compare and contrast between events. The function of this construct may be merely to serve as a means of 'setting the scene'.

Customer		Frequency of Mention		
		Strength of Construct		
No.	Orientation	Dominant	Sensitive	Weak
19	P			
18	P			2
7	P			3
4	P			2
20	P			2
6	P	1		1
5	P			2
15	P			1
14	P	1		1
17	P			2
1	P		1	1
11	E			2
12	E			3
13	E		1	2
16	E		1	3
3	E		2	
2			1	1
10	E	1		1
9	E			

Sub-total:
2 + 1 + 17 = 20

Sub-total:
1 + 5 + 12 = 28

Total:
20 + 28 = 38

Table 12: Type of Task as a Construct

The explanation for the second feature, i.e. the differing influence this construct has for the two types of customers, is not so straightforward. A sizeable proportion of this construct exerted a strong influence on the efficiency-centred customers suggesting that for this type of customer, the construct goes much

further than to provide a ready means of comparison. It is as if to suggest that the person-centred tend to look upon the elements as encounters between people regardless of whether they involve purchase, enquiry or negotiation. In contrast, the efficiency-centred customers view the encounters as transactions which are essentially different from one another depending on the activity being carried out. They see this as an important difference, and the encounters accordingly take different meaning.

3.4.10 The Self and the Other Person

The Self and the Other Person is normally the exclusive realm of the person-centred customer. The efficiency-centred customers however, came up with constructs relating to this area, on a number of occasions.

Table 13 outlines the nature of constructs falling in this area under these convenient headings. In some cases the polarity of the construct is also described to illustrate the preference of the customer.

Customer No.	Nature of Construct	Strength of Construct
	The Self	
9	Transaction depended heavily on assessment of me as a Customer (E5)	Dominant
16	Didn't need information regarding me (E5)	Sensitive
12	Emotions (P1)	Sensitive
3	Hassle (P1)	Weak
11	Motives (P1)	Weak
13	Motivation (P1)	Weak
13	Certainty (P1)	Weak
	The Other Person	
13	Doubting the sincerity of the other person (P2)	Weak
2	Out to make a sale (E5)	Dominant
11	Regard for the other person (P2)	Weak
2	Employee v/s official (P2)	Weak
13	Other Person's role advisory (E5)	Sensitive
13	Other Person's function to deal with Me (E5)	Sensitive
	Relationship between Self and Other Person	
12	Informal/formal (P3)	Sensitive
16	Informal/Formal (P3)	Sensitive
11	Personal/Impersonal (P3)	Weak
3	Face-to-face/telephone (P3)	Weak
12	Prefer little personal contact (P3)	Weak

Table 13: The Nature of Constructs associated with the Self and the Other Person as elicited by the Efficiency-centred Customers

Findings and explanations

The first point to note is that when the efficiency-centred customer does refer to the Self and the Other Person, it is as a transaction-supportive exercise (e.g. "Transaction depended heavily on assessment of me as a Customer" and "The other person's function is to deal with Me"). In contrast, the person-centred customer engages in a wide variety of phrases falling in this region which have a less direct bearing on the transaction (e.g. 'friendly', 'lively', 'interesting', 'optimistic', etc.).

Secondly, some aspects of the construct, which pedantically may be interpreted as person-centred, are rather of a descriptive nature, and therefore, quite neutral to the orientation of a customer. The case in point is the informal/formal construct or the face-to-face/telephone construct which may have more to do with channels of communication, and as mere descriptions of the elements of a task, rather than serve an important function in any other way.

Finally, much of the Self as elicited by the efficiency-centred customer (e.g. motivations, and emotions) is an area common to both person- and efficiency-centred customers, not least because they are both thinking humans. It is nevertheless interesting to note from Table 13, that the self-related constructs of customers 12, 3, 11 and 13 (twice), exert only a weak influence in 80% of the cases.

In summary, the efficiency-centred customers seem to focus on aspects associated with the Self, the Other Person, and the Relationship between the two only when these aspects are considered to influence, or interfere with, the efficiency of a transaction.

3.4.11 The Necessity Construct

An interesting discovery, was the pre-occupation of the person-centred customer with comparing between encounters on Necessity v/s Pleasure lines, and less surprising, for attaching a strong preference for the Pleasure mode of the construct.

The column under B2a in Figure 11 refers to this type of construct (e.g. necesary v/s not). The necessity construct, arguably lying somewhere between the Priority attached to Task (B1), and Type of Task (B2), was separated from the rest of the B2 constructs as a B2a construct.

Table 14 summarises the findings for this construct. In contrast to 5 person-centred customers (45%) eliciting this construct, and aligning strongly with the Pleasure mode of the necessity-pleasure construct, there were only 2 (25%) efficiency-centred customers eliciting this construct. Secondly, and in sharp contrast to the person-centred customer, the necessity construct served to exert, at best, only a weak influence on the efficiency-centred customers.

Customer		Nature of Construct	Strength of Construct
No.	Orientation		
4	P	recreational v/s necessity	Dominant
5	P	Pleasure v/s necessity	Dominant
15	P	necessity v/s not	Dominant
15	P	pleasure v/s necessary	Sensitive
19	P	leisure v/s necessity	Sensitive
1	P	home v/s work	Sensitive
12	E	pleasure v/s necessity	Weak
10	E	necessity v/s not	Weak

Table 14: The Necessity Construct

Explanations

It is not altogether clear why there should be this disparity between person- and efficiency-customers.

One explanation lies in the make-up of the person-centred customer who seems to go for novel, out-of-the-ordinary encounters. The recreational encounters, rather than the necessary day-to-day ones, provide the livelier alternative.

It is also possible that the person-centred customer sees his world as consisting of necessary-but-not-pleasing and recreational-and-pleasing encounters. The efficiency-centred customer, by contrast, sees his world as consisting of encounters which are either necessary, or not necessary, irrespective of whether they are pleasing or not. He would indulge in the necessary ones, and avoid those he thought were unnecessary. This could explain why this construct is hardly elicited by this customer, as he perhaps saw all the encounters in which he had participated, as being necessary ones, and all the elements hence shared this necessity-quality.

3.4.12 The Priority Construct

We shall round off the inspection of constructs of interest with a brief look at the Priority Construct.

It may be seen from Figure 12 that the majority of the priority constructs (B1) (e.g. high priority - low priority) derived from the person-centred customer. Six person-centred customers (55%) elicited this construct, in contrast to 2 efficiency-centred customers (25%). More important, the construct, when it did occur, had quite a strong influence on the person-centred customers, while the influence on the 2 efficiency-centred customers, was weak.

Explanations

Explanations, as the results stand, are difficult. However, when one interprets this finding in the context of the necessity construct discussed in the foregoing section, interpretations become easier. It was remarked then that the person-centred customers might look at their encounters as ranging from the pleasant recreational ones, to the not-so-pleasant necessary ones. In contrast, the efficiency-centred are attracted only to those encounters which they judge to be necessary.

As such, the feature of priority, it may be argued, is common to all necessary tasks (i.e. those of the efficiency-centred customers), while priority may fluctuate widely for tasks ranging from recreational to necessity (i.e. those of the person-centred customer). Hence, the construct was redundant for the former, but not for the latter. The finding that 4 of the 6 person-centred customers eliciting the priority construct, also elicited the necessity construct, seems to lend added support to this explanation.

3.4.13 Enjoyable and Disliked Task Encounters

It may be recalled from the Introduction that one of the aims of the study was to examine the task encounters elicited by the customers for general similarities or dissimilarities within the most enjoyable and the most disliked encounters.

Table 15 lists the enjoyable and disliked encounters for person- and efficiency-centred customers.

There are problems associated with comparing amongst a large number of different encounters, but two features from Table 15 may be of interest. These relate to the differing affinities of the two kinds of Customers with what may be interpreted as 'necessary' encounters, and with those that may be interpreted as 'out-of-the-ordinary' encounters.

1) 'Necessary' encounters. Whereas only two person-centred customers enjoyed such an encounter: bank loan enquiry (customer 7) and job hunting enquiry (customer 15), the efficiency-centred customers enjoyed a much longer list:

insurance (customer 9)

bank loan (customer 9)

rail ticket (customer 10)

insurance (customer (10)

play group enquiry (customer 2)

insurance (customer 11)

Person-centred Customer	Enjoyed Task Encounters	Disliked Task Encounters	Efficiency-centred Customer	Enjoyed Task Encounters	Disliked Task Encounters
19	Visit to Library	Telephone Bill, Enquiry	9	Insurance Agents, Bank Loan	Bookshop
18	Flights for Darts, Calculator	Library Enquiry	10	Rail Ticket, Insurance	Bookshop
7	Bank loan enquiry	Renewing TV	2	Play Group	Visitor's Passport
4	Swimming lesson, Travel Enquiry	Job hunting, Telephone	3	Library Info	Hunting for furniture
20	Hifi System Enquiry	Insuring with AA	16	Judo Club Enrolment	Unemployment Benefits
6	Visit to Sale	Unemployemnt Benefit, Office	13	Shirt	Doctor
5	Handgliding Enquiry, TV Hunting	Bank about Flat	12	Car owners Club	Invoice Payment, Bank loan
15	Job enquiry	Obtaining passport	11	Insurance, Watch	Doctor
14	Opticians	Job Enquiry			
17	Hunting for a Teddy	Medicine Hunting			
1	Buying a House, Buying a Computer	Buying a car			

Table 15: Enjoyable and Disliked Task Encounters

2) 'Out-of-the-ordinary' encounters. In contrast to the 'necessary' kind, if one singles out the out-of-the-ordinary encounters, then two efficiency-centred customers enjoyed such encounters:

judo club

car owners club

whereas, the person-centred customers, seemed to enjoy many more such encounters:

flights for darts

swimming lessons

handgliding

Hifi stylus

Hunting for a Teddy

Hunting for a Computer

Explanations

There is some support in both the features for earlier suggestions regarding the differing affinities of the person-centred and efficiency-centred customers for their task encounters. The efficiency-centred customers engage in encounters which are deemed necessary, while the person-centred are attracted to out-of-the-ordinary encounters.

As for encounters held in unanimous dislike, the widely varying nature makes examination difficult. It seems however, that whereas the efficiency-centred customer may enjoy or dislike what may be the same class of encounters, the person-centred enjoys out-of-the-ordinary encounters and dislikes the ordinary ones.

Specific encounters should be easier to examine from a supporting study, to be described shortly, which was based on a fixed set of elements.

3.4.14 Specific Groups within the General Public

We come to the final aim of the exploratory aspects of the study. If we accept that the public at large may be classified into person- or efficiency-centred customers, it would be interesting to note if there is any noticeable difference as one shifts the focus to specific groups within the larger parent group.

Table 16 outlines the break-up of the customers according to their occupations. Since there were only 2 efficiency-centred customers in the non-student sub-sample, we may shift our focus to the student sub-sample, as it offers a more balanced distribution and one that was easier to compare.

It is interesting to note that the 4 person-centred students are all with arts background, while at least 5 of the 6 efficiency-centred students (occupation of customer 16 not known) are from engineering background.

Students		Non-Students	
Person-centred	Efficiency-centred	Person-centred	Efficiency-centred
18 (Social Psychology)	11 (Civil Eng.)	19 (Illustrator)	3 (Technician)
15 (Ergonomics)	12 (Civil Eng.)	7 (Unemployed)	2 (Housewife)
14 (Library Studies)	13 (Physics)	4 (Housewife)	
17 (Business Admin and French)	16 (Unknown)	20 (Manager/ Editor)	
	10 (Physics)	6 (Dressmaker)	
	9 (Auto Eng.)	5 (Designer)	
		1 (Technician)	

Table 16: Occupations of Customers and their Orientation

Explanations

It is possible that this may be due to a combination of causes. The first possibility is that the nature and requirements of Arts courses attract candidates who are person-centred, while Engineering courses attract the efficiency-centred. Secondly, that the nature of, and involvement with, Arts courses promotes a person-centred orientation for students while that of Engineering courses promote an efficiency-centred orientation, in their students. In the final instance, it may be a nature-nurture combination that explains the interesting dichotomy. We shall look further into this issue, in the next section.

It would be interesting to note the emerging similarities/differences when the focus is confined to a homogenous sample within the general public, as the sample distribution seems to suggest.

It seems appropriate to introduce here a small supporting study to meet the needs that have arisen. Because of the supporting role it has for our explorations, it seems suitable to outline the study here, as a development of the explorations, rather than to treat it as a separate issue. The discussion is accordingly deferred till after a brief outline of the study.

3.5 A SUPPORTING STUDY

The aims were to attempt to meet the two secondary needs that have not been satisfactorily met in the previous study, and mainly to explore the following issues:-

a) are there noticeable similarities/differences in the reception of specific task encounters? (this may be achieved by fixing the elements in a Repertory Grid Study).

b) are the orientations of a homogenous group of people different to those of the public at large? (this may be achieved by basing the study on, say, a group of adult students drawn from the same year and course).

3.5.1 Experimental Details

Eight Ergonomics second year students participated in a repertory grid study as before. After a consensus that all the participants had recently engaged, as customers, in the following

task encounters, these were therefore used as the 5 fixed elements for the study:

A = my consultation with the DOCTOR

B = my consultation at the BANK

C = my consultation with a LECTURER

D = my consultation at the LIBRARY

E = my consultation at the EMPLOYMENT EXCHANGE

3.5.2 Results

Appendix 6 describes individual results as before, and Figure 13 provides a graphical interpretation of the results.

It may be noted that:

a) the constructs, as well as the customers, are predominantly person-centred.

b) there is a large contingent, as before, of the descriptive construct 'Type of Task' (B2b).

c) there is no mention of the priority construct (B1).

d) the necessity construct (B2a) is elicited twice only.

3.5.3 Explanations

The Person-centred nature of the sample

There may be two reasons why this sample is predominantly person-centred.

Cust No.	NATURE OF CONSTRUCTS															Cust Class
	Basic Function			Person					Efficiency					Unclassified		
	B1	B2a	B2b	P1	P2	P3	P4	P5	E1	E2	E3	E4	E5	X1	X2	
1			○○	◐◐○	●	●○	●							◐		P
2			◐◐○		◐○○ ○		●●		○							P
3			◐○○ ○		◐◐○ ○										◐○	P
4		●	●●○ ○○○	●○	◐											P
5			●●○ ○○			○		◐◐○ ○								*
6			●	○	●○○	●◐	◐○				○					P
7			●○		●◐○ ○	●○				○			○			P
8		○		○	◐◐○ ○	○	●		○		○					P

Key: ● dominant construct ◐ sensitive construct ○ weak construct

Notes: 1. Breakdown of constructs B, P, and E in Table 4
2. Detailed data in Appendix 6.

Figure 12: Graphic Illustration of the Results of the Supporting Study

The first explanation lies in the evidence of the previous sample when it was seen that all the Arts Students in the sample emerged as person-centred, and all the Engineering Students, efficiency-centred. It could be argued that the Human Science content of the Ergonomics syllabus promotes a person-centred emphasis, whereas Machine sciences may lead to an emphasis on an efficient operation or an efficient production of goods, and hence promote an efficiency-centred conduct. Hence, both the pressures and the kinds of work undertaken by the two types of students, may contribute to this difference.

Secondly, it is possible that the students may be free as yet, from adopting a responsible role in society which may reflect through their non-efficiency-centred orientation. Why then is the same not true for Engineering students? Assuming a responsible role in society may mean becoming more efficiency-centred, but the converse (i.e. to be efficient is to be responsible) may not necessarily be true.

The Priority Construct

The second alternative may also explain, to an extent, why there is no mention of the priority construct. The students may face few high priority tasks, or may not have begun to view tasks, in terms of priority. The experimental conditions may also have contributed, as will be seen in the next paragraph.

The Necessity Construct

Closely related to the last paragraph, is the relative absence of the necessity construct. Although much of the previous explanation also applies here, there is another factor associated.

The reader may recall from the main study, the preoccupation of the person-centred customer with [recreational] tasks and with the necessity-pleasure construct. The current sample, although predominantly person-centred, only produced 2 constructs, one of which approximated a necessity-leisure construct ("home v/s university", customer 4), while the other one was only a weak construct (customer 8). This is thought to be at least partly due to the conditions of the experiments. The students had no recourse to their own elements, while all the ones imposed could generally be described as 'necessary encounters' (consultations with lecturer, doctor, librarian, bank and employment exchange staff).

The Type of Task Construct

The large contingent of the descriptive construct (B2b) could be due to the reasons offered in the previous study. It is possible that the descriptive nature of the various encounters provide a ready means of comparison.

More important, let us turn to the encounters that gave the customers the greatest, and those that gave the least pleasure.

3.5.4 The Enjoyable and Disliked Encounters

Table 17 lists the ranked preferences, depicted by the enjoyment construct, of the 8 customers. Table 18 re-organises the data to depict the number of times each encounter was ranked 1st (most enjoyable), 2nd, 3rd, 4th and 5th (least enjoyable).

Customer No.	Ranks				
	doctor	bank	lecturer	library	employment exchange
1	5	3	4	2	1
2	1	3	2	5	4
3	5	4	1	2	3
4	5	2	3	1	4
5	4	2	1	3	5
6	3	4	2	1	5
7	1	5	4	2	3
8	2	1	4	3	5

1 = most enjoyable
5 = least enjoyable

Table 17: Ranked preferences for the Task Encounters

Encounter	Frequency of Mention				
	encounter ranked 1st	2nd	3rd	4th	5th *
doctor	2	1	1	1	3
bank	1	2	2	2	1
lecturer	2	2	1	3	0
library	2	3	2	0	1
employment exchange	1	0	2	2	3

* 1st = most enjoyable
5th = least enjoyable

Table 18: Distribution of Ranks for each Task Encounter

It may be noted:

a) the Library Consultation, relatively, is held in most favour.

b) the consultation at the Employment Exchange is least favoured.

c) there are no clear preferences, for consulting with a Doctor, with a Lecturer, or with the Bank.

Explanations

The generally mixed reception which most encounters have received may be related to the explanation for the absence of the pleasure/necessary construct. The encounters overall, were of the 'necessary' type, leaving the customers to choose between encounters that were somewhat limited in range.

This is further supported by the finding that the Library consultation received a favourable reaction. The Library, out of all 5 encounters, may come nearest to providing a leisure encounter.

There seems some consensus regarding the Employment Exchange. This encounter is held in least favour. The reason why Employment Exchange consultations are not generally (with the exception of customer 1) held in favour, may extend to all job hunters Such consultations take place for most individuals at a time in life when they are surrounded by circumstances of anxiety and uncertainty.

3.5.5 Lessons for the Planning of Public Service Counters

There are three main features emerging.

a) the relationship between man and his task encounter seems to manifest itself through person- or efficiency-orientation.

b) as one restricts the focus to specific sub-samples within the general public, the orientation may shift predominantly towards person (e.g. arts students) or towards efficiency- (e.g. engineering students).

c) there are situations which need special care in planning (e.g. Employment Exchange). These are situations or services which customers would not by choice, resort to.

Much can be accomplished by careful design of the service and of the environment, to alleviate the customer's negative disposition, when meeting such situations.

3.6 DISCUSSION

We are now in a position to discuss the findings of the Main Study, supported where necessary by the secondary study.

3.6.1 Person-centred and Efficiency-centred Customers

The findings overall offer considerable support for the existence of Person-centred and Efficiency-centred customers. The experiment has produced some useful insights into the mechanisms governing the Person/Efficiency framework.

At the outset of a transaction, there is a Basic Function which most customers share in common. This is an overall idea of the task at hand and the priorities attached to the intended encounter. What is important to note, however, is that the same task may be offered a high priority by both the person- and efficiency-centred customers but for different reasons. In addition, the Basic Function also includes some descriptive aspects of the encounter but which are mostly weak constructs.

The next stage is a branch-off from the basic function, and an entry into the Means Function which characterises the differing orientations of the two customers. The person-centred customer attaches a strong preference to the Self, to the personality aspects of the Other Person, to aspects relating the Self with the Other Person, and to the novelty of the encounter. By contrast, the efficiency-centred customer aligns himself strongly with the purely efficiency-related constructs such as Time and Speed, Convenience, Ease of Execution, and the Nature of the Transaction. When the efficiency-centred customer does draw on the person-region, it is mostly as a transaction- and efficiency-supporting exercise.

Besides the distinctions outlined above, there are specific features of interest. The efficiency-centred customer differentiates between encounters based on the differences in the nature of transactions (e.g. 'purchase v/s information hunting', 'enquiry v/s negotiation'), while the person-centred customer views all transactions as encounters between people and compares between

encounters by reviewing the person aspects. The only time the efficiency-centred customer makes observations regarding the Self and the Other Person, is when he considers certain aspects relating to this area as interfering with the smooth running of the transaction. There are also suggestions that the efficiency-centred person's world consists of tasks that he considers to be either 'necessary', which he then indulges in, or 'not necessary' which he tries to avoid. On the other hand, it seems that the person-centred customer's world consists mostly of tasks that are a necessity and displeasing to engage in, or at the other end, recreational, and a pleasure to engage in. There are indications all along for the person-centred customer's love for the novel and out-of-the-ordinary aspects of an encounter.

The End Function is the final assessment stage when both parties consider the degree to which an encounter was successful or satisfactory, though for different reasons.

Figure 13 outlines this model. The essential feature to note is the 'Means' block between the 'Basic' and the 'End' Functions. This is where the majority of the dominant constructs occur and which characterise the differences - on occasions, extreme differences - between the two kinds of customers.

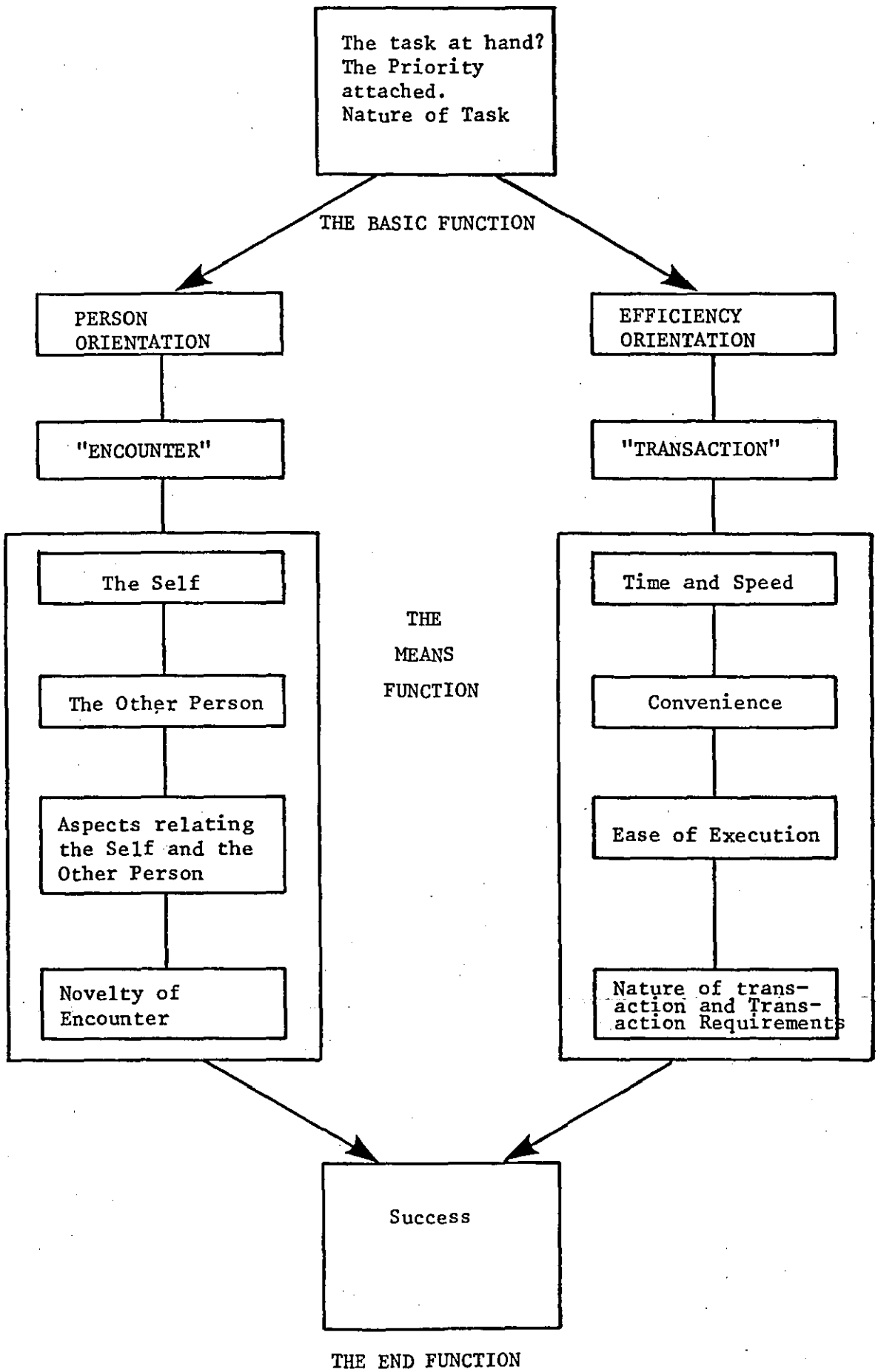


Figure 13: Orientations of Customers

3.6.2 Specific Encounters

The findings about the reception of specific encounters were difficult mostly because of the problem of dealing with large numbers (the main study elicited 100 encounters from 20 customers). However, there may be two broad features worth noting.

A possible dissimilarity in the reception of different encounters lies in the finding already discussed in some depth. This is the pre-occupation of the person-centred customer for the out-of-the-ordinary tasks and of the efficiency-centred for the necessary tasks.

A possible similarity in encounters lies in the demands on the individual made by some necessary tasks which are also of a complex nature. It was seen how the Employment Exchange encounter was one that was most disliked by the subjects in the supporting study. This is not explained simply by their predominantly person-centred orientation. There are tasks in everyday life such as job hunting which are of particular anxiety to most individuals. The individuals may be at a critical stage in their lives and surrounded by great uncertainty about the future, during such instances. This class of tasks, which may be interpreted in the majority of cases as tasks which the individuals would not engage in by choice, may extend to a wide variety of public services: hospitals, unemployment benefits, citizens advice. Such services may need especial care in planning, to alleviate the burdens of the participating individual.

If the general service design, as well as system design, does not broaden to include within its focus the particular predicament that the individual may be in, as also the differing priorities that the 2 kinds of Customers may place on an otherwise similar task, then there are two critical implications. The needs of the individuals (the immediate implications of task resolution) may suffer, but their aspirations (the continuing and long term needs and the context in which the task takes place) will almost certainly suffer.

Whereas the very realisation of the nature of the problem may go a long way at providing suitable answers, there is still the need for a more specific statement of what these answers may be. This we shall examine in a sub-section to follow, as also in the forthcoming chapter.

3.6.3 Specific Groups within the General Public

It is interesting to note the difference between the Engineering students of the main study, and the Arts students of the main as well as of the supporting studies.

Although the general public may be viewed along person- or efficiency-orientations, it seems that when one concentrates on a specific group within the general public, the manifestations of person- or efficiency-orientation can apply to entire groups.

There is an additional feature of interest relating to the question of whether the origins of a person- or efficiency-centred orientation, stem from the Self, or from the Environment. The interpretations of the findings listed to the Arts and Engineering students can run as follows. The nature and requirements of Arts courses attract the person-centred student. The nature and requirements of Engineering courses attract the efficiency-centred students. Conversely, it may be argued that the involvement with, and the pressures applied by, Arts courses evolve person-centred students. The involvement with, and the pressures applied by, Engineering courses evolve efficiency-centred students. However, extreme phenomena are seldom the case in real life, and hence this leads us perhaps to the most plausible explanation of the nature-nurture combination, i.e. that the emerging orientation is a result of the interaction between nature forces and the nurture forces.

If both system design and general design of customer handling counters are undertaken on efficiency-centred goals, as arguably is the case with current practice, then the implications are obvious. It means that the intermediary will be under pressure to adopt a system-centred, and therefore an efficiency-centred, orientation. If the system or general design does not provide for the person-centred orientation, this type of customer will incur growing displeasure at meeting task encounters which do not fulfil his aspirations. Alternatively, and as Festinger (1957) would suggest, the resolution of the dissonance would be for the person-centred customer also to adopt a system-centred or efficiency-centred orientation, if resort to such services cannot be avoided.

3.6.4 What are the answers?

How can we satisfy both the person-centred and the efficiency-centred customer? The answers are not simple. Solutions are possible, which the author believes, provide for the interests of all parties concerned, bearing in mind particularly the prevailing stage of societal evolution and the role dictated of system deisgn.

The first suggestion is the optimization of person- and efficiency-thinking into the planning of double-interaction. As was seen in the earlier work by Maldé (Chapter 1, section 1.6.4), there is some evidence that the combination of a person-centred intermediary and computer technology are acceptable both to the person-centred as well as to the efficiency-centred customer.

This prescription is particularly suitable for present day state of affairs, when the public in most cases resort to computer-aided systems, not by choice, but by necessity. It is important to recognise the nature of task encounters in issue, which are more service-oriented, and less product or commodity oriented. This has relating implications of differing emphasis and concern placed in real life whereby a 'product' is under much greater pressure to provide customer satisfaction (since marketibility of product is of major concern to manufacturers), then is a 'service' (health, employment exchange,

citizens' advice) which seems to be concerned with providing a service of any kind rather than that of a particular kind. If the service is inadequate, the customers do not necessarily have any choice in the matter other than that of total alienation. However, for all those concerned with providing an adequate service, i.e. one which is effective and one which extends to provide for both needs and aspirations of the participants, the prescription of joint optimisation of person- or efficiency-values seems the best way forward. This is particularly so because of the early stages we are in, concerning both the occurrence of double-interaction, as well as the public use of advanced technology, when it seems more important to make the 'right' start than any start at all.

Secondly, specific users within the general public may dictate partisan values underlying system design. This is to say that services planned for a specific group of people may necessitate special efforts in trying to meet their aspirations in one direction. On the other hand, the attraction of the joint optimization of person- and efficiency-thinking is that this would discourage social divisiveness between groups of people, while also providing the platform, for society at large, of meeting its needs and aspirations.

Thirdly, system design, it is thought, has a critical role to play in the manner in which advanced technology alleviates the needs of people. As was seen in chapter 1, there are a number of ways systems fall short of the role required of them. Much of this is explained by the discrepant values employed in system design which seldom address the issues of how the customer and the intermediary relate to their tasks. When systems are designed on purely system principles, they demand a certain conduct from the intermediary and the customer, who due to pressures of conformity, have to realign their orientation to match that of the system. It may be that we have to undertake the design of the system with the view of allowing for - even supporting - the natural conduct and orientations of the intermediary and the customer. Also, we may have to interpret the task in such a way that it accommodates any one customer's individual needs. In short, we need systems which in their approach, design, and practice are customer-centred. We shall offer a detailed examination to this issue in the next chapter.

3.7 SUMMARY AND CONCLUSIONS

1. This chapter provides the basis for understanding the relationship between Man and his Task Encounters. It is hoped that it also provides the context within which the planning of Double-interaction encounters and systems may be undertaken.

2. The experiment offers considerable support to the existence of Person-centred and Efficiency-centred Customers. The characteristic difference between the two is that the person-centred customer assesses an encounter in terms of its person-aspects (the Self, the Other Person, the Relationship between the Self and the Other Person, and the Novelty of the Encounter). By contrast, the efficiency-centred customer assesses an encounter in terms of its efficiency aspects (Time and Speed, Convenience, Ease of Execution, and the requirements of Transaction).

3. Certain situations, such as Employment Exchange, Unemployment Benefits and Hospitals, may require special attention in the way the service is provided. Unless it takes into account the particular predicament of the individual involved, the service provided will fall short of meeting the full expectations of the customers.

4. Specific groups within the general public, may as a group, align themselves to person- or efficiency-centred orientations. The design of systems, for specific use by such groups, may have to bear this feature in mind.

5. The recommendation is the joint optimisation of person- and efficiency-centred thinking into the design of systems and services in general, especially in view of the fact that the public use of computer technology is in its early stages. At one level, it means the provision of an intermediary not just trained/selected on efficiency grounds, but also on person-centred grounds. At another level, it means adjusting the role of services in general, and of system design in

particular, to align with the needs, the aspirations, and the natural conduct of people - the intermediary, and particularly, the customer. This is to say, the system design should evolve from customer-centred, rather than system-centred principles.

6. There is intuitive attractiveness in the idea of technology designed to bend to the needs of people, and for it to meet the aspirations of people, rather than for people to have to come to terms with technology.

Plan for Thesis

1 Introduction
2 Impact of Advanced Technology on Work Satisfaction
3 The Public in relation to their Task Encounters
4 Task Interpretation, System Design, and the Customer
5 Discussion
6 Conclusions

Plan for Chapter 4

4 TASK INTERPRETATION, SYSTEM DESIGN and THE CUSTOMER
4.1 Introduction
4.2 The Customer and his Task
4.3 System Design
4.4 The Experiment
4.5 Results
4.6 Discussion
4.7 Summary and Conclusions

CHAPTER 4: TASK INTERPRETATION, SYSTEM DESIGN, and THE CUSTOMER

4.1 INTRODUCTION

This chapter attempts to inter-relate the issues of task interpretation, system design and the customer. The chapter occupies a significant position in the development of this research, and it is important to recognise in essence the build-up to this chapter. We will therefore briefly illustrate our case as it stands so far.

4.1.1 Background

Chapter 1 contained a statement of ways in which current system design may fall short of meeting the expectations of the human participants in double-interaction. Briefly stated, these were that systems control the running of double-interaction, that they impose a structure on the task to be carried out, and that they interpret the task in a way which is exclusive of the nature of the involvement of the human participants. Although it would have incidental benefits for some customers, many apparent benefits take place as a result of compromise by the human participants in double-interaction. Chapter 2 discussed the importance of work and the role of technology in this context. Although mostly dealing with the intermediary, the broad conclusion extended also to the customer. This was that there was a need to provide them with a reasonable degree as well as a satisfactory experience of task resolution. Chapter 3 demonstrated the existence of person- and efficiency-centred customers, and the related problem of how best to satisfy both kinds of customers. Earlier work by the author (at a master's level) suggested that a possible way forward might lie in combining a person-centred intermediary with suitably designed computer technology.

4.1.2 Aims of this Chapter

In this chapter, we are still concerned with providing for the needs of both person- and efficiency-centred customers. We are supported in our task by earlier findings of the suitability of combining a person-centred intermediary with a suitably designed computer technology. We may now exploit the situation further by restricting the focus to the system issue of double-interaction; by examining, in detail, ways in which it can provide support and relevance for all customers, person- AND efficiency-centred.

The intermediary aspect is less critical to study at this time, for various reasons (as outlined in Chapter 1). The intermediary has previously been studied as a variable, and additionally, a detailed examination of the system variable would be possible only if other influencing factors can be nullified or held fixed for different experimental conditions. The aim therefore is to hold the intermediary variable fixed or neutral, while varying the system to test the impact on the customer.

Specific to the system, we need to develop two kinds of technologies, which one may meet in real life. One kind is based on a system-centred task interpretation; the second kind on a customer-centred task interpretation.

A system-centred task is one which may be said to be interpreted in terms directly relateable to, and compatible with, a system. In essence, it establishes as its theoretical base, the essential operation to be carried out. The resulting technology is almost a one-to-one transformation of this model. A customer-centred task interpretation on the other hand, interprets the task as a customer would interpret it. It bases its focus on a customer engaged in a task. The technology designed on such a consideration evolves as a customer-centred technology.

The broad differences that the two approaches produce may become clearer as we delve deeper in the chapter but at this stage the essential difference between the two approaches may be summarised thus. The system-centred design of a technology pre-supposes the contribution of the system as being central to double-interaction. For a successful task performance all other aspects in double-interaction have to co-operate in supporting its behaviour. The customer-centred system design pre-supposes that the customer lies at the centre of double-interaction. All other aspects have to co-operate in supporting his behaviour, for a successful task performance.

The development of the former, we will undertake by our broad understanding of real-life systems as outlined in Chapter 1. We will undertake the development of the latter, by considering issues marking the build-up to this chapter, as well as by carrying out a fresh review of the real-life behaviour of customers.

To assist in our efforts, in addition to the two task interpretations, and the associated system designs, we need a real-life 'total task', for which system design can be undertaken. A 'total task', it may be remembered, is the representation, as completely as possible, of the activity mediating and including the stages of needs formulation and needs resolution. This was adopted as a basis for this research, in rejection of 'component task' which as one of many possible sub-derivations of the total task, may fail to represent the real nature of the task. We need a representative task, that is to say, one which incorporates the essential features of a number of other tasks likely to be executed by double-interaction. Such a task would serve as a basis for experimental work whose findings could then be generalised over other similar double-interaction tasks and situations. The problem lies in picking a task, which is real enough for the customer, which is at the same time representative of other similar tasks that double-interaction may support, and which in addition, provides one with the basis for examination under controlled conditions. This would present tremendous challenge, but would be very worthwhile if such a task could be found.

After considerable search, the most promising class of tasks is that of the purchase of commodities ranging from heaters, coolers, and fridges, to cars and houses. With a substantial range of alternatives existing, one of the most pressing problems of the present day customer is the lead-up to the final choice. The essence of the problem for the

customer is that even when the nature of purchase is decided on (i.e. a package holiday, a car, a piece of hi-fi etc.), the customer only wishes to purchase a single item against a background of wide range of alternatives, a range which sometimes runs into hundreds of items. This class of task seems to offer a useful platform from which to launch our considerations in this chapter.

4.1.3 Plan for Chapter 4

The chapter proceeds through 7 main stages. It is thus conveniently laid out in 7 sections.

Section 1: The introduction outlines the broad aims of the chapter.

Section 2: The Customer and his Task. This develops the model of the customer and the structure of the task on which system design for the experiment is to be based. It does this by review of research relevant to the selected class of customer tasks, and to the customer engaged in such a task.

Section 3: System Design. This section outlines the development of the system along customer-centred and system-centred task interpretations.

Section 4: The Experiment. This section deals with a number of issues ranging from hypotheses, to experimental design and experimental setting.

Section 5: Results.

Section 6: Discussion.

Section 7: Summary and Conclusions.

4.2 THE CUSTOMER AND HIS TASK

The aim of this section is mainly twofold. We need to understand the nature of the task on which we may base the two versions of the system. Secondly, we need to derive a customer model of 'a customer engaged in a task', by extracting the relevant characteristics from the person/efficiency model of 'a customer engaged in a task encounter' as developed in Chapter 2. We will use this model as a basis for our customer-centred task interpretation which in turn, will provide the basis for the related system design. To this end, we need to understand both the common region that binds most customers together, as well as think of ways in which technology may be designed to accommodate the broad nature of their differences.

Answers to these aims will be sought from literature relating to the nature of the class of tasks adopted in Section 4.1.2, and to the customer engaged in such tasks.

We begin with a summary of the customer model as demonstrated and developed so far in this research.

4.2.1 This Research

The findings can be listed under similarities and dissimilarities.

Similarities (as derived mostly from Chapter 2).

1. Customers aspire to a reasonable degree of task resolution.
2. Customers aspire to a satisfactory experience of task resolution.
3. Customers may use their own terms of reference with which to describe and act upon their tasks.

4. Customers may attach different priorities to different tasks.

Differences (as derived from Chapters 1, 2 and 3).

1. The person-centred customer derives satisfaction from person aspects governing task resolution, the efficiency-centred customer derives satisfaction from efficiency aspects governing task resolution.
2. The person-centred is highly conscious of his needs and ideals which he regards as 'special'.

4.2.2 Other Research

There is a substantial amount of literature on customers, the majority of this as studies of consumer behaviour. This in turn has been derived in the main, from marketing and economics researchers. The broad focus of their efforts offers apparent significance to our needs, and the work of major theorists in the area may be summarized as follows.

Consumer behaviour as defined by Engel and colleagues (1968) is:-

> "the act of individuals directly involved in obtaining and using economic goods and services, including the decision processes that precede and determine these acts."

The focus is shopping, marketing, and buying behaviour. Nicosia (1966) attempts to condense consumer behaviour into 4 equations arising from four major variables:

1) the final act of buying,
2) motivation,
3) attitude, and
4) communication sent by business firms.

Engel and colleagues (1968) present a 5-phase theory of consumer behaviour.

1) need exists,
2) search for alternatives,
3) evaluation of alternatives,
4) purchase,
5) experience which may influence future buying behaviour.

Howard and Sheth (1969) suggest that the stages involved in consumer behaviour are:

1) a goal,
2) a triggering cue which activates the satiation process,
3) choice process (affected by state of predisposition; e.g. 'high predisposition' leads to no selection),
4) information search (ruled by personal and impersonal sources).

Ehrenberg (1972) has offered a widely used theory of repeat buying based on stationary markets i.e. markets which do not change over time, especially markets concerned with utility and household items, e.g. soap powder.

Although the setting is appropriate, the findings are not suitable for the kind of needs we have. Much of the research reviewed reflects an ulterior motive in many instances of manipulating consumer behaviour towards a certain market. Hence, when Tuck (1976) produced "How do we Choose", there was a possibility that we may at long last come to grips with the 'how' rather than the 'why' of consumer behaviour. Unfortunately Tuck, too, was to succumb in the final instance, to the academic fascination that consumer behaviour has for many researchers. She concludes with Fishbein's theory (Fishbein and Ajzen, 1975). Briefly stated, it explains the Behavioural Intention of a person (to buy, vote, act) in terms of the additive influence of regression weighted Attitude to the Act (how I feel) and the Subjective Norm (how others may feel)

$$BI = Aact_{W1} + SN_{W2}$$

Unfortunately, it still leaves our needs for helping a customer, unfulfilled. How can we assist the customer who seeks to purchase an item or a service, but who finds that there exist too many alternatives to consider? If behavioural intention stems from attitude to the act and subjective norms, how is the person to exhaust the consideration of all the alternatives that exist, as a lead-up to the final choice?

We therefore need to turn to a different class of theorists; those that concentrate their efforts on search behaviour and decision making.

Here, a considerable amount of work has been carried out by psychologists. Arndt (1969) provides an attractive summary of consumer models in existence. The "defenceless consumer" is the model which places the customer at the centre of a number of manipulative influences. The "recalcitrant consumer" is the model of a customer, somewhat an opposite to the "defenceless consumer", in the sense that he is highly self-reliant and less subject to manipulation from the environment. The "problem solving consumer" sees the customer engaged in a buying decision problem which to help solve, he resorts to available information.

Howard and Sheth (1969) base their theory cited earlier on the level of predisposition of the customer. Decision-making for the customer reduces to one of three forms of problem solving:

a) Extensive problem-solving, which is based not only on considering amongst products, but also classes of products.
b) Limited problem-solving, which narrows down to selecting between a class of products.
c) Routinized Response Behaviour, where the buyer knows exactly what he is going for and there is no decision to make.

If indeed consumer models can be narrowed down to the defenceless, the recalcitrant, and the problem-solving consumers, then the reader will recognise the parity that exists with the work of Attribution theorists cited in the review of man-man interaction in Chapter 1. The issue for Attribution theorists (e.g. Heider, 1944) is whether the action of a person could be attributed to the Self (which has interesting links with the recalcitrant who is more self-reliant and less on external sources in the environment), the Environment, (which has interesting links with the defenceless customer who seems most exposed to external forces in the Environment), or the combination between Self and Environment (the problem-solving consumer processes and selects those aspects of the Environment which will support his task, as defined in his own way).

There is little evidence in real-life of the Self alone, or the Environment alone, dictating terms for man to act in a particular manner, which indirectly leads us to the attractiveness of the problem-solving model of man. Rather than reject the models of the defenceless and the recalcitrant consumers, we will assert their usefulness for our purpose, by suggesting that most if not all customers may be seen to exist along a continuum whose ends are the defenceless consumer on the one hand, and the recalcitrant, on the other. A large amount of customer behaviour, lying between these two extremes, may proceed along problem-solving lines.

Arndt (1969) describes the problem-solving customer's situation as:

> "The consumer has, or is trying to formulate, a set of buying goals. Uncertainty exists both in regard to the formulation of appropriate goals and to the matching of existing (perhaps unknown) alternative products and brands with these goals. The consumer tries to reduce or cope with uncertainty by drawing on stored information (experience) and by seeking and processing new information".

In addition, the problem-solving model allows for rational behaviour by the customer. This is to say that even the subjective nature of this kind of customer decision-making may be quite rational to a customer's own terms of reference. As Markin (1969) puts it,

> "Inasmuch as his behaviour is goal-oriented, regardless of what that goal may be, inasmuch as the customer is a sensory and data-gathering organism, despite the fact that he wants his information embellished with some fanciful entertainment, he ought to be viewed as rational".

Choice between items is carried out by an examination of various attributes contained in each alternative. Here the issue, is explained, simply but attractively, by 'vector psychologists' (e.g. Bilkey, 1951). The purchasing problem stems from the conflict between the consumer's attraction towards certain attributes of the product (positive valences), and his repulsion against other attributes regarding the problem (negative valences). If the combined valence is positive, a purchase will be made. If

the combined value is negative, the purchase will not be made. Putting it in another way, the customer will purchase the item with the strongest valence.

This relates to the second of the two major aspects of decision making, i.e. to 'riskless' rather than 'risky' decision-making. Risky decision-making is characterized mostly by a risk attached to each plan of action or outcome. It is relatively strict and precise, one on which many business and military operations are based, and is also the kind on which many operational research techniques are based. The customer activity that we are concerned about is different from these strict, strategic characteristics, as the next paragraph will elaborate.

Various researchers address this kind of customer activity in terms of utility values, subjective decision-making and the problem of choosing between multi-attribute alternatives. (Yntema and Torgerson (1961), Adams and Fagot (1959), Shepard (1964).) The main propositions of this model may be summarised in the following way:

1) This kind of decision-making may be said to fall in the area of 'riskless choice'.
2) The optimum choice is the one based on the highest subjective overall evaluation of an alternative.
3) Each alternative may be segmentalised into component attributes each of which may be attached a 'utility', 'worth', or simply a 'preference weighting'. The addition of these separate utilities may combine to produce the overall utility value attached to an alternative.

4) A dilemma may result when two or more alternatives are compared which have unrelated, but equally appealing, attributes.

Much of present day household decision making stems from urban households, many of which are characterized by nuclear rather than extended, families. Litwak and Szelanyi (1969) argue that the nuclear family is particularly handicapped on the experience criterion governing their household decision-making. In their efforts to draw on their own experience, which may be limited, they have to resort to the environmental cues more than they would have if they were not an isolated nuclear family. Midgley and Christopher (1975) explain the problems that an over-reliance on the environment can produce. Many purchase decisions, especially those with "high social and/or economic risk", have to be made for which "the isolated nuclear family is poorly equipped. They are poorly equipped because the rate of innovation and technological chang has reduced their facility for assimilating information and making objective assessments."

4.2.3 Structure of a Consumer Task

An inspection of consumer magazines such as "Which?" and "What Buy?" provide a neat summary of the structure in which a customer may process his information. Information for most products and services is organised first in terms of selected aspects. For example, for carpet fibres (Which? May 1973), these could be Wear, Resistance to Flattening, Soil and Stain Resistance,

Ease of Cleaning, and 'other points'. Each factor is then given an attribute and an attached rating, for different kinds of carpet fibres. ('Factor' here, is simply one of several aspects or categories into which a commodity may be represented. An 'Attribute' then is the definition within that category.) The customer then looks at the table of information, and somehow arrives at a 'best buy'. However, even with extensive service carried out by such consumer magazines, there are many consumer aspects which they cannot cover. They offer a fixed structure on all readers, i.e. they base their considerations on factors and attributes which both in their nature and definition may or may not be relevant to the customer. Secondly, they do not allow for individually based utility values which form the basis of the vector psychology model of decision-making. Especially for complex buying problems, e.g. cars and houses, the customer may have differing priorities to attach to the various attributes. It is possible that these magazines do attempt their best to aid the customer but that within the limitations of structure within which they have to operate, they can only offer factors and attributes which are assumed to be equally important.

While such magazines do leave the customer to his own final choice of item, the nature of service offered is often limited in terms of practical relevance. As Klahr (1970) states, referring to the provision of long lists of attributes or products:

> "Is such a presentation actually useful to the consumer? Can he consult his thirty-six dimensional utility function for automobiles and determine which auto vector yields maximum utility? Can the human decision-maker deal with this degree of complexity, given his demonstrably limited capacity to notice, to remember, and to compute ?"

It is exactly to this end that a computer may be usefully employed. It can provide both the computational and individually based benefits, especially if one takes due care in establishing that the new situation, arising from the use of computer aided technology, links closely to the real-life nature of the consumer task.

4.2.4 House-hunting

The real-life choice/decision problem selected for this investigation is house-buying or house-hunting because it offers all the main facets of a customer's complex problem-solving behaviour. In addition, it offers significant real-life relevance, especially in urban areas where the problem of the house-hunter takes on strenuous proportions.

4.2.5 The Problem-Solving Customer: Relevant Issues

Two relevant issues seem important when considering the problem-solving customer. They are both related to the customers' needs, and especially to the issue of how well-defined the needs may be at the outset of the task.

One factor which would lend special definition to needs is that of Experience which various researchers address (Engel et al. (1968), Arndt (1969), Litwak and Szelenyi (1969), Midgley and

Christopher (1975).) The extent of assistance sought from the environment may then depend on the needs borne of personal experience.

As Arndt (1969) puts it:

"... the problem-solving customer draws on stored information (experience), and by seeking and processing new information".

The second important factor may be the orientation of the customer. Although literature makes an indirect mention of needs, there is little address specifically to uniqueness of needs (e.g. for the person-centred customer, Chapter 1) or the means by which participants may seek to resolve their tasks (e.g. person- and efficiency-centred orientations, Chapters 2 and 3). Both these, however, seem highly relevant to the behaviour of the customer, and hence, we shall retain as a second relevant aspect of the customer model, our own findings on person/efficiency orientations of customers

These two dimensions will be developed further in the light of the findings of a small-scale interview study, outlined a little later. Attention is now turned to the case of house-buying customers.

4.2.6 Work on house-buying customers

Canter and colleagues (1976) have carried out some interesting work with house-hunting customers based on a sample of residents in the Guildford area of Surrey.

One of their conclusions specially seems to characterise the person-centred customer. Canter and colleagues comment:

> "The reasons why a person buys a house are far more complicated than the bland investment, security, privacy, reasons customarily given. These idio-syncractic motives affect the style with which people buy and help shape their housing aspirations. They are more varied and diversified than the stereotyped reasons evident in newspapers or political statements."

In addition, they suggest four main stages involved in house buying, the first of which seems particularly relevant to the double-interaction potential for the house-hunting process.

1. Search - transformation of housing aspirations and needs into actions.
2. Feasibility - checking out acceptability of a potential house.
3. Negotiation/Consolidation - legal transfer of property.
4. Satisfaction - assessment of purchase.

They list as the main problems associated with the search stage,

1. Finding what you want
2. Time taken in searching
3. Inaccurate information
4. Inopportune information
5. High prices

To cope with the problems, customers modify their specifications by a host of methods such as enlarging area of search, increasing price, making a check list of requirements, etc.

4.2.7 Husband-Wife Decision-making

House-buying may be viewed more than most other household purchases, as joint husband-wife decision-making. Midgley and Christopher (1975) have reported an in-depth study of the issue using the Repertory Grid Technique. Their conclusions may be summarised thus:

1. "The tendency was for husbands and wives to exhibit a considerable degree of similarity in their perception of joint decision-making situations."
2. Where some differences between husband and wife decision-making di emerge, these were in the weightings attached to different factors

We may therefore draw some justification in proceeding with the experiment on lines of individual decision-making, but with a view that if clashes of choice between husband and wife do arise, these may be resolved in their home, rather than in the experimental environment.

4.2.8 Interview with an Estate Agent

It is seldom the case that literature answers exactly to the needs of a searcher. Although several issues have been established as pertinent to the problem of the customer that a double-interaction system should purport to meet, as well as to the

relevance of the task chosen on which to base the experiment, one last effort is needed. We need to address the issue of the changing needs of customers, either as a case of the 'erring human' model, or as a case of humans seeking adjustment to their environments.

An in-depth interview was conducted with an estate agent, who kindly agreed to co-operate. This estate agent had an extensive professional record of operating in and around Loughborough. The full questionnaire/interview appears in Appendix 7, but the summary may be noted. The distribution of customers who he had met in his professional career whose needs remained the same, as compared to those whose did not, throughout a house-buying transaction, is outlined in rough percentages in Table 19. Roughly, for 15% of customers, the needs remain the same. For the rest, half undergo substantial changes.

This highlights the need for technology to provide some ready means for customers to be able to revise their needs. There is also an interesting bias in the distribution, towards the customer whose needs change. One interpretation is that for the vast majority of customers, the ideal is seldom met. Hence, it is possible that the way the needs remain fixed for some customers and substantially change for others may depend on the interaction between level of experience and person/efficiency orientations, as suggested earlier.

needs remain same	15%
needs undergo slight refinement/changes	42½%
needs undergo substantial refinement/changes	42½%

Table 19: House-hunting Customers and the Exactness of their Initial Specification

In addition, the estate agent made the following comments:

1. "If you compared the final house they buy with what they set out to buy in the first place, you wouldn't believe your eyes."
2. "Some stick to their guns right the way through."

His comments on computer systems that have been tried out and failed were:

1. the system did not account for "the personal choice element".
2. "straightforward retrieval has been impractical in real life".
3. on most occasions the system either "output 1 house or something like 40 houses. In either case, the customer would be left somewhat dissatisfied."

4.2.9 Decision

We may adopt a two way classification of customers: Person-cented or Efficiency-centred, and Experienced or Non-experienced. The issue of needs, which may vary from the few primary ones, to a higher level, diverse set, makes the person-centred category highly relevant. The experience dimension, on the other hand, seems particularly

relevant to the solving of complex and important household problems. In matters such as house-hunting, the effect of experience may not only derive from the knowledge gained from previous house-hunting encounters, but experience may also relate to the present needs of the customer in another way. New needs may define the transition from the non-experienced status (i.e. first-time buyer) to the experienced status (second-time or third-time buyer), as ruled by the change in personal aspirations ('better life') or in family status (children).

We may list the following parameters as those incorporating the customer from whom the customer-centred task interpretation should derive, and, on which subsequently, the associated system designs should be based.

1. Customers err, or may re-define their needs to adjust to the environment.
2. Customers may have well-defined needs of their own (e.g. person-centred customers, and experienced customers).
3. There may be a need to provide customers in general, and person-centred customers in particular, with a facility to choose their ov terms of reference.
4. Customers may elect to seek guidance from the environment (e.g. 'defenceless customer'). There may therefore be a need to provide such customers with a guideline of aspects to select from.

5. Customers have differing subjective utility values to attach to separate features representing the commodity or service to which they aspire ('valence psychology'). There may be a need to provide the customers with a facility to attach weightings to their objectives as well as to state special preferences.
6. Customers may prefer having their houses output in an order of overall subjective utilities computed by the computer, to complement the limited information processing capacities of customers (e.g. Klahr (1970)), and generally to ease the burden of house-hunting.
7. For the customers to be treated as problem-solving individuals with authority over their needs and wishes.
8. Rather than technology deciding for the customer, customers to be provided with a platform on which to make decisions. There may be merit, therefore, in the computer outputting a finite number of best houses for each customer (say 10), which the customer may easily handle, as well as for outputting both 'hits and near-hits' to minimize the danger that the estate agent illustrated in section 4.2.8.

4.3 SYSTEM DESIGN

Here, we address the issue of computer systems designed firstly on a customer-centred task interpretation, and secondly, on a system-centred task interpretation. The two technologies will serve as a basis for the planned experiment. The house-hunting task which the two technologies purport to serve will be outlined in due course.

4.3.1 Customer-centred Technology

The design of technology here was planned to be based on the issues defining the customer model we derived in section 4.2 and which was summarised in section 4.2.9. These detailed implications will be taken up as the basis for the design of a customer-centred technology.

4.3.2 System-centred Technology

A brief statement explaining the system-centred approach may be formulated thus: There is a simple progression along 3 main stages:

a) The ideal commodity may be defined along a finite fixed number of factors,

b) This specification may be input into a computer equipped with a data bank consisting of a number of available commodities of a particular kind.

c) The computer would match the input specification, with each item in the data bank, to come up with the ideal commodity.

The aim was to reproduce an existing technology which would typify this approach of system design, but which also come under the category of house-hunting technology. Fortunately, a lot of the dilemma was resolved when the author was introduced to a house-hunting system which appeared in an advertising package of one of the computer manufacturers. The advertised system had a lot of qualities that could be interpreted as stemming from a 'system-centred task interpretation'. The alternative version for the experiment was therefore modelled on this system.

In addition, a number of artificial measures were incorporated into this version to enhance its overall attraction in order to offset uncontrolled bias that may influence its design. These will be explained in the next section.

4.3.3 The Two Technologies

We may summarise the nature of the two system approaches as:

1. customer-centred approach based on customer-centred task interpretation, and employing a customer-first philosophy.
2. system-centred approach, based on a system-centred task interpretation, and employing a system-first philosophy, with the task thought to consist of a fixed number of component operations.

The departmental programmer was approached with a specification bearing these two broad aims in mind.

Table 20 summarises how the two technologies were to attempt to support the task adopted for the experiment.

To help understand the real-life context, specimens are provided of how the 2 technologies may support a house-hunting task (Appendix 8). For the system-centred technology, the customer is armed with a hand-out bearing a list of factors, each with an attached list of attributes, from which the customer has to select one attribute (Appendix 11).

System-centred Technology	Customer-centred Technology
1. provides factors	evolves factors (but may provide guidelines)
2. provides attributes	evolves attributes
3. is simple: no facility to revise or combine objectives	is complex: facility to revise and combine objectives, and to state special preferences
4. treats all objectives as being equally important	allows for objectives to have different weightings
5. final selection in no particular order	final selection ordered according to computed overall subjective value

Table 20: How each Technology supports the Task

In addition to the information in Table 20, the customer-centred technology allowed for input of alternative attributes, which the system-centred did not generally allow.

It was remarked earlier how certain features of the system-centred technology did not stem directly from a purely system-centred task interpretation. These customer-centred features were incorporated into the system-centred technology, however, to offset the uncontrolled bias that may beset its design. There were mainly three such features.

1) As in the case of the customer-centred version, the system-centred version allowed for immediate correcting of errors. (Real life systems may not have such a facility, as pointed out by Hebditch (1977).)
2) The system-centred version was to select the best-fit houses, at the end of transaction, as in the case of the customer-centred version. (Real life system may output absolute hits only, as seen in the comments of the estate agent.)
3) Although generally each factor was to be specified by a selection of one attribute only from the attached list, this rigidity was not applied for 2 factors which were thought to be handicapped by the absence of this feature. As such, the factors Other/Rooms and Other/Features were allowed a combination of attributes.

Both technologies in addition had certain features that were necessary for experimental control purposes. The main need here was for defence against customers assessing the suitability of each system on the merits of the houses the system output, rather than base on the nature of the system itself. Also, there were practical problems in devising a data bank large enough to accommodate the needs of a wide variety of customers. It was decided therefore that the syst would generate its own data, based on each customer specification, employing randomized techniques, and thus provide 2 sets of selections which would prove equally attractive to the customer. Hence, when assessing each technology, the customer would in theory, not be influenced by the nature of houses output by each version.

4.3.4 Development

Taking normal technical and other delays into account, as well as extensive de-bugging and feasibility testing, the system took 7 months to develop.

The two versions of the system are outlined in flowchart form in Appendix 9.

4.4 THE EXPERIMENT

4.4.1 Predictions

The system-centred technology was based on a system-centred task interpretation, and its design was undertaken on 'system-first' principles.

The customer-centred version was based on a customer-centred task interpretation, and its design was undertaken on 'customer-first' principles. The customer model that this version was built on included aspects which were held, separately or commonly, by a wide range of customers as seen in section 4.2. It was remarked in section 4.1.1 that systems in real life although based on a system-centred task interpretation, do provide incidental benefits for some customers. Who, if any, is the kind of customer for whom the system-centred technology is likely to provide benefits?

	Experienced Customers	Non-experienced Customers
Person-centred Customers	(cell 1)	(cell 2)
Efficiency-centred Customers	(cell 3)	(cell 4)

Table 21: Experimental Paradigm

We may undertake to speculate on the reception of each technology by real-life house-hunting customers, by considering in turn, each of the 4 cells representing the different customers making up our model (Table 21).

Cell 1: Person-centred/experienced customer

The person-centred customer is characterised by needs which he considers to be unique or special. Furthermore, the experienced status may further strengthen his needs. His treatment as a customer is also an important issue for him. The customer-centred approach attaches special importance to the customer, while the resulting technology offers a broad structure within which the customer may employ his own definition of the task, as well as terms of reference. As such, the customer-centred technology seems especially suited to this cell of customers.

Cell 2: Person-centred/non-experienced Customer

As suggested in previous sub-sections, and elsewhere in chapter 1, a person-centred customer finds few situations which meet his ideal. Even as a non-experienced customer, the nature and intensity of whatever needs he may have, would take precedence for him, and any situation which did not allow him to express these needs fully and in his own way, would prove inadequate. He would therefore, also find the customer-centred approach suitable.

Cell 3: Efficiency-centred/Experienced customer

This customer, being experienced, may have developed needs which structured approach of the system-centred technology may not account for. If his efficiency needs are interpreted as a trade-off between simplicity and thoroughness, the thoroughness of the customer-centred technology in meeting his needs, would outweigh the simplicity of the system-centred technology. He would be likelier with the first to obtain the kind of house he sought. He would find some attraction, however, in the structure that the system-centred technology offered, but this he could draw from the guideline that the customer-centred version provided as an option. This customer too would favour the customer-centred technology.

Cell 4: Efficiency-centred/non-experienced customer

This customer is in some ways the odd one out. His efficiency needs would dictate simplicity and thoroughness. However, his non-experience would mean that the thoroughness would have to be derived from the Environment rather than from the Self.

In other words, he would come closest to the defenceless-customer concept. He would depend on external resources to provide a definition of his task. The make up of the system-centred technology would do this quite tidily for the customer. Both simplicity and thoroughness thus, could be provided by the system-centred rather than the customer-centred technology. On the other hand, the customer-centred approach did offer as an option, a guideline of factors that he could select from, while also offering various attractive and practical options of being able to revise and re-define one's objectives. Although a little difficult to do, we may nonetheless predict that this customer too, everything considered, would favour the customer-centred technology.

In general, therefore, for the 4 cells, we may predict that a significant majority in each cell would prefer overall, to work with the customer-centred rather than the system-centred technology.

Before finalising the hypothesis and extending it to sub-hypotheses, we may pause to consider in brief, a small scale pilot study that was carried out. Although the aims of the pilot were mainly to test the real-life relevance of the system for customers, as well as to test the experimental design issues, the results had a small but important effect on the nature of the hypothesis.

4.4.2 Pilot Study

The pilot study was based on 6 customers, 3 first-time buyers and 3 second or third-time buyers. The three experienced buyers were deliberately selected to be academic/research staff, to provide expert opinion on experimental design issues, since the needs of hypothesis testing at this stage were less critical than the need to test firstly, the real life relevance of the system, and secondly, the experimental setting.

The criticism of one researcher was that by providing the guideline option to the customer-centred technology, this also removed, what to his thinking, was the main advantage of the system-centred technology. Thus, he argued, that in providing the customer-centred technology with a guideline, there was a danger of making this version look too attractive. It would be scientifically more acceptable to deprive the customer-centred technology of the guideline option, and rather for the customer-centred approach to base itself on the customer who selects his own factors and attributes, unassisted. This would minimise any trace of artificial advantage that one might associate with the customer-centred technology.

The advantages that the customer-centred technology offered, were thought to stem directly from the underlying philosophy dictating the customer-centred design. However, the subject's criticism was considered highly relevant and it was decided therefore that the

guideline option be taken away from the customer-centred version. However, this issue could still be treated at an exploratory level. The questionnaire could incorporate questions to obtain from the customer whether he would have preferred to work with a guideline. Other results of the pilot, besides some minor methodological issues, are summarised below.

1. The customers agreed on the relevance and real-life nature of the situation.
2. The overall distribution of customers in the pilot was 5 in favour of the customer-centred technology, 1 in favour of the system-centred technology. The latter was an efficiency-centred, non-experienced customer, who was not offered the guideline option for the customer-centred technology.
3. The two selections of houses, as may be remembered, were generated by the computer on randomised principle to offer equal attractiveness to customer. However, the pilot study revealed that there was still some danger of one or two houses appearing in a selection that could be of chance personal significance to some customers, and this issue may then influence his assessment of other issues. The possibility of such contamination over assessment of other features, especially over the overall assessment, needed guarding against. It was decided therefore to withhold both selections until the customer had filled in all the questions leading to and including the decisive question of overall preferences for one or the other technology. Following this, the selections would be revealed

to him and the customer would then fill in the questions relating to the selections. (The questionnaire will be outlined in more detail in the sections to follow, and appears in Appendix 10.)

4.4.3 Hypothesis

The developments from the pilot, and the subsequent change in experimental conditions, meant revising the original predictions.

The removal of the guideline as an option offered by the customer-centred technology would not make much difference to the person-centred customers, and little to the experienced efficiency-centred customer who would still find this technology more suited to his experienced status.

The impact on the non-experienced efficiency-centred customer, by contrast, would be considerably different. The advantages of the system-centred technology were that whereas it would impose a structure on people with unique and/or well defined needs, it would offer a structure to people with unformulated needs, such as the non-experienced efficiency-centred customer. The guideline option would transfer some of this advantage to the customer-centred technology. But with the guideline option eliminated, the customer-centred technology was likely to prove too extravagant for the needs of the non-experienced efficiency-centred customer. Hence, the

prediction needed rephrasing. There was now a greater possibility of a mixed, rather than a partisan reception, for either technology by this customer. We may now be in a position to state the predictions in the form of hypotheses.

General Hypothesis

A significant majority of customers would prefer working with a technology designed on customer-centred rather than a system-centred task interpretation.

In detail, (refer to Table 22).

1. The person-centred customer who was an experienced house-hunter would prefer the customer-centred technology (cell 1).
2. The person-centred customer, who was non-experienced house-hunter, would prefer the customer-centred technology (cell 2).
3. The efficiency-centred customer, who was an experienced house-hunter, would prefer the customer-centred technology (cell 3).
4. The efficiency-centred customer, who was non-experienced, would offer a mixed reception to both the customer-centred and the system-centred technology (cell 4).

	Experienced Customers	Non-experienced Customers
Person-centred Customers	prefer customer-centred technology (cell 1)	prefer customer-centred technology (cell 2)
Efficiency-centred Customers	prefer customer-centred technology (cell 3)	some prefer customer-centred technology others prefer system-centred technology (cell 4)

Table 22: Experimental Paradigm with Hypothesis Predictions

The hypothesis testing would be based on the ratio of the number of customers preferring one technology, to the number of customers preferring the other technology. After considering a number of sub-issues as a build-up to the overall assessment, Question 7a in the questionnaire (Appendix 10) asked the customer to attach an overall preference to one of the 2 technologies met. Hewas also asked to state the reasons attached to his preference, which he was to undertake on a self-report basis.

As a secondary issue, he was asked if he thought that a minor adjustment to the non-preferred technology would improve it to such an extent that he would then prefer this technology over the one he had picked earlier. This was to assess any special advantages that the non-preferred technology nonetheless offered the customer (question 7b).

4.4.4 Sub-hypotheses

It may be remembered that each version had component features making up, collectively, the overall customer-centred nature of one version, and the overall system-centred nature of the other. The hypothesis can now be extended to predictions about these separate features.

The assessment of any one component feature per se, is unlikely to predict the assessment of the overall system. However, the assessment of separate features would serve a useful role as exploratory issues. For the sake of simplicity, the sub-hypotheses may be linked to the overall hypothesis, on a one-to-one basis. To qualify, customers in cells 1, 2 and 3 would prefer the separate features associated with the customer-centred technology as outlined in Table 23. The customer in cell 4 would have mixed views, preferring some customer-centred, and some system-centred features.

In addition, there was another issue that the questionnaire explored (Q.6, Appendix 10, Part C). The pilot had demonstrated that the customers found the system 'real' and believed that the data bank contained details of a large number of actual houses on the market. The aim here was to test the customer's reliance on technology of another nature. Both systems would conclude with a selection of houses. Question 6 would seek an answer to the question: "How far does the impact on the customer, of the stages leading to a final selection of houses output by the computer, rule the level of confidence he attaches to this selection?"

Customer-centred technology	Related Question Nos. in Questionnaire (App. 8)	System-centred technology
1) pick their own factors, unaided	1a,b 1c	1) computer to provide a finite number of factors
2) pick their own attributes, unaided	2i a,b 2ic	2) computer to attach a finite list of attributes to each factor for the customer to select from
3) to have one or more attribute per factor	2iib 2iia	3) to have one attribute only per factor
4) to state any special preferences that they might have	3ia 3ib 3iiia 3iiib	4) not to have any special preferences
5) to be able to change/ revise/redefine objectives	3iib 3iia	5) not to have to change/ revise/redefine objectives
6) to be able to rank or rate their objectives	4a 4b	6) computer to treat all objectives as being of equal importance
7) computer to provide the final selection of houses ordered according to the overall utility values computed by computer from customer's weightings to objectives	5ib 5ia	7) computer to provide final selection of houses in any order

Table 23: Detailed Features of the Two Technologies

4.4.5 The Questionnaire

(The full questionnaire appears in Appendix 10.)

The questionnaire which has already been introduced in the previous section is in 3 parts.

Part A serves as back-up information of secondary importance to the study.

Part B is devoted to the study of customer status and customer-orientation, to be explained more fully in section 4.4.7.

Part C represents the main, or the assessment part of the questionnaire. The customer considers a number of separate features making up the 2 technologies, as a build-up to the overall assessment (q.7) when he decides which technology suited him better and why.

The order in which each question in the questionnaire sought answers on the acceptability of a System A or a System B feature, was randomly alternated to counter order effects. In addition, the alternatives to each question were phrased to appear equally attractive to avoid response bias. Finally, there were a number of questions asked by the questionnaire as side issues to the main study. These appeared mostly in Part A of the questionnaire and were a part of an adopted policy by the author of dealing also with side-issues on the off-chance that some useful discoveries might be made.

4.4.6 The Intermediary

It was pointed out earlier that the aims and nature of study involved neutralising the effect of the intermediary.

It was decided, on considering the various pros and cons relating to the technical aspects of the situation, that the author himself would act as an intermediary. The reasons were mainly the following:

1) The intermediary would have to be extensively trained to understand and operate the technologies, especially for tackling the more complex features. The author was actively engaged in the development of the system and was the only expert operator.
2) The system had already run months beyond schedule and the training of an operator was thought to create unnecessary further delay.
3) The knowledge of his own discovery that an intermediary, too, may have a person-centred or an efficiency-centred approach to the customer (Chapters 1 and 2), meant that the author may be suitably placed to adopt a neutral approach in the experiment. This was mainly attempted by assuming the role, as far as possible, of a 'terminal expert', i.e. as an operator of the terminal on behalf of a customer. The intermediary was to interfere in no other way, even if guidance was sought, unless this was experiment-, rather than task-specific.

4) First-hand experience for the author, of the impact of technology on the intermediary's task, especially with reference to serving a customer, would provide valuable insights. This had been one of the pitfalls in a previous study, but in that experiment, the intermediary was an experimental variable defining critically, one aspect of the experimental condition. Here, the intermediary was not an experimental variable, and hence, this would be a useful opportunity for gaining first-hand insights. Many of the findings to emerge, it was thought, could now be understood in more practical terms.

There were few signs of possible interference in the running of the experiment. The intermediary was merely to act the role of an interface between computer and customer, and the conduct was bound by the system design undertaken. In addition, the customers would be assessing the situation by choosing between 2 technologies and between sets of features, which were little related to the intermediary.

Again, the assessment was to be undertaken on a self-report basis, with no interference from the intermediary. The intermediary was to interfere only when the customer preferred to be interviewed, (e.g. due to bad sight).

4.4.7 Customer Classification

Experience/non-experience

This was done simply by selecting subjects roughly on a fifty-fifty basis, that half were first time buyers (non-experienced) and half were second or third time buyers (experienced). This status was further substantiated in their answers to questions 1 to 5 of Part B of the questionnaire (Appendix 10).

Person/Efficiency-centred Orientation

A simple methodology was employed whereby each customer was asked to rank in order of importance, 6 qualities of the service, as well as of the person serving, that would define his real-life house-hunting task encounters (question 6, Part B).

Three of these were person-related (interesting, friendly and personal) and three were efficiency-related (concise, quick, and accurate). Inverting the ranks, and summing over the 3 qualities would provide a Person to Efficiency ratio. The bias in the ratio would then be used to depict person- or efficiency-orientation.

Whereas the experience/non-experience distribution was controlled by selection, no selection was employed for the person/efficiency orientation distribution mainly for two reasons.

1) Prior screening was impractical.
2) Lack of prior selection would retain the real-life nature of the sample, and the study.

4.4.8 Customer Type

It was decided to base the study, as in previous studies by the author, on a sample representing the general public. In addition, the customers were to fall in one of the following marital categories: 'married', 'once married', living with a boyfriend or a girlfriend, or 'single adult', status. It would be much easier to base the sample on students, but this would undermine the significance of the study while also limiting grossly the possibility of generalising. Indeed, students were particularly avoided, except in the case where they were in a position to be classified into one of the first 3 categories.

4.4.9 Sample Size

The aim was a sample size of 40 customers, as a rough figure, and this figure was to be enlarged until each of the 4 cells was amenable to significance testing.

4.4.10 Statistics

A frequency count of customers preferring one technology to the other would lead to dichotomous frequencies amenable for testing by the Binomial Test (Siegel, 1956). For combined frequencies in excess of 25, Siegel recommends transfer from bionomial to normal distribution and the use of the Z-test. In so doing, one also moves from a non-parametric to a parametric test, while the raw data is of discrete nature. Siegel

therefore recommends that the combined frequencies in excess of 25 be first corrected for continuity and then tested by the Z-test. These recommendations were followed.

4.4.11 Experimental Design

Each customer was to engage in a house-hunting exercise assisted first by one technology, then by the other. The order was alternated within each cell, so that each cell when complete would have half the number who met the customer-centred technology first and, half who would meet the system-centred technology first.

The order would therefore be determined by the cell to which the customer belonged. The experienced/non-experienced status of the customer was roughly pre-determined, and therefore the problem reduced to determining the orientation.

The person- or efficiency-orientation was determined from the top 3 ranks to see whether the higher number of qualities ranked 1, 2, or 3 belonged to person- or efficiency-class. This provided a quick and ready means of determining the orientation of the customer, as any more detailed an analysis at this stage would interfere with the running of the experiment.

For the first half of the experiment (i.e. about 20 customers), the order was simply alternated between one customer meeting one version first, and the next customer meeting the other version first, without first seeking to determine the cell to which the customer might belong.

4.4.12 Experimental Setting

Customers drawn from mixed occupations from Loughborough and surrounds were invited to participate in a house-hunting exercise. The focus was reserved only for customers with real house-hunting needs, i.e. customers of adult status as outlined earlier. Students were particularly avoided unless they fitted into one of the required categories.

Each customer willing to participate was introduced to the nature of the situation, but not of the study, and was asked to hunt f a house appropriate to his current personal circumstances. He was asked to present himself at the Research Laboratories, as if he was going to an Estate Agents, with a real-life house-hunting problem. He was to have some notion of a house, that he wanted to buy at the present. He was told he would be helped in his search for suitable houses first by one computer technology as if at one Eatate Agents, and then by another computer technology as if at another Estate Agents. He was told that at the end of the exercise he would be asked for his likes and dislikes, of the two technologies he had met.

Each customer, on arrival, was asked to fill in Parts A and B of the questionnaire. The relevant parts of his answers were checked to determine the order in which he should meet the two systems.

For the customer-centred approach, he was asked for factors or aspects he was looking for, which would then be entered into the computer. For the system-centred approach, he would be given a hand-out (Appendix11), and asked to call out his selection to each factor in turn, from the attached list of attributes.

On completion of his task, and while the computer was prepared for data generation, computation, and output, he was provided with some tourism brochures to browse through, as an interlude. On output of the selection of houses, the selection was stored away from the customer, and the customer asked to prepare himself for his next house-hunting. Here, he would be supported by the second technology, and when this task was completed, he was given the two progress sheets (hard copy printouts, see specimens in Appendix 8), associated with each technology, and marked A and B according to the order in which he met the 2 conditions.

He was asked to use these sheets as a reference for filling in questions 1 to 4, and 7 of Part C of the Questionnaire. (Questions 5 and 6 were left to the end because they related to the house-selections. As will be recalled, it was decided to withhold the selections until the customer had finished outlining his preferences in questions 1 to 4, and his overall preference in question 7. This was so that the house data depicted in the selections did not interfere with his assessment overall, as well as of the separate features of the system.) Meanwhile, the intermediary would prepare the computer for data generation, and when the selection of houses was output, he would wait for the customer to finish filling in the questions. The customer, when

ready, was finally provided with the 2 selections of houses marked A and B as appropriate, to study and to make his assessments in questions 5 and 6.

The total time of engagement varied between 45 minutes and 2 and a half hours, with the customer-centred technology usually taking up to one and a half times, or sometimes twice, the amount of time taken by the system-centred technology.

In this way, over an intensive period lasting one month, 42 customers participated in the study.

4.5 RESULTS

The analysis involved the following stages:-

1)a. determination of the experience status by prior screening and substantiating from experience-related parts of the questionnaire (Part B, questions 1 to 5).

b. determination of customer-orientation from person-efficiency parts of the questionnaire (Part B, question 6). The derivations were explained in section 4.4.6. Each customer was accordingly allocated to the 4 cells outlined earlier.

2) Frequency count for each cell, resulting in a dichotomous frequency linked to the number of cases preferring technology A to technology B, or feature A to feature B.

3) Recording the qualitative aspects of the questions. These were mainly the reasons justifying the customer's overall choice, and whether there were special advantages derived also from the non-preferred technology.

Appendix 12 provides a Sex, Age, and Occupation breakdown of the 42 customers. Appendix 13, outlines the full results, from which sub-sections will be derived and displayed in the text to follow, from time to time, to aid the discussion of results.

Table 24 outlines the final breakdown of the 42 customers for the 4 cells. It may be recalled that the experienced/non-experienced qualification was controlled while person-efficiency distribution was not. This explains the balanced distribution of experienced and non-experienced customers, and the non-balanced distribution of person- and efficiency-centred customers.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	7 (cell 1)	5 (cell 2)
Efficiency-centred Customers	14 (cell 3)	16 (cell 4)

Task 24: Distribution of Customers

In the sections to follow, the initial stages will test the overall hypothesis by concentrating on answers to question 7 in the questionnaire.

Related issues will then be explained, namely the sub-hypotheses as well as the overall patterns of behaviour amongst customers. Table 25 presents the main findings extracted from the detailed data in Appendix 13. Reference to the relevant portions of this table will be made from time to time, to aid the discussion of results.

4.5.1 System-centred v/s Customer-centred Technologies

After engaging in house-hunting supported by the 2 technologies the customers answered a number of questions relating to detailed aspects to these technologies, leading up to the final question of the overall assessment: Which technology, of the 2 they had met, would they prefer working with overall, and why? (Columns 6 and 7, and 'Reasons' in Table 25.)

customer no.	experienced customer	non-experienced customer	person-centred customer	efficiency-centred customer	prefer customer-centred technology	prefer system-centred technology	any advantages with the non-preferred technology	REASONS
1		✓		✓		✓		easier, less danger of missing out important factors
2		✓		✓		✓	✓	find it easier to choose from, rather than think up
3		✓	✓		✓			because I can see at a glance what I am looking for, and knowing what I am looking for, I would decide more easily
4		✓		✓	✓			better chance of your ideals met, personalized, individual-centred, concise
5		✓	✓		✓			took account of personal details
6	✓			✓	✓			deals with me personally
7		✓		✓		✓		more to choose from, better organised
8		✓		✓		✓		easy, already defined, clearer, more elaborate version of other approach
9	✓			✓	✓			generally better
10	✓		✓		✓			enabled me to state my own objectives
11	✓			✓	✓			more detailed account of my requirements
12	✓		✓		✓			personal preference
13	✓			✓	✓			customer details fed in rather than fixed program submitted to customers
14		✓		✓		✓		felt more at ease and sure
15		✓		✓		✓		more concise "came on the right wavelength" generally suited me much better
16	✓			✓	✓			preferred thinking through the problem, the other approach imposed a structure which was at times artificial to my situation
17	✓			✓	✓			truer picture of house I require
18	✓			✓	✓			more searching, more descriptive
19	✓			✓		✓	✓	easier
20	✓			✓		✓		more efficient mentally "one can get confused after long deep descriptive views and therefore perhaps make the wrong choice of house"
21		✓	✓		✓			more efficient, as I wound't have to look at houses which only might be suitable

Figure 25: Customer Preferences for the Customer-centred or System-centred Technology and Reasons

Customer no.	experienced customer	non-experienced customer	person-centred customer	efficiency-centred customer	prefer customer-centred technology	prefer system-centred technology	any advantages with the non-preferred technology	REASONS
22		✓		✓		✓	✓	enabled me to select, at the same time not miss out, important factors
23	✓		✓		✓			freedom of choice, possibility of changing mind
24	✓			✓		✓		easier, factors already listed for you
25		✓		✓	✓			more personal details accounted for
26		✓		✓		✓		less danger of overlooking something; had options I had missed out (more than one option would have been nice)
27	✓		✓		✓			more flexibility in choosing factors (only this version took full account of our particular needs
28	✓			✓	✓			the other not flexible enough, too narrow for such an important transaction, also forced response
29	✓		✓		✓			"I was choosing from my own experience in the light of previous experience, and knowledge of present needs"
30	✓		✓		✓			difficult to explain, more thorough
31		✓		✓		✓	✓	easier to choose from given list, also with the other version, might miss out
32	✓			✓	✓		✓	greater flexibility and qualification
33	✓		✓		✓			definitions of my own choice
34	✓			✓	✓			open, relaxed, less regimented
35	✓			✓	✓		✓	the other didn't allow for certain features, too narrow, forced response
36		✓		✓	✓			more flexible, personalized
37		✓	✓		✓			I could specify exactly what I wanted, I was not limited, and made me think more
38		✓		✓		✓		list helpful to look at and choose from
39		✓		✓	✓			more flexible, "the customer who is buying a house is not looking for everthing, but more of a home"
40		✓	✓		✓			allowed to specify my own factors
41		✓		✓		✓		includes items I may not have thought of otherwise
42		✓		✓		✓		"given the naive and minimal needs of a first time buyer, and a case for objective helpful estate agent", this approach "wisest and most comprehensive".

Table 25: Customer Preferences for the Customer-centred or the System-centred Technology and Reasons
(continued)

	Experienced Customers	Non-experienced Customers
Person-centred Customers	7:0 (cell 1)	5:0 (cell 2)
Efficiency-centred Customers	11:3 (cell 3)	4:12 (cell 4)

each cell contains ratio of customers preferring customer-centred technology, to thos preferring system-centred technology

Table 26: Frequencies for preference between Customer-centred and System-centred Technologies

Table 26 converts the individual findings into dichotomous frequencies for the 4 cells representing the customer sample.

1. Experienced Person-Centred Customers (Cell 1)

These customers were unanimously in favour of the customer-centred technology.

7:0 Binomial Probability 0.00781 Highly Significant

The reasons given by the customers in this cell, for preferring the customer-centred technology are extracted from Table 25 and appear in Table 27.

Customer No.	Reasons for preferring the customer-centred Version
10	enabled me to state my own objectives
12	personal preferences
23	freedom of choice, possibility of changing mind
27	more flexibility in choosing factors (only this version took full account of our particular needs)
29	"I was choosing from my own frame of references, in light of previous experience, and knowledge of present needs"
30	difficult to explain, more thorough
33	definitions of my own choice

Table 27: The reasons given by Experienced Person-centred Customers

Explanations

In the majority of the cases it can be seen that this customer is very particular about the issue of personal preferences, a at least 5 out of 7 addressed themselves specifically to the issue of how this technology allowed him his own personal objectives, terms of reference, or needs. The flexibility was also an issue although of secondary importance while one customer assessed its advantage in terms of thoroughness.

This reinforces the recurrent feature of this customer, that he is very particular about his personal ideals. In addition

to the natural orientation of the customer, his aspirations are doubly refined through experience of previous house-hunting as well as the subsequent development of new needs. Any situation which threatens to disregard the personal aspirations is held in disfavour by this customer.

Conclusion

The experienced person-centred customer finds substantial favour in working with a computer technology whose design is based on a customer-centred task interpretation.

2. Non-experienced Person-centred Customers (Cell 2)

All 5 customers, despite their non-experienced status, preferred the customer-centred technology.

5:0 Binomial Probability 0.03125 Significant

The reasons given for preferring this version appear in Table 28, as previously.

Explanations

Again, as in the case of the experienced person-centred customers, the non-experienced person-centred customers too, are preoccupied with whether the situation did or did not allow a full and free expression of their needs. The one time when this customer attaches efficiency advantages to the customer-centred technology (customer 21), the justification is still related to personal needs. (Customer 21 seemed to argue that this technology was more efficient because it would bear greater relevance for him, than the counterpart technology.)

Customer No.	Reasons for preferring the customer-centred version
3	because I can see at a glance what I am looking for, and knowing what I am looking for, I would decide more easily
5	took account of personal details
21	more efficient, as I wouldn't have to look at houses which only might be suitable
37	I could specify exactly what I wanted, I was not limited, and made me think more
40	allowed me to specify my own factors

Table 28: The reasons given by the Non-experienced Person-centred customers

It is interesting to note that no customers despite their non-experienced status, seemed to mention any handicap for having to state their needs, without any external support. Even when the person-centred customer is non-experienced, the nature of his orientation alone seems sufficient to promote the kind of needs that make external guidelines redundant.

Conclusion

The low overall number of 5 limits the extent of interpretation. However, interpreting from the significance suggested by the Binomial Test, we may conclude that: The non-experienced person-centred customers finds favour in working with a computer technology whose design is based on a customer-centred task interpretation.

3. The Experienced Efficiency-Centred Customers (Cell 3)

There is less unanimity of decision here. The Experienced Efficiency-centred customers are 11 in favour of the customer-centred technology and 3 in favour of the system-centred version.

11:3 Binomial Probability 0.02869 Significant

Although a significant majority prefer working with the customer-centred technology, there are 3 (21%) who prefer the system-centred version. Let us first examine the reasons attached to their votes, before attempting to explain this finding.

The reasons given by the 11 customers for their preferences for the customer-centred technology appear in Table 29a.

Customer no.	Reasons
6	deals with me personally
9	generally better
11	more detailed account of my requirements
13	customer details fed in rather than fixed programs submitted to customer
16	preferred thinking though the problem, the other approach imposed a structure which was at times artificial to my situation
17	truer picture of house I require
18	more searching, more descriptive
28	the other not flexibile enough, too narrow for such an important transaction, also forced responses
32*	greater flexibility and qualification
34	open, relaxed, less regimented
35*	they didn't allow for certain features, too narrow, forced responses

* see text

Table 29a: The reasons given by the Experienced Efficiency-centred customers

The reasons given by the 3 customers who preferred the system-centred technology appear in Table 29b.

Customer No.	Reasons
19*	easier
20	more efficient mentally, "one can get confused after long deep descriptive views and therefore perhaps make the wrong choice of house"
24	easier, factors already listed for you

* see text

Table 29b: Why 3 Experienced Efficiency-centred Customers preferred the System-centred Technology

Explanations

It is particularly interesting to note that not only is there a breakdown from the unanimity displayed in the 2 person-centred sub-samples, but that there is an additional feature of significance. The selections of the person-centred customers, were marked in intensity, that is to say, they had strong, even extreme, preferences. For example, there were no customers who thought that the system-centred technology had any special advantages to offer (Column 8, Table 25). In contrast, 2 of the 11 experienced efficiency-centred customers (customers 32 and 35 asterisked in Table 29a) who preferred the customer-centred technology, thought that a minor adjustment might make the system-centred technology better (Column 8, Figure 25). This is somewhat countered by 1 of the 3 customers who preferred the system-centred technology (asterisked in Table 29b) who noted special advantages in the non-preferred technology.

The other interesting feature emerges by reading through the reasons, offered by the 11 experienced efficiency-centred customers, for preferring the customer-centred technology. In contrast to the predominately personal-preference reasons of the person-centred customers, the reasons of the efficiency-centred are a mixture mainly comprising 3 features. The first one resembles the personal needs issue of the person-centred customers (customers 6, 11, 17, 35). The second feature is the flexible structure that this version offers (customers 13, 28, 32, 35). Finally, and closely linked to the above, this version offered thoroughness (customers 16, 18).

The 3 customers choosing the system-centred version (Table 29b) are all impressed with the ease it offered.

It appears that the experienced efficiency-centred customers are impressed by a mixture of features. In addition to the extent to which personal requests can be taken care of, there are also aspects of thoroughness, flexibility and ease or simplicity. It seems that this customer is a balanced combination of Experience (i.e. requirements that emerge through experience) and Efficiency (thoroughness and ease). The customer-centred version cannot fully accommodate this customer, as it does both the experienced and the non-experienced person-centred customer.

Conclusion

However, there is a substantial majority (79%) who prefer the customer-centred technology and from the significance value of 0.029 we may conclude:

The Experienced Efficiency-centred customers predominantly prefer working with a computer technology whose design is based on a customer-centred task interpretation.

4. The Non-experienced Efficiency-centred Customer

The findings reveal that this cell should have been easier to predict than was thought the case. 12 out of 16 preferred working with the system-centred technology - a trend which reverses all the 3 previous findings.

4:12 Binomial Probability 0.03841 Significant

The hypothesis predicted a mixed reception, while the findings suggest a more extreme outcome. However, a study of the reasons for preferring the system-centred technology, should make explanations easier.

The reasons given by the 12 customers who preferred the system-centred version are given in Table 30a. The reasons given by the 4 non-experienced efficiency-centred customers who preferred the customer-centred version, appear in Table 30b.

Customer No.	Reasons
1	easier, less danger of missing out factors
2*	find it easier to choose from, rather than think up
7	more to choose from, better organised
8	easy, already defined, clearer, more elaborate version of other approach
14	felt more at ease, and sure
15	more concise, "came on the right wavelength", generally suited me much better
22*	enabled me to select, at the same time not miss out, important factors
26	less danger of overlooking something; had options I had missed out ("more than one option would have been nice")
31*	easier to choose from given list, also with the other version might miss out
38	list helpful to look at and choose from
41	includes items I may not have thought of otherwise
42	"given the naive and minimal needs of a first time buyer and a case for objective helpful estate agent, this approach wisest and most comprehensive"

* see text

Table 30a: Why the Non-experienced Efficiency-centred Customers preferred the System-centred Technology

Customer No.	Reasons
4	better chance of your ideals met, personalised, individual-centred, concise
25	more personal details accounted for
36	more flexible, personalised
39	more flexible, "the customer who is buying a house is not looking for everything, but more of a home"

Table 30b: Why 4 Non-experience Efficiency-centred Customers preferred the Customer-centred Technology

Explanations

To deal with the majority opinion first, there are three main features to note.

One is that the system-centred technology is liked for its simplicity and ease (customers 1, 2, 8, 31, 38). These may be interpreted as efficiency-related aspects.

The second feature of interest is the unsure disposition of the non-experienced efficiency-centred house-hunter. He is preoccupied with the danger that he may overlook important factors; to this end, the help of the handout in the system-centred condition (Appendix 11) is found particularly useful (customers 1, 22, 26, 31, 38, 41). This seems largely an aspect related to the non-experienced status of the customer. He seems heavily dependent on the environmen for cues that will tell him what to look for when hunting for a house. When one compares this with the advantages, though few, which the experienced efficiency-centred customers (cell 2) ascribed to the system-centred technology, then it is evident that the present reasoning has not appeared before. This makes this feature all the more interesting and it seems to characterise the cell 4 customers.

The third feature of interest emerges when one reads down the list of reasons offered for preferring the system-centred technology. When one combines the reasons attributed to simplicity, ease, and thoroughness (customers 1, 2, 7, 8, 15, 31, 38) and the reasons ascribed to 'less danger of missing out an important factor' (customers 1, 22, 26, 31, 41), reflection reveals that most of the customers are commenting on the advantages of the guideline that this version provides. (At the outset of house-hunting with this system, as will be remembered, the customer is given a hand-out containing a number of factors, each attached with a small number of attributes.)

Indeed, this is further borne out by the views of the 3 customers who thought that a minor adjustment might make the customer-centred technology better than the system-centred version (customers 2, 22, 31, asterisked in Table 30a and derived from Column 8, Table 25). All three stated this minor adjustment to be the provision of a guideline (Appendix 13). It may be remembered that the customer-centred condition was initially to offer a guideline option, but that this was later abandoned to contrast the experimental conditions. All the above evidence suggests that the ratio in favour of the system-centred technology may be somewhat inflated. Had the customer-centred technology indeed provided the guideline option, the ratio may have been reversed, with the vast majority even preferring the customer-centred technology. We may make a note of this in the conclusion we arrive at. However, at another level, the overwhelming preference for a guideline (by 10 out of 16 customers) lends much stronger support to the need for guidance for the non-experienced efficiency-centred customer, than had originally been expected to be the case.

To turn to the minority opinion, the reasons offered by the 4 customers here offer some support, despite the lack of a guideline in the customer-centred condition, that there is still some attractiveness in this technology, even for the non-experienced efficiency-centred customer. There is an amusing, if not embarassing, feature associated here. Three of the 4 customers (customers 4, 25, 36) offer, as their reasons for preferring the customer-centred technology, ones such as:

"better chance of your ideals met"

"more personal details accounted for"

"personalised"

The reader may recognise these as a characteristic of the person-centred customer. The only difference is that these are the remarks of the non-experienced efficiency-centred customers! There was little evidence of such remarks in the case of the experience efficiency-centred customers. The first point to note is that this remark is made by 3 out of 16 non-experienced efficiency-centred customers, which could mean, very likely, a chance finding. On the other hand, giving the individual the importance he deserves, it seems that at least a small number of non-experienced efficiency-centred customers begin to display values that resemble person-centred values. It seems that the non-experienced status of a small number of these customers, provides for them a guidance need that may best be met by personalised individual-specific systems. It seems that the non-experienced status 'brings out the person' in some efficiency-centred customers.

We may conclude this section, by once again reminding ourselves of the emerging significance level of 0.038, as well as the strong possibility that a lot of the preference attached to the system centred technology could be ascribed to the contrast between experimental conditions, rather than to the contrast between technologies.

Conclusion

The non-experienced efficiency-centred customers find favour in working with a computer technology whose design is based on a system-centred task interpretation. However, it seems that they would find the computer system based on a customer-centred task interpretation equally acceptable, if not more, if the latter offered a guideline from which the customers could select their objectives.

The Hypothesis

We may add a concluding remark that the findings for the entire sample are in broad agreement with the general hypothesis.

27:15 Z-score = -2.006 p = 0.0228 Significant

We may further conclude that, in their efforts at resolving tasks of the problem-solving, decision-making kind, the vast majority of the customers derived from the general public, may be expected to prefer being supported by a technology that is designed on the basis of a customer-centred, rather than a system-centred, task interpretation.

Secondly, we may summarize the degree of fit offered by the customer-centred technology, for each of the 4 cells of customers, by considering as a rough but ready approximation, the significance levels ascribed to each finding by the Binomial Test. These were:

Cell 1	preferred customer-centred technology	0.008
Cell 2	preferred customer-centred technology	0.031
Cell 3	preferred customer-centred technology	0.029
Cell 4	preferred system-centred technology	0.038

We may remind ourselves that in Cell 3, there is less unanimity than suggested by the figures because 3 customers, who preferred the customer-centred technology felt that a minor adjustment to the system-centred technology would have led them to prefer this version over the customer-centred technology. In contrast, although the non-experienced person-centred customers were a small number, their preference for the customer-centred technology was intense.

We may therefore summarize the issue thus. In general, a significantly greater number of customers prefer the customer-centred technology to the system-centred technology. Within this pattern however, the degree of fit with the customer-centred technology may be described:

1) as best, for the experienced person-centred customers,
2) as 2nd best, for the non-experienced person-centred customers,
3) as 3rd best, for the experienced efficiency-centred customers,
4) and as least, for the non-experienced efficiency-centred customers.

4.5.2 Customer-centred v/s System-centred Features

We may, as a logical development to the preceeding section, turn to the customers' views regarding the separate features making up the 2 versions of the system. Let us first note the following points:

1) the assessment of any single feature, as argued previously, is unlikely to predict the overall assessment of a system. But these separate assessments may provide some indication of what we may attempt to incorporate in 'an ideal system'.
2) an experiment design hypothesis-testing of separate features, would be cumbersome based on unreal experimental tasks. (To explain, under ideal conditions, the impact of separate features may be rigidly tested only with the provision that all other features remain fixed. This is to say that if System A had 6 features, say, (ai, bi, ci, di, ei, fi), and System B had 6 corresponding features (aii, bii, cii, dii, eii, fii), then a study of the acceptability of features ai v/s aii, bi v/s bii and so on, may involve no less than 60 separate experiments (6 paired comparisons x $^5C_2$ cases of all other features remaining fixe

3) The aims of this chapter as well as those of the thesis in general are not directed at perfecting any one system. They are rather related to the issue of what kind of approach of system design may best serve situations such as double-interaction.

To this end, we may undertake to assess the impact of the separate features making up the two technologies, and particularly, to look for patterns that extend to other features.

1) Customers stating their own factors v/s responding to factors provided by the computer

Question 1 in Part C of the questionnaire asked the customers whether they preferred eliciting their own factors (1a) or whether they preferred the computer to generate the factors on which they should focus their task (1c). Table 31 breaks down the results for the four classes of customers, together with the significance levels depicted by the Binomial Test.

It may be noted that the person-centred customers (cells 1 and 2) prefer evolving their own factors while the efficiency-centred customers (cells 3 and 4) are split roughly fifty-fifty between customer-generated v/s computer-generated factors. Roughly half the efficiency-centred customers prefer the computer to suggest the factors on which they should focus their attention.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	7:0 (S 0.008) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	9:5 (NS 0.212) (cell 3)	10:6 (NS 0.227) (cell 4)

each cell contains ratio of customers preferring customer-centred feature to those preferring system-centred feat

Table 31: Customer-generated v/s Computer-generated Factors

This is to suggest that the person-centred customers do not like to be imposed with foreign terms of reference, while some efficiency-centred customers look upon this facility as a task made easy.

This finding may be viewed in better perspective when one considers a supporting issue incorporated in the questionnaire. (Question 1b asked the customers to suggest, besides their overall preference for the customer-centred feature or the system-centred feature, whether they would have liked a guideline from which to select their factors.) Table 32, as before, provides the breakdown, with the left figure in the dichotomies referring to the number of customers preferring a guideline.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	5:2 (NS 0.227) (cell 1)	4:1 (NS 0.188) (cell 2)
Efficiency-centred Customers	9:5 (NS 0.212) (cell 3)	13:3 (S 0.011) (cell 4)

each cell contains ratio of customers preferring customer-centred features, to those preferring system-centred feature

Table 32: Preferring a Guideline of Factors v/s Not

It may be noted that the need for a guideline is generally high, though for cells 1, 2, and 3 the figures are not significant.

The significance attached to the cell 4 preferences is particularly very high. This supports our conclusion reached in testin the main hypothesis, earlier. We interpreted then that the non-experienced efficiency-centred customers were particularly attracted by the provision of a guideline mainly because this would provide them wit a basis on which to focus their house-hunting. They were therefore particularly attracted to the system-centred technology, which seemed to provide just such a guideline.

Conclusion

The person-centred customers prefer to work with their own factors defining their task. The efficiency-centred customers are less unanimous in this view and some prefer the computer defining the factors on which they should focus their attention. Generally, the majority of customers prefer guidelines to assist them in their efforts; this facility is most significant for the non-experienced efficiency-centred customers.

2) Customers specifying their own attributes v/s selecting an attribute from the small list of attributes attached by the computer to each factor

Question 2i asked the customers whether they would prefer specifying the factors with attributes of their own choosing (2ia), or whether they would prefer to select an attribute from a small list of attributes that the computer attached to each factor (2ic). Table 33 provides the breakdown of the frequencies.

The two outstanding features to note are related to cells 1 and 4. The experienced person-centred customers are unanimous in stating their preferences in their own way rather than the computer providing a list of attributes to select from. The non-experienced efficiency-centred customers on the other hand whose figures are close to significance, are in favour of the computer providing the list of attributes. For the remaining cells, the levels are not significant. They seem mostly to prefer stating their own attributes, but some prefer the computer to provide these.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	7:0 (S 0.008) (cell 1)	4:1 (NS 0.188) (cell 2)
Efficiency-centred Customers	9:5 (NS 0.212) (cell 3)	5:11 (NS 0.105) (cell 4)

each cell contains ratio of customers preferring customer-centred feature to those preferring system-centred feature

Table 33: Customer-generated v/s Computer-generated Attributes

We may withhold explanations until we have examined a supporting aspect to this issue. As previously, customers were asked, if in addition to stating their own attributes or those provided by the computer, they would like a guideline provided to assist their efforts, (Q.2ib).

Table 34 provides the breakdown of the frequencies. As before the left hand figure of the dichotomies refers to the preference for a guideline.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	6:1 (S 0.062) (cell 1)	3:2 (NS 0.500) (cell 2)
Efficiency-centred Customers	8:6 (NS 0.395) (cell 3)	8:8 (NS 0.598) (cell 4)

each cell contains ratio of customers preferring customer centred feature to those preferring system-centred feat

Table 34: Preferring v/s Not Preferring a Guideline of Attributes

It may be noted that there is a similarity in the 2 questions, the only difference is that in the computer provided list of attributes, it is compulsory to make a selection from the attached list. In contrast, a guideline does not bind one to select from the provided list of attributes.

The shift in figures also suggests this similarity. Once again, the experienced person-centred customers are the group least attracted by the provision of any guidelines. The non-experienced efficiency-centred customers are now split half and half, as to whether they would choose to work with the help of a guideline, or solely on the basis of their preferred option of computer-generated list of attributes. Finding the computer-generated list of attributes very attractive, they find the further assistance of a guideline redundant.

It seems that they prefer to be bound by having to select an attribute from the list provided by the computer. This seems related to their reliance on the environment for the necessary cues with which to execute their house-hunting, as demonstrated in earlier examinations.

In contrast to the neat pattern that emerged from the guideline findings in the last section, customers seem generally less affected by whether to evolve their own attributes, whether to do so with the assistance of a guideline, or whether to resort to the forced response required on the computer-generated list of attributes.

However, comparing between the first issue of whether customers prefer customer-generated v/s computer-generated attributes, and the second issue of whether they would like a guideline to assist in their efforts, the following conclusions may be offered.

Conclusions

Person-centred customers prefer evolving their own attributes. The experienced person-centred customers also like the assistance of guidelines but the experienced efficiency-centred customers, have no clear preferences. The non-experienced efficiency-centred customers, on the other hand, generally favour the idea of computer-generated attributes.

3) Optional Attributes

Question 2(ii) in Part C of the questionnaire asked the customers whether or not they would prefer having more than one attribute per factor (e.g. Cottage, as compared to Cottage OR Bungalow). (This does not include more complex combinations of attributes, e.g. 'A AND (B OR C)' which are discussed as a separate feature later on.)

Table 35 provides the breakdown of the frequencies. It may be noted that for cells 1 and 3 (the experienced customers) there is no clear preference for either. However, cells 2 and 4 take on a different characteristic. The non-experienced person-centred customers seem to prefer the option of having more than one attribute. By contrast, the non-experienced efficiency-centred customers prefer, to a considerable extent, to have one attribute only.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	4:3 (NS 0.500) (cell 1)	4:1 (NS 0.188) (cell 2)
Efficiency-centred Customers	9:5 (NS 0.212) (cell 3)	5:11 (S 0.105) (cell 4)

each cell contains ratio of customers preferring customer-centred feature, to those preferring system-centred feature

Table 35: Multiple v/s Single Attributes

For the experienced customers, findings seem to suggest that the would prefer single or multiple attributes depending on their needs. The non-experienced person-centred customers do not want to be bound by one attribute only either knowing that their ideal attribute may not exist, or that they may have joint ideals expressed in several attributes. The non-experienced efficiency-centred customers in contrast, are happy confining their focus to one attribute only per factor. They rely on technology to provide the necessary cues, and also to provide a simple structure on which to operate. In addition, multiple attributes do not characterize the primary needs of house-hunting with which they are pre-occupied.

Conclusion

There are no clear-cut preferences for or against having alternative attributes. However, the non-experienced efficiency-centred customers are particularly attracted to the idea of having only one attribute per factor.

4) Special Preferences

Question 3(i) in Part C of the questionnaire asked customers their views regarding the facility of stating special preferences (e.g. MUST Locality SCHOOL, or NOT Locality AIRPORT). Table 36 breaks down the frequencies associated with this finding.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	6:1 (S 0.062) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	13:1 (S 0.001) (cell 3)	14:2 (S 0.002) (cell 4)

each cell contains ratio of customers preferring customer-centred feature, to those preferring system-centred feature

Table 36: Preferring the facility for stating Special Preferences v/s Not

There is a clear preference all round for such a facility. This is despite the care taken to phrase the question so as to make the options appear equally important. This seems one customer-centred feature which all customers welcome.

Conclusion

Customers favour considerably the facility of stating their special preferences.

5) Changing/Revising/Redefining Objectives

Question 3(ii) in Part C of the questionnaire asked the customers their views on the facility to revise their objectives (factors, attributes, special preferences, etc.), whenever they wished. Table 37 provides the breakdown of the frequencies attached to this finding.

There is a high significance attached to each cell in their preference for this facility. There is still a weak indication in cell 4 (non-experienced efficiency-centred customer), in contrast to other cells, for preferring not to have to change/revise/redefine their objectives, but to opt for a simple execution of task.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	6:1 (S 0.062) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	13:1 (S 0.001) (cell 3)	12:4 (S 0.038) (cell 4)

each cell contains ratio of customers preferring customer centred feature, to those preferring system-centred feature

Table 37: Preferring v/s Not Preferring the facility for Redefining Objectives

Conclusion

Customers are strongly in favour of the facility to change/revise/redefine their objectives whenever they wish to.

6) Complex Preferences

Question 3(iii) in Part C of the questionnaire attempted to derive the views of the customers on the facility to state special preferences which were more complexly defined (e.g. MUST Type COTTAGE AND Lease FREE).

Table 38 provides the breakdown of the frequencies associated with this finding.

The only significance is attached to cell 1, while the non-significant distributions in the remaining cells suggest a chance effect for all other cases. The experienced person-centred customer, as an exception to all other customers, finds this feature of particular relevance to his situation. Not only is he particular about the nature of his needs but the complexity of these needs is reflected in the multiple dimensions with which he chooses to define them.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	6:1 (S 0.062) (cell 1)	3:2 (NS 0.500) (cell 2)
Efficiency-centred Customers	7:7 (NS 0.605) (cell 3)	9:7 (NS 0.402) (cell 4)

each cell contains ratio of customers preferring customer centred feature, to those preferring system-centred feature

Table 38: Preferring v/s Not Preferring the facility for stating Complex Preferences

Conclusion

The further facility to state complex needs is very possibly an extravagent feature for the majority of the customers. By contrast, the experienced person-centred customers find this facility highly relevant to their situation.

7) Customers preferring to rank or rate objectives v/s computer treating all objectives as bearing equal importance

Question 4 in Part C of the questionnaire addressed the issue of whether customers would like to rank or rate their objectives in the importance these had for them, or whether they would rather prefer to have all their objectives treated as being of equal importance. The associated frequencies are outlined in Table 39.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	4:3 (NS 0.500) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	9:5 (NS 0.212) (cell 3)	10:6 (NS 0.227) (cell 4)

each cell contains ratio of customers preferring customer-centred feature to those preferring system-centred feature

Table 39: Preferring to rate or rank objectives v/s have objectives treated as equally important

It may be of interest to note firstly, the importance of this feature, in the light of the literature reviewed in section 4.2, and particularly the subjective utility model of consumer behaviour.

It may be noted that with the exception of cell 2 (non-experienced person-centred customers), the preference for the facility to rank or rate the objectives according to the importance they have for the customer, is not very marked.

In particular, the situation as depicted by cell 1 (experienced person-centred customers) merits closer attention. The frequency breakdown suggests that this customer, particularly, is least impressed with this feature. However, when one compares this cell, with the adjacent one containing the non-experienced person-centred customers, the result is all the more remarkable, as the latter are strongly in favour of this facility.

There is evidence here of our theme all along that the impact of separate features per se, have little bearing on the overall impact of a technology.

If one retraces the findings associated with the experienced person-centred customer for the preceding issue (complex special preferences), this might suggest why there is this difference between experienced and non-experienced person-centred customers. It was seen then that the experienced person-centred customer was the only customer who found special relevance in the facility to state needs of a complex nature.

It seems that the experience factor expands the needs of the person-centred customer beyond 'common', and 'special', to 'complex'.

It seems that with his special preferences accounted for, and also his complex social preferences, he finds little relevance in any further attempt to differentiate his objectives.

For the non-experienced person-centred customer, his objectives may thus far be only developed up to special preferences stage, and he finds that this is insufficient as it stands, and a facility to establish the order of his preferences is welcomed, as this would complete the picture.

For the efficiency-centred customers both experienced, and non-experienced, the facility to weight objectives seems to complicate matters somewhat and there is a mixed feeling about its relevance. A noticeable minority seem to prefer the simpler option of having all objectives treated equally importantly.

Conclusion

The needs of the person-centred customers generally occupy a hierarchy of importance. The efficiency-centred customers, too, may have different weightings to attach to their needs but they sometimes find it complicated to order their needs, and hence may reject this in favour of the simplicity of having all objectives treated as equally important.

8) Ordered selection of houses v/s selection of houses in any order

Question 5(i) on Part C of the Questionnaire asked the customers for their views on the manner in which the selection of houses was provided. One technology (customer-centred) computed the overall subjective values from the subjective values attached to separate features incorporating each house, and displayed the 10 best houses ordered according to the fit suggested by this combined value. The house with the highest value appeared first in the order. The alternative technology (system-centred) displayed the 10 best houses in any order without attempting to work out the extent of fit of each house with customer requirements.

Table 40 provides the frequencies ascribed to this finding.

The significant cells are cell 2 (the non-experienced person-centred customers) and cell 3 (the experienced efficiency-centred customers). In contrast, the person-centred efficiency-centred customers (cell 1) are less marked in their preference for an ordered selection, while the non-experienced efficiency-centred customers (cell 4) are split fifty-fifty on this issue.

	Experienced Customers	Non-experienced Customers
Person-centred Customers	5:2 (NS 0.227) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	12:2 (S 0.006) (cell 3)	8:8 (NS 0.598) (cell 4)

each cell contains ratio of customers preferring customer-centred feature to those preferring system-centred feature

Table 40: Preferring Ordered Selection v/s Selection in Any Order

The non-experienced person-centred customer found it highly relevant it will be remembered (sub-section 7, of this section), to rate or rank their objectives. They are equally attracted to the selection of houses being ordered according to their ranks or ratings. This feature seems a logical extension of the previous issue.

Although the experienced person-centred customers are positive in their reception of the ordered selection (i.e. 5 out of 7 prefer an ordered selection), the significance depicted by the distribution is not high. This may relate to the preceding finding. Having found the need to order objectives slightly irrelevant, they may now find the feature of the computer ordering the houses also a little irrelevant.

The experienced efficiency-centred customers are by far the most impressed with this facility, as it perhaps provided for them a basis for least effort expended. The fifty-fifty split in the case of the non-experienced efficiency-centred customers, suggests that they are undecided on whether they like the unordered or the ordered selection. It is possible, that once again, they are reacting to the simplicity need in their task, which they feel is endangered by complex facilities which compute subjective values of houses, and which order houses according to these values. They are presumably impressed enough with the guidance provided by the computer in suggesting that they may concentrate their focus on a set of 10 houses.

Conclusion

In the majority of cases, customers are impressed with the facility of the computer to provide houses ordered according to the fit each house has with customer requirements. The non-experienced efficiency-centred customers are undecided on the value of this feature, as this may be too complex a representation for the kind of needs that they are faced with.

9) Confidence attached to Selections of Houses

When the customer had answered questions 1 to 4 and the main issue (question 7) of the overall preference for one or the other technology, the customer was provided with the 2 selections of houses that each approach had produced. These selections as might be remembered, were with-held from him to avoid the danger that the house-data contained in these selections may influence his preference

	Experienced Customers	Non-experienced Customers
Person-centred Customers	7:0 (S 0.008) (cell 1)	5:0 (S 0.031) (cell 2)
Efficiency-centred Customers	10:4 (S 0.090) (cell 3)	2:14 (S 0.002) (cell 4)

each cell contains rati of customers attaching greater confidence to customer-centred selection, to those attaching greater confidence to system-centred selection

Table 41: Confidence attached to Customer-centred v/s System-centred Selections

for one or the other overall approach. He thus answered question 6 in Part C of the questionnaire the last of all. He was asked to suggest, without going by the details contained in each selection as far as it is possible to do so, the selection in which he would have greater personal confidence.

Table 41 depicts the frequencies related to this finding. It may be noted that this table closely resembles the table representing the frequencies depicting customer preference for the overall technologies (for cells 1 to 4, these were 7:0, 5:0, 11:3. 4:12, respectively).

It seems that the majority of customers in cells 1, 2, and 3 attach greater confidence to the selection derived by a customer-centred approach. In contrast, the non-experienced efficiency-centred customers are near-unanimous (the value of their distribution bears the highest significance) in their confidence in the selection derived by the system-centred approach.

From the detailed results in Appendix 13, it is evident that there are in all, 5 out of 42 customers, who although preferring one technology overall, attach greater confidence to the selection provided by the other technology. 17 of the 42 customers in the study volunteered information on why they attached greater confidence to a particular selection. (This they did in a little spare space left under question 6.) These 17 customers also contained 4 out of the 5 customers who attached greater confidence to the selection derived by the non-preferred approach. Table 42 outlines the reasons of these 4 customers, who were an exception to the general rule.

It may be noted that all 5 customers belong to the efficiency-centred group. This supports earlier findings that whereas the overall acceptability of the customer-centred approach was intense for all the person-centred customers, this was less the case with the efficiency-centred customers.

overall preference for: customer-centred approach	greater confidence with: system-centred house selection	overall preference for: system-centred approach	greater confidence with: customer-centred house selection	overall preference for: customer-centred approach	greater confidence with: system-centred house selection	overall preference for: system-centred approach	greater confidence with: customer-centred house selection
cell 1				cell 2			
none		none		none		none	
cell 3				cell 4			
customer 32 reasons: can identify more clearly the form of house. customer 35 reasons not provided		customer 20 reasons: registers quicker, more familiar.		customer 36 reasons: contains factors which otherwise may have been missed out. customer 39 reasons: gives much greater information.		none	

Table 42: The reasons given by some Efficiency-centred Customers for attaching greater confidence to Houses Selected by the Non-preferred Technology

The explanation by the 2 experienced efficiency-centred customers seem to be even better qualified by the earlier comments of customer 20. This was the interesting case of a customer finding favour generally with all the customer-centred features leading to the main question of which technology was the more acceptable overall. Customer 20 then opted for the system-centred technology, and explained that this technology had been "more efficien mentally" and that, "one can get confused after long deep descriptive views and therefore perhaps make the wrong choice of the house".

Without attempting to interpret this explanation literally, it seems that at least for some of the experienced efficiency-centred customers, the customer-centred approach complicated matters somewhat.

On the other hand, customers 36 and 39, the non-experienced efficiency-centred customers, attached greater confidence to the system-centred technology although preferring the customer-centred approach overall, for reasons which are now becoming a characteristic of this group. It is once again, that they are looking for cues from the environment and they find the system-centred version providing them with comprehensive although simply defined information.

This also explains why cell 4 customers were near-unanimously in favour of the selection derived by the system-centred technology and to which they attached greater confidence. There is further support in this from another finding we shall take up in the coming sections. This is that out of all 4 cells, this customer elicited the lowest number of factors, on which to base his house-hunting. He found the system-centred technology particularly attractive in that it elaborated on

his list, though not unduly so.

However, 37 out of 42 customers suggested a high degree of correspondence, between overall acceptability of an approach and the high degree of confidence attached to the selection derived by this approach.

Conclusion

In general, if the customers find stages leading to a final selection acceptable, then they attach a high degree of confidence to the resulting selection. If they find the preceding stages unacceptable, they attach a weak degree of confidence to the ensuing selection.

10) Summary

We may summarize all the separate findings discussed so far by reviewing the significance value ascribed to each, as laid out in Table 43.

System feature	experienced person-centred customers		non-experienced person-centred customers		experienced efficiency-centred customers		non-experience efficiency centred customers	
customer generated v/s computer generated factors	■	.008	■	.031	■	.212		.227
factor guideline	■	.227	■	.188	■	.212		.011
customer generated v/s computer generated attributes	■	.008	■	.188	■	.212	□	.105
attribute guideline	■	.062	■	.500	■	.395	◪	.598
optional attributes	■	.500	■	.188	■	.212	□	.105
special preferences	■	.062	■	.031	■	.001		.002
revising objectives	■	.062	■	.031	■	.001		.038
complex preferences	■	.062	■	.500	◪	.605	■	.402
rank/rate or equal	■	.500	■	.031	■	.212	■	.227
order of selection	■	.227	■	.031	■	.006	◪	.598
confidence	■	.008	■	.031	■	.090	□	.002

■ ratio in favour of customer-centred feature

◪ fifty-fifty ratio

□ ratio in faviour of system-centred feature

(value) significant

Table 43: Significance values of evaluations of Customer-centred and System-centred Features

1. It may be noted that 38 out of 44 values (86%) refer to ratios in favour of customer-centred features (filled squares).
2. The only significance there is for system-centred features lies with the non-experienced efficiency-centred customers.
3. A more detailed inspection reveals that the overall significance of customer-centred features ranges from very high for the experienced person-centred customer, high for the non-experienced person-centred customer, high for the experienced efficiency-centred customer, to mixed for the non-experienced efficiency-centred customer.

Conclusion

The impact of customer-centred features provided by technology is generally very high for the vast majority of customers. The impact is weakest for the non-experienced efficiency-centred customer who favours some customer-centred features, and some system-centred features.

4.5.3 Related Issues

In this section, we explore a few related issues. With the overall aim of designing better computer aids for customers in mind, the focus is reserved to those issues which would enable us to understand the extent of similarities or differences amongst customers.

1. Person/Efficiency and Experienced/Non-experienced Customers

If our aim was to plan for a kind of technology that would provide a common basis on which all kinds of customers could operate, how well have we achieved the customer/technology fit for customers as defined by person/efficient and experience dimensions?

It may be remembered that each customer assessed a number of specific features to build up to the final overall assessment of the technologies encountered. In all, there were 9 sub-issues dealt with by the questions and Figure 14 concentrates on the customers' preferences for the system-centred versions on these sub-issues. To balance out unequal cell sizes, the figure deals in percentage frequencies. To explain, the figure depicts in % terms, the proportion of customers within each cell who preferred a gradually increasing number of system-centred features ranging from none at all, through 1, 2, 3, 4, 5, 6, 7, 8, to 9 representing 'a full house'. It may be noted that this method, sometimes called the 'head count method', has the disadvantage that it treats all sub-features as equally important. However, bearing this deficiency in mind, it may still serve a useful purpose if only as a graphic aid.

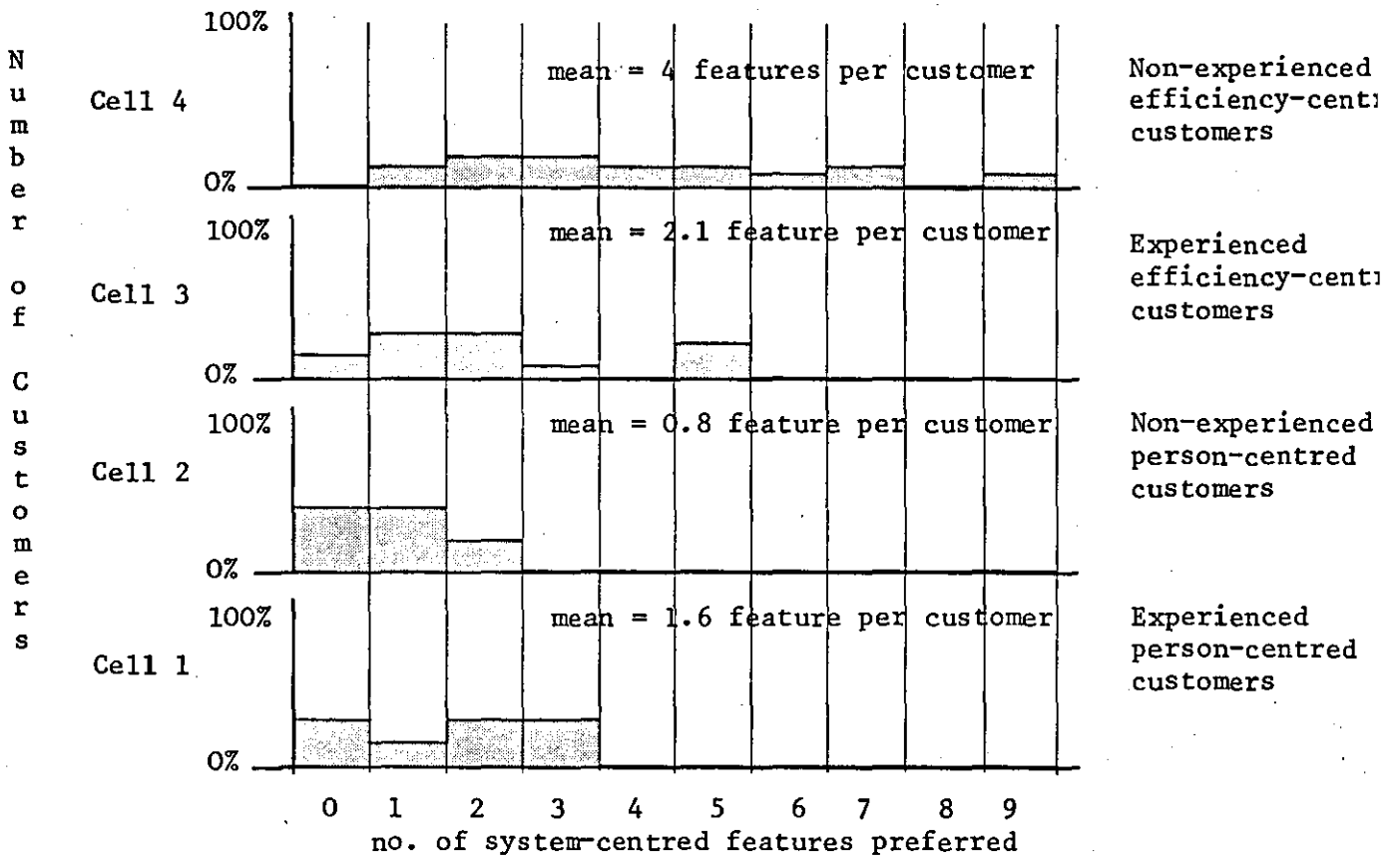


Figure 14: Number of customers preferring different numbers of system centred features

Two points need first to be noted. One is the small size of cell 2 and secondly, the possibility of inflated figures in cell 4: for this customer type, the customer-centred technology seemed to prove inadequate mostly for its failure to provide a guideline. Bearing these two points in mind, there are indications in Figure 15 of the attractiveness of system-centred features increasing as one shifts from the person-centred customers (cells 1 and 2) to the experienced efficiency-centred customers (cell 3), and finally to the non-experienced efficiency-centred customer (cell 4).

We may also note that the person/efficiency dimension (cells 1 and 2 vs. 3 and 4) bears a sharper contrast to the experienced/non-experienced dimension (cells 1 and 3 vs. 2 and 4). Along the experienced/non-experienced dimension, there is a sharp contrast within the efficiency region (cell 3 vs. 4).

Explanations

We may summarize the explanations by drawing on our understanding from various stages of this research: predictions, findings, and considerations leading to this section. The customer-centred technology is particularly suited to the person-centred customer, experienced and non-experienced, for its ability to attach importance to the individual customer by allowing him to define and specify his needs without constraint.

The customer-centred technology is also suited to the experienced efficiency-centred customer in that he has well developed and well defined needs emerging from experience which

he finds a system-centred technology unable to account for. The non-experienced efficiency-centred customer, on the other hand is the classic model of the guidance-seeking man, relying on his environment to provide the aids necessary to task formulation as well as execution. For him, both simplicity and the required thoroughness are met by the system-centred technology.

The findings highlight the inadequacy of technology alone, however complex, to account fully for the needs of man engaged in the execution of complex tasks. In the discussion, we will explore the question of how to make technology extend its service more completely, and to serve all kinds of customers.

2. Customers and the Extent of their Needs

Here, we resort to another head-count method, to serve as a rough basis for illustrating similarities or differences between customer groups in the extent of their needs. We will use the number of factors evolved by each customer in the customer-centred condition, as a measure, though somewhat crude, of the extent of the needs of various customer groups.

Figure 16 gives a frequency distribution of the number of customers within each cell who elicited:

less than 10 factors

11-15 factors

16-20 factors

20+ factors

This is derived from the progress sheets used in the customer-centred condition by the 42 customers. The full list of factors elicited appears in Appendix 14.

It may be noted that the experienced person-centred customer produced the highest number of factors. This may explain why some customers in this group were not very attracted by the idea of having to rank or rate such a large number of factors.

On the other hand, the non-experienced efficiency-centred customers have the least number of factors to report, if one notes the nature of their distribution in Figure 15. Looking down the first column representing cases with less than 10 factors for all 4 cells in Figure 15, it can be seen that this group has the largest number of entries. This reinforces our interpretation of the non-experienced efficiency-centred customer as a house-hunter heavily reliant on external sources or the Environment, rather than on the Self, at providing the aspects with which to define his choice of a house. He probably finds the aid of the system-centred

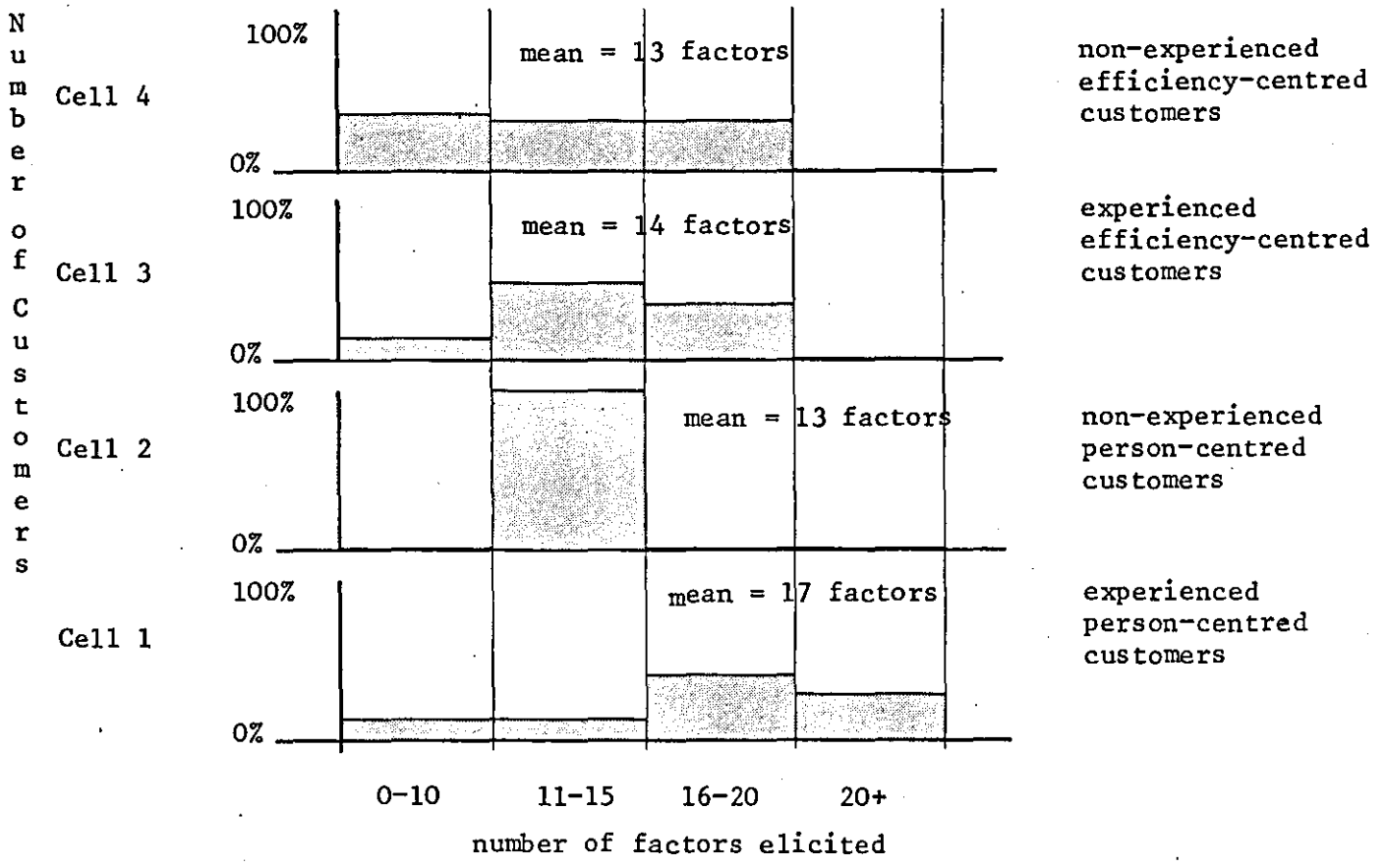


Figure 15: Graphic Illustration of Extent of Needs for Different Customer Groups, as depicted by the number of factors evolved by each Customer

technology particularly useful as it suggests many other factors that his own short supply might exclude.

Of the other 2 customer types, the number of factors generated by the non-experienced person-centred customer is generally high, and this cell falls entirely in the region of 11 to 15 factors. When one compares this with the low number of factors associated with the non-experienced efficiency-centred customer, it is evident that for the person-centred customer, non-experience does not have a very marked influence to the extent of his needs. The appreciable extent of his needs can be ascribed to his person-centred orientation.

Finally, it may be interesting to note the rather low number of factors elicited by the experienced efficiency-centred (cell 3) customer, despite his experienced status. This suggests that for the efficiency-centred customer, the needs may only increase, even with experience, to a small finite number. This in turn links with the general findings of an earlier experiment in double-interaction outlined in Chapter 1 (Maldé, 1976). It was found then that services and situations seldom meet the ideals of the person-centred customer. The rather high number of factors ascribed to him, as seen in this study, and the relatively low number, ascribed to the efficiency-centred customer, illustrates why it may be easier in a real-life situation to satisfy the needs of the efficiency-centred than the person-centred customer.

Looking across the distributions within all 4 cells in Figure 16 a feature emerges which serves as a succinct summary of the situation.

With experience, the extent of needs of the person-centred customer shifts from medium (cell 2) to high (cell 1). With experience, the extent of needs of the efficiency-centred customer, shifts from low (cell 4) to medium (cell 3).

3. Customers, and the Intensity of their Needs

We may undertake one more study in our explorations regarding similarities and differences between customers. It would be useful to be able to note the nature of each factor and to examine all the factors elicited in the study. There were a total of 588 factors elicited by 42 customers (the full list of factor categories is provided in Appendix 14). Secondly, customers chose to adopt different strategies for inter-relating their factors: some chose to rate, some to rank, while still others opted for having all factors treated with equal importance. Together, the considerable number and complexity make factor-analysis a major hurdle.

However, there is one way in which we may still undertake the examination, i.e. by resorting to a descriptive statistic. Let us first reduce the complexity of the 588 factors/sub-factors by putting these into 16 categories, as in Table 44.
The aim is to derive a weighted comparison between the 4 classes of customers ('classes' is adopted temporarily in favour of 'cells' as the latter takes a different meaning in the description to follow), since the 4 classes are of unequal size. We may focus our attention on those factor categories which are ascribed with a frequency exceeding the 'weighted mean frequency' (to be outlined below) for the particular class of customers to which the frequency belongs. Hence, we would confine the focus to the larger half of the total range of frequencies. We shall interpret this half as the region of 'most cited factors' which in turn we will interpret, though crudely, as the 'more important factors'.

The weighted mean frequency for a particular class of subjects may be obtained in the following stages:

1) Count total no. of factors cited by all customers (= 588).
2) Count total no. of subjects (= 42).
3) Obtain mean frequency of factors cited by each customer $= \left[\frac{588}{42}\right]$
4) Count total no. of factor categories in each class (= 16).
5) Obtain mean frequency of factors cited within each factor-category, by each customer $= \frac{\frac{588}{42}}{16}$

6) Hence, the weighted mean frequency for any one class, is the previous value multiplied by no. of subjects in that class

i.e. $\frac{\frac{588}{42}}{16}$ x no. of subjects in a class

Hence, the weighted mean frequency for class 4, of 16 subjects, is

$$\bar{f}_{w4} = \frac{\frac{588}{42}}{16} \times 16 = 14$$

Table 44 gives the 4 $\bar{f}_w$ values for the 4 classes of subjects, as 6.1, 4.4, 12.3 and 14 for classes 1 to 4, respectively.

FACTOR CATEGORY	NO. OF TIMES CITED			
	$f_{class\ 1}$	$f_{class\ 2}$	$f_{class\ 3}$	$f_{class\ 4}$
1. Age	3	4	6	9
2. Size/Type/Style/Character/ Storeys	(9)	4	12	(19)
3. Location/Distance from Work	(9)	(5)	(17)	10
4. Locality/Situation	(8)	3	(18)	(18)
5. Structure/Condition/ Improvement/Development Plans	2	(5)	5	7
6. Price	6	4	12	(15)
7. Heating	(8)	(6)	(13)	13
8. Bedrooms and Rooms	(21)	(13)	(35)	(42)
9. Washing Facilities	(10)	3	(17)	12
10. Kitchen	(11)	2	10	13
11. Furniture/Fittings	(10)	(6)	11	11
12. Garden	(12)	(8)	(30)	(23)
13. Garage	6	2	(13)	9
14. Lease	1	1	1	2
15. Possession	0	0	0	1
16. School Catchment Area	2	0	0	0
	$\bar{f}_{w1} = 6.1$	$\bar{f}_{w2} = 4.4$	$\bar{f}_{w3} = 12.3$	$\bar{f}_{w4} = 14$

$\bar{f}_w$ = weighted mean frequency

Table 44: Most Cited Factors

Key Class 1 : Experienced, Person-centred Customers

2 : Non-experienced, Person-centred Customers

3 : Experienced, Efficiency-centred Customers

4 : Non-experienced, Efficiency-centred Customers

All these factors whose frequencies exceed the derived weighted means for each class, may now be interpreted as the most cited, and therefore most important, factors. These factors are circled in Table 44.

It may be seen that class 1, namely, the experienced person-centred customers group, bears the largest number of circled entries of all 4 classes suggesting that this class provides the largest 'pull' towards the most cited factors of the entire group. This also supports the findings of the previous section.

We can take our explanations one stage further to remark on the degree of agreement, expressed by the overall sample of customers, for any one category of factors. Hence, the factor ascribed with circled entries in all 4 classes, would express unanimity, while other combinations would represent gradually decreasing levels of agreement. (We shall now revert back to our adopted usage of 'cells' to represent the 4 classes of customers.)

Table 45 produces this breakdown by listing all the 15 possible combinations expressing differing levels of agreement within the entire sample of customers, ranging from the case when all 4 cells cite a factor frequently, to the cases when a highly placed factor is unique to one cell only.

Cells				Factor Category Description	Associated Customers
1	2	3	4		
*	*	*	*	Rooms Garden	All 42 customers: Person/ Efficiency centred and Experienced/Non-experienced
*		*	*	Locality	All Efficiency-centred and All Experienced
	*	*	*	-	All Efficiency-centred and All Non-experienced
*	*		*	-	All Person-centred and All Non-experienced
*	*	*		Location Heating	All person-centred and All Experienced
		*	*	-	All Efficiency-centred
	*		*	-	All Non-experienced
	*	*		-	Unrelated
*			*	Size/Type/Character etc.	Unrelated
*		*		Washing Facilities	All Experienced
*	*			Furniture/Fittings	All person-centred
			*	Price	Non-Experienced efficiency-centred
		*		Garage	Experienced efficiency-centred
	*			Structure/Condition etc.	Non-experienced person-centred
*				Kitchen	Experienced person-centred

* represents frequency in excess of weighted means

Table 45: Levels of Inter-Cell Agreement in the Most Cited Factors

Some of the points to note are that:

1) there is unanimous agreement amongst customers on the factor categories; Bedrooms and Rooms, and the Garden.
2) the next in importance are Locality/Situation as well as Heating and Location/Distance from Work, on which 3 out of 4 cells agree.
3) the factor category Washing Facilities, is unique to experienced customers.
4) Furniture and Fittings are unique to the person-centred customers.
5) Price is unique to the non-experienced customers.

Explanations

We may draw support in the fact that it is possible to find a degree of commonality in the way customers in general define their task parameters. Hence, for the house-hunting task, the factors providing the most unifying base for all customers were the Garden and the Rooms. Also strong are Locality/Situation, Heating and Location.

It is somewhat surprising that Price emerged so low down the list and only offered significance for the non-experienced efficiency-centred customer. This is contrary to a finding cited in literature that the Price of the House is the most important factor for most customers (Canter and colleagues, 1976). It seems that the function of Price mostly serves only as a practical entry point to the solution

of a problem. It may often be a niggling aspect of a real-life problem, which the customers in the experiment, due to the nature of the study may have been able to avoid. Indeed, there were a number of customers in this study to whom the issue of Price was, while not minimal, of a secondary importance. It is interesting therefore, that for the non-experienced efficiency-centred customer, Price bears special significance. If one associates this finding with the earlier finding that this customer generally focusses only on a small number of factors, it is apparent that for this customer, house-hunting needs are confined to those that are of fundamental or primary importance. The trend shifts towards secondary needs as one moves to the experienced efficiency-centred customers, through the non-experienced person-centred customer, and finally to the case of the experienced person-centred customer for whom the needs seem to take on a most diverse form.

Implications

One of the implications is that technologies which are restricted in the degree of support they can provide for customers, should concentrate on providing summary information on the main factors, while delving much deeper in select areas which are not only of common, but also of special importance to most customers. (For example, see the high frequency ascribed to Rooms, by each cell in Table 45.) While the practical constraints to data storage and retrieval methods may constrain the facility to provide detailed information, there are still many possibilities of approaching the task through a joint utilization of human, computer and manual resources.

4.6 DISCUSSION

We may derive the following conclusions from the findings of the study.

1. Technology designed on system-centred principles may at best prove adequate only to a sub-sample of customers (in our study, to the non-experienced efficiency-centred customer).
2. Design of technology undertaken on a different task interpretation, namely one that centres around the aspirations and behaviour of the customer, begins to attain a much greater acceptance by customers.
3. Computer technology if utilized in a certain way, does have the potential to provide a common base on which a wide range of customers can operate, especially as regards the execution of complex tasks.
4. On the other hand, technology by itself cannot answer fully for the diverse range of customers in real-life, nor fully for diverse range of aspirations of single individuals.
5. Everything considered, effectiveness of technological aids could be better seen in terms of support to, rather than a substitute for, an individual's task.

4.6.1 System-centred and Customer-centred Design of Technologies

There was, in general as well as specific terms, a positive evaluation attached to the customer-centred technology, by most customers. The person-centred customer is the customer who considers himself, as well as his needs, to be 'special'. The customer-centred technology, both in its underlying philosophy as well as in its detailed features, proved very suitable to his needs.

The experienced efficiency-centred customers were also conscious of needs, attributed to experience and change in circumstances, which were well developed. The system-centred technology though simple could not provide the comprehensive execution that his needs dictated, but which the customer-centred technology accounted for admirably. The non-experienced efficiency-centred customer was under the double influence of efficiency-orientation and the non-experienced status. His needs therefore took the form of primary needs while his disposition dictated a reliance on the environment for providing a simple structure both of task formulation and execution. For him, the required level of simplicity and thoroughness were admirably contained in the system-centred technology.

This study illustrates two main features which may be ascribed to real-life philosophies governing system design.

One is that when a system design is undertaken to answer mostly to the operational variables underlying a task, it does succeed in providing benefits for some customers. More importantly, many of the remaining customers through their adaptive characteristics, may in time adjust to whatever the system has to offer, especially if the resort to such a system is necessary and one without alternatives. The fact that a system works at all may be a wrong and misleading concept on which to base an evaluation, as it may be that the system operates at considerable human costs, both to the intermediary and to the customer.

A shift in focus underlying the design problem may do a considerable amount to enhance the overall suitability of a system.

With a more customer-centred technology assisting him in his efforts, the customer may now find himself less restricted in the way he may execute his task because the task interpretation on which technology is based accommodates the nature of his own task. In contrast to the theoretical framework offered by the system-centred technology, the alternate version may now provide a practical framework within which to execute his task, and where the only compromises he has to make are less to do with technology (e.g. his needs to have to change in order for them to be computer-compatible) and more to do with inevitable issues relating to the environment (e.g. if the ideal does not exist, a near-ideal has to be accepted).

The incidental benefits of a system-centred technology occur, to one kind of customer because this technology actually offers essential guidance as to how to hunt for a house. For the customer who either has no previous experience of undertaking a task, or treats the task only as a means to an end whereby a house is 'something that provides a roof over one's head' or a car is 'something tha

takes you from A to B', the attractiveness of the system-centred technology is that it performs for the customer a major proportion of the task. Also, the final solution it provides meets most primary needs with which this customer seems only to be concerned. However, with time, and with primary needs leading to secondary needs, the same technology may now prove inadequate even for this customer.

4.6.2 The Potential of Computer Technology

This brings us to the related issue of the potential offered by computer-aided technology.

Computer technology seems to have the necessary potential to provide to an extent, a common basis for both kinds of customers, as reflected in the findings and in customer comments. Indeed, the substantial majority of experienced and non-experienced efficiency-centred customers elected to ascribe suitability to the customer-centred technology. Particularly evident in the comments of the minority group who found the system-centred technology more suitable, was the possibility that had the customer-centred technology been supported by the provision of a suitable guideline of factors on which to base the task, at least some of the minority group would have then preferred the customer-centred technology.

Utilized in a certain way, computer technology is therefore uniquely placed to provide a common base on which a wide range of customers can exercise their aspirations.

4.6.3 Differences amongst Customers

It was evident from many findings that despite the overall fit in accommodating most customers, there were finer levels at which customer-centred technology proved a little irrelevant, and even a hindrance, to some customers.

We may recall the evidence briefly. There was evidence that the customer-centred technology generally, was much better suited to person-centred customers, than efficiency-centred customers. A very small number of the experienced efficiency-centred customers even opted for the system-centred technology, while others liked some of the specific features offered by this technology. Along the experienced/non-experienced dimension, the differences were less marked, but the interaction of the 2 dimensions was particularly manifest in the case of the non-experienced efficiency-centred customer.

Even though the two-way nature of predictions regarding this cell of customers was appreciated well in advance of the experiment, the results, if allowed to stand, reverse the results for other categories of customers. The efficiency-orientation and the non-experienced status of the customer combined to align remarkably closely with the model on which the system-centred design was undertaken.

At yet another level, there were further differences, this time within the person- or efficiency-region. For example, the experienced person-centred customer was particularly attracted by the facility of the customer-centred technology to allow the stating of special preferences as well as complex preferences. However, when it came to rating or ranking objectives, he was less enthusiastic about this feature, in contrast to his counterpart non-experienced customer who liked this feature but not the earlier one regarding complex preferences.

Indeed many of the within-dimension differences may be summed up by an overall pattern that emerged. It seemed that the transition from the non-experienced to the experienced status of the efficiency-centred customers meant that the extent and nature of his needs progressed from low to medium. By contrast the same transition had an intense effect on the person-centred customer. For this customer, the effect of experience produced a shift in the extent and nature of needs, from medium to high.

It is evident that although customer-centred technology may provide an excellent common base from which most customers may derive satisfaction, by itself it is still limited in meeting the aspirations of a wide ranging public (e.g. the inter-cell differences) or even in meeting the full aspirations of a single individual (e.g. person-centred customer). The needs of some customers may best be described as 'guidance needs' (e.g. the 'defenceless customer' or the non-experienced efficiency-centred customer),

for whom the external sources in the Environment, rather than the Self, become a major force in dictating the provision of solutions.

This brings us to the next point regarding ways in which the customer's aspirations relating to complex tasks, may be supported more fully.

4.6.4 The Human Intermediary

The human intermediary is uniquely placed to provide task encounters which could attempt not only to meet the widely differing needs of various customers but also to manipulate technology to provide the best support that it can offer, specific to the circumstances of the individual customer.

We need several qualifications. Let us accept that a system-centred design may be defined, in one major way, according to the simplicity if offers in the execution of the task. This it does mainly through a rigidly defined structure and a finite number of variables. However, such a technology is suitable for a minority of customers, while others use it at considerable personal compromise. If we next accept the argument that shifting the focus of the design to the customer, (who comes in diverse forms), results in a technology that is widely accepted by customers, but which becomes highly complex to operate, then this leads us to an obvious conclusion. A human intermediary proves a valuable device

for operating this complex technology, to the advantage of the customer, while also drawing on other unique capabilities as a human being such as a host of task-specific natural or trained skills, again to the benefit of the customer.

This, however, means that technology must provide the basis for the intermediary to conduct such a role. As was seen in Chapter 1, providing an intermediary with a system-centred technology may produce the reverse effect. This technology may then lead both the intermediary and the customer into forced adaptation, in an attempt to come to terms with technology, especially if there is no recourse from it, and because, as individuals, they have little power over the way it behaves. For the provision of a desired level of a customer-centred conduct from the intermediary, the necessary prerequisite is a customer-centred technology.

The intermediary serves a unique role in another way. It was seen how some customers may require a considerable amount of guidance in their tasks (e.g. the non-experienced efficiency-centred customer). The need would be even more general for other task encounters especially ones such as citizens advice and vocational guidance. Here the situation calls for a person-centred intermediary who is an expert of his profession and also an expert at operating a particular form of technology. For those whose needs exist at already highly developed levels, the intermediary may direct the attention to higher levels of the task. For those whose needs act at a lower or primary level, the intermediary may attend to these but in a comprehensive manner. He would therefore

select widely between personal guidance and computer-provided guidance, according to the needs of the customer.

If organisational goals can be summarised as efficiency and customer-satisfaction, then the coupling of a human intermediary with a customer-centred technology, offers considerable promise. We may provide a final point to this issue by reminding ourselves of our early findings regarding person- and efficiency-centred customers. One way in which technology may provide a common base for person- and efficiency-centred customers, lies in the provision of an intermediary oriented to providing a person-centred service for customers. For the person-centred customers, a matching orientation would prove particularly acceptable. On the other hand, he could equally successfully answer to the needs of the efficiency-centred by exploiting the considerable efficiency advantages ascribed to computer technology per se.

4.6.5 The Role of Technology

It seems therefore that the most effective way forward for technology to meet the aspirations of customers, particularly for the kind of situation we are faced with, lies in its utilisation as a supportive, rather than a substitute, tool for customer tasks. Essentially, this means that the design of technology be undertaken on a human interpretation of the task, where the customer is held as the centre point of the task. In supporting, rather than substituting a customer's task, there are some unique advantages that computer technology offers, which are seemingly overlooked in many present day real-life instances.

The feature of added attraction lies in computer technology being able to provide, within its wider ranging customer-centred features, an option which also serves the purely functional needs of some customers.

In general, individuals may need to be treated as masters of their own tasks, and a substitute role provided by technology may take away too much from them. A supporting role, on the other hand, would only make them better masters at their own tasks.

4.6.6 Improvements to the System

The aims of the chapter were not to perfect a system, but to attempt to demonstrate, and to explore the essence of, a system design approach which provides customers in double-interaction with the basis of a satisfactory level of task resolution.

We may make a brief system-specific address however, by noting some improvements that may be carried out on the customer-centred technology. This may be done partly by re-installing features that were deliberately left out, partly through learning from experience of how some features proved more suitable than others, and finally by learning from

experience, how some features may be modified to advantage. Such features may be summarised as:

1) The option of a computer-generated guideline of factors with an attached list of attributes to select from.
2) For the intermediary to be able to skip factors from the computer generated list which the customer feels are of little relevance to him.
3) For the intermediary to be able to input an attribute (or attributes) selected by the customer to a computer-generated factor, but which is not (are not) included in the list of attributes that the computer attaches to this factor.
4) For the intermediary to be able to add factors to the list generated by the computer.
5) The facility of being able to state a desired attribute without having first to elicit a factor, i.e. rather than COLOUR: BLUE, BLUE on its own.
6) The facility of being able to attach an attribute on immediately eliciting a factor, rather than first elicit a list of factors, and then to attach attributes to each factor.
7) A suitable visual display unit depicting the on-going transaction either for consultation by the customer, or for joint consultation by both customer and interemediary.
8) Suitable hard copy printout facilities as a means for the customer to take away information and progress accounts.

4.6.7 Relevance for other Tasks, Services, and Customers

It may be remembered that house-hunting was selected as the task on which to base the experiment as it essentially encompassed the major aspects of a class of tasks of particular significance to the present-day customer. It was also representative of 'a complex task'. In both its nature as well as its complexity, generalisations are possible not about specific system features addressing such tasks, as much as the broad philosophy governing such systems, and other systems in general, which purport to serve the customer. The broad philosophy that may be generaliseable is simply the shift from defining the task in strictly operational, even theoretical, terms, on system-first principles, to the task which is interpreted as a customer would interpret it and for the interpretation to include all the particular characteristics which define a customer engaged in such a task.

Generalisations in another area are less direct. When double-interaction task encounters shift from product to service centred, then the message may be of a somewhat different nature. To illustrate, if we were to shift from house-hunting or car-hunting to citizens advice, then the issue of subjective utilities, priority of factors, and of providing final selections according to computed overall subjective values, may be less relevant, since the structure defining the task changes. Here, the customer may be viewed as one seeking guidance ranging widely from the abstract to the highly structured. Although the person-efficiency and

experience/non-experience customer model would still be relevant, the focus would have to change slightly. The design in this instance may best take place against an overall background of a customer-centred technology design as well as the context in which customer and intermediary relate to one another, but with an important objective of answering the task needs of the intermediary that arise. Here, technology should provide him with a means of enabling him to handle his customers on a highly customer-centred, individual-specific manner as demanded by the situation. All too often, technology dictates terms in which the intermediary may conduct his affairs with the customer and even the way in which he should execute the task. This may particularly aggravate his role with the customer.

The important feature to note here is that the considerations in the design of technology to support situations such as citizens advice, should take special account of the multiple role required of a human intermediary in such situations.

Finally, we may consider customer categories which we have not been able to include. The main customer categories that the sample may not have provided for, despite its wide range of occupations, are 'special needs' groups such as the aged and the handicapped. Both these groups however, like the specialist group in the supporting study in chapter 3, may need a differing emphasis in the person-efficiency thinking offered to design of double-interaction encounters; in these situations, heavily in favour of 'person'. Once again our broad philosophy of a

customer-centred approach which relates to the special needs of these customers and one which will protect them from technology that may, for example, prove too fast for some (the old) and too complex for others (the mentally handicapped).

We will consider the issue of the human intermediary more fully in chapter 5.

4.6.8 Some Special Customers

There are highly strenuous aspects to studies based on real people (as compared to students), such as the trying, even humiliating experience of customer-hunting. Each time, however, the joy of discovery compensates for much of this. A significant part of this joy derives from meeting some of the individuals who make up the sample.

We will allow ourselves only a brief exposé, for fear of side-tracking.

One non-experienced efficiency-centred customer needs special mention. As an exception to the entire sample of customers, he preferred every system-centred feature he was offered. Even the nature of his ticks displayed a time-saving mission in life; they went rather than the conventional ✓ to ⁄ . He was a clockmaker by profession!

Customer 41 summed up the case of the cell 4 customer (the non-experienced efficiency-centred) thus: "Given the naive and minimal needs of a first time buyer, and a case for objective, helpful estate agent", the system-centred approach was "wisest and most comprehensive".

But the most prominent place is reserved for Customer 29, who although experienced and person-centred, succinctly expressed not only the reasons for the overall suitability that the customer-centred technology provided for most customers, but also the views underlying the design of technology in the first place:

> "I was choosing from my own frame of reference, in light of previous experience, and knowledge of present needs."

Customers not only can, but do most effectively, provide valuable insights into the impact of technology.

4.7 SUMMARY AND CONCLUSIONS

1. This chapter inter-relates the issues of task interpretation, system-design and customer satisfaction as this applies to double-interaction.
2. An experiment was undertaken to test the general hypothesis that a significantly greater number of customers engaging in double-interaction and drawn from the general public, would prefer deriving support in their task by technology that is designed on customer-centred principles, rather than on system-centred principles. Both approaches - though to a different degree - are either currently practised, or are a strong possibility for the near future.
3. Design of computer technology was undertaken to support house-hunting, as representative of a major class of real life consumer tasks which combine aspects of problem-solving and decision-making
4. The design of one technology was undertaken on a customer-centred interpretation of the task. This interpretation treated the customer as a centrepoint of the task, and took into account the various needs of customers reflecting their person- and efficiency-centred orientations, their experienced and non-experienced status, as well as their general characteristics as human beings.
5. The design of another technology was based on a system-centred interpretation of the task. This treated the system as a centrepoint of the task. It took into account the main parameters and operations involved in the execution of the task.

This approach interpreted the task, in the simplest possible way, as a transfer from a fixed finite set of factors attributable to house-hunting, to a retrieval of matching houses from a data bank. In addition, the design of this technology was modelled on a house-hunting system currently on the market.

6. 42 customers mapped along person- and efficiency-orientations as one dimension, and experienced and non-experienced status on another, took part in the experiment. They were drawn from a wide range of occupations representing the general public.
7. Each customer engaged in hunting for a house of his own choice, bound by his current real life circumstances, first supported by one technology, then by the other. A self-report questionnaire formed the basis of his evaluation of the 2 technologies encountered.
8. As predicted, a significantly greater number of customers favoured working with customer-centred technology.
9. One of the 4 cells representing the customers seemed specially attracted to the system-centred technology (the non-experienced efficiency-centred customers), in contrast to the rest of the 3 cel which opted over-whelmingly for the customer-centred technology. At least a small part of this finding however, is attributable to an artificial condition applied to the experiment, of making the two technologies as disparate as possible.

10. At a higher level, there were some inter-group differences in the impact created by the 2 technologies.

11. On the one hand, computer technology has the potential to provide a common base on which a wide range of customers may operate. On the other hand, technology alone does not seem to provide fully for the aspirations of the wide variety of customers, or even for the full aspiration of individual customers. This highlights the unique role required of a human intermediary so that customers may derive fuller significance and satisfaction particularly at resolving tasks of a complex nature.

12. The potential of advanced technology in meeting the needs and aspirations of man-kind may be more successfully harnessed by technology providing a supportive rather than a substitute role, for people's tasks. There may be a need for individuals to be masters of their own tasks. A supportive role provided by advanced technology would only make them better masters.

13. We may feel a little optimistic in the mission of technology designed to provide customers with both a satisfactory level, as well as an enjoyable experience of task-resolution.

Plan for Thesis

1 Introduction
2 Impact of Advanced Technology on Work Satisfaction
3 The Public in relation to their Task Encounters
4 Task Interpretation, System Design, and the Customer
5 Discussion
6 Conclusions

Plan for Chapter 5

5 DISCUSSION
5.1 An Outline of the main stages of the thesis
5.2 Some Critical Issues
5.3 People
5.4 Task Interpretation
5.5 Evaluation Criteria
5.6 The Human Intermediary
5.7 The Right Technology
5.8 Summary
5.9 Limitations
5.10 The Future

CHAPTER 5: DISCUSSION

We set out in this thesis to provide for effective double-interaction for all parties concerned, chiefly the customer and the intermediary.

Let us view briefly the build-up to the stage we have now reached.

5.1 AN OUTLINE OF THE MAIN STAGES OF THE THESIS

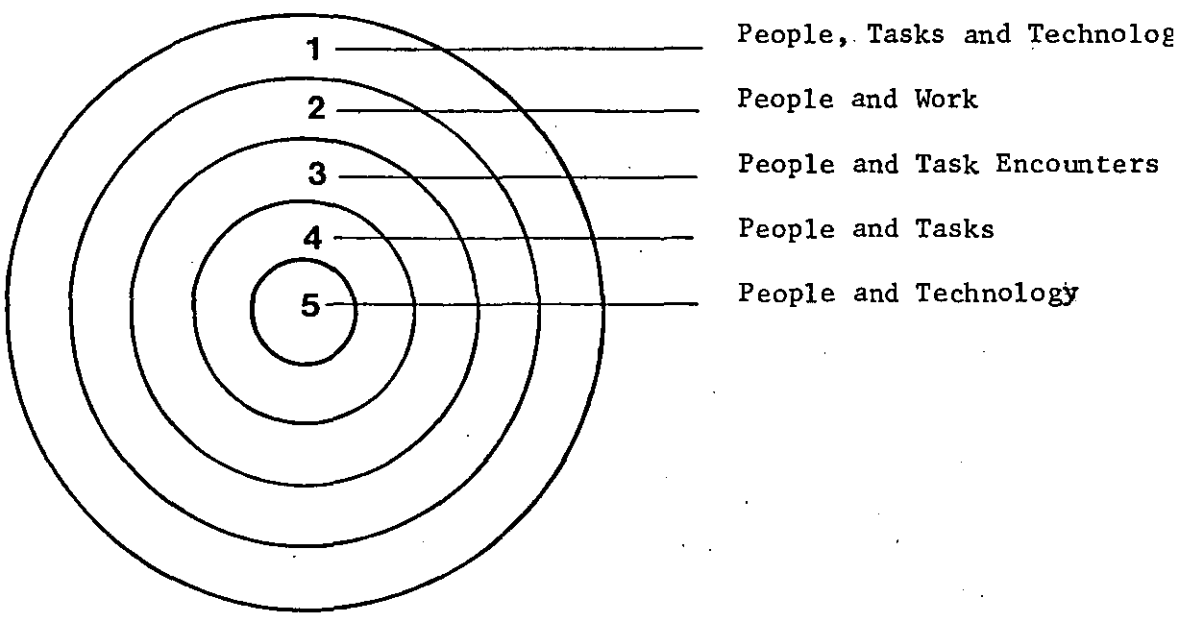


Figure 16: An outline of the main stages of the thesis

The reader may note that as we moved from chapters 1 to 4, we roughly progressed from general to specific issues, in 5 stages outlined in Figure 16. Depending on the particular circumstances of the reader, he may wish to remind himself about the build-up to this stage, in greater detail. If so, a brief look at the conclusions at the end of each preceeding chapter, may be useful. Alternatively, the main stages of the thesis as outlined in Figure 16 are covered more fully in the first few pages of the next chapter.

5.2 SOME CRITICAL ISSUES

Bearing in mind the main lessons of the foregoing efforts, we need a special address to a number of issues which will critically affect whether or not we succeed in providing effective double-interaction situations, and in general an adequate service to the customer, in years to come. It is very much the role of the thesis to point out the possible dangers that may occur if the planning for this is carried out in a certain way, as trends seem to suggest, but where the dangers may not be readily apparent. With the provision of an adequate service in double-interaction serving as a main objective, the relevant considerations are cast under 5 topics:

1. People
2. Task Interpretation
3. Evaluation Criteria
4. The Human Intermediary
5. The Right Technology

5.3 PEOPLE

There are two main issues that we may discuss under People. The first one is the needs and aspirations of people. The second one, and closely related, is the person/efficiency orientations of people.

5.3.1 Needs and Aspirations

The thesis has made repeated references to the phrase 'needs and aspirations' and we may now be in a position to classify the vast range of needs and aspirations that people may have. This classification is there for a purpose. It is to clarify in the mind of the designer the kind of needs on which to base his interpretation of task, and the subsequent design of technology.

Although the classification is in terms of different classes of 'needs', this is so for convenience, and refers to both 'needs and aspirations'.

Primary Needs	-	those that are critical to survival.
Secondary Needs	-	a variety of needs which may be interpreted as those relating to a meaningful existence for Man.
Developed Needs	-	needs arising out of change of personal circumstances, e.g. effect of experience.
Orientation Needs	-	those that are special to the individuals' orientation, e.g. person- and efficiency-orientations.
Operational Needs	-	those arising out of lack of necessary expertise in how to resolve a set of needs, e.g. owning a house may mean a wide variety of personal and written consultants with a building society, an estate agent, a solicitor, a surveyor, the present owner, etc.

Induced Needs - triggering off a latent need, or activating Man's adaptive qualities to produce a 'new need', e.g. through advertising.

Imposed Needs - the need for an individual to operate in a certain way, or else to face the consequences of another set of needs not being met. The sub-class of particular interest here is the kind of needs that are imposed upon people by a solution that provides for assumed needs which may be far-removed from the real needs. Hence the individual has first to transform his own needs in order to make them compatible with technology, if he is at all to benefit from the service offered.

If an adequate service is to be achieved, then all of the needs outlined above may have to be taken into account, with a special address offered to some, and a general address to others. The nature of the special and general considerations should become clearer as we delve deeper in the sections to follow.

5.3.2 Person- and Efficiency-Orientations

A major corollary to this thesis has been the recognition of person- and efficiency-orientations of people, as an effective means of relating people to their task encounters and situations. A number of researchers make an indirect address to this issue (e.g. Little (1969), Miller and Rice (1967), Docherty and Stymne (1977)), although rarely to any reasonable detail.

The main matter for discussion here relates to how best to accommodate the feature that the customer and the intermediary, may be either person- or efficiency-oriented.

We may remind ourselves here of the earlier findings (Maldé, 1975b) which suggested that intermediaries, in describing their customers and their work, seemed to display two kinds of orientation: person-centred and efficiency-centred. The nature of this orientation is essentially the same that we met in chapter 3 of this thesis. However, in the context of an intermediary engaged in double-interaction, it seems that efficiency-centred orientation manifests itself as 'system-orientation', particularly when the system itself runs on efficiency-centred, rather than person-centred lines. (Figures 4 on page 26 and 13 on page 132 summarise the orientation issue.)

Now if customers and intermediaries each bear either a person-centred or an efficiency-centred orientation, what are the implications for the real-life nature of double-interaction? There are two ways of directing our efforts in the achievement of the desired kind of balance between people, tasks and technology in double-interaction. One is for the system to support the customer, as well as the customer-centred role of the intermediary. Secondly, the intermediary needs to be person-centred if an adequate service to customers is to be achieved. This is supported to

an extent from the earlier work by the author (Maldé, 1976) where it seemed that the most promising combination that would 'satisfy' both the person-centred and the efficiency-centred customers was a person-centred intermediary and computer technology.

How can we have a person-centred intermediary in the case where the intermediary's existing orientation is efficiency-centred? The answer may lie in the kind of selection/training employed. In the case of fresh recruitments, this may mean selecting intermediaries who are naturally person-centred, backed with suitable training on customer-awareness and customer-centred orientation. On the other hand, it may not be impossible for other kinds of intermediaries also to adopt a customer-centred role, as one may see from Blake and Mouton's work on management styles (1964). Although their work is with managers, it has interesting links with the work of intermediaries in double-interaction. Blake and Mouton argue that in order for a management-style to be effective, the style needs to reflect both a people-concern (which one may interpret as 'person-orientation') and a product concern (which one may interpret as 'efficiency-orientation'). They have accordingly devised a training programme which helps managers to achieve a joint people- and product-concern. Similarly, one may help an intermediary attain both a customer-centred role as well as a proficient operation of the system. This makes the right kind of system, a vital prerequisite.

The adaptive quality of humans as demonstrated in the previous paragraph, highlights the need for the right kind of balance between the customer, intermediary, and technology in double-interaction. If systems are designed only on efficiency lines, they may fall short of supporting the customer-centred role required of the intermediary. However, with little power to affect changes in the system behaviour, the intermediary will be under great pressure to change his own conduct to match with the system. The customer, rather than the system, would offer the adaptive counterpart, and he would expect the customer too, to readjust his own position, if he is to benefit at all from the service. Hence systems designed on operation-centred or efficiency-centred values may run the danger of inducing in time a wholesale conversion to efficiency-orientation of both customer and intermediary. This may not be alarming in itself but when one considers two questions, the implications do begin to look important.

These are firstly, whether people should bend to suit technology rather than technology bending to suit people, and secondly, how much of the customer's initial needs have to be forgone just because the technology is designed in a particular way.

The most promising solution seems the provision of an intermediary who is person-centred, and the provision of technology which supports, rather than aggravates, the customer-centred role

of the intermediary. Clearly, there may be more room for design of double-interaction situations to run on partisan, i.e. person OR efficiency, lines in the case where the customers are a specialist class of the general public, who seem to have as a group, an over-riding preference for one or the other set of values (e.g. the Engineering students and the Ergonomics students in chapter 3).

Although the evidence in chapter 3 as well as of the past work of the author (Maldé, 1975a) provide strong indications both of the existence and the relevance to double-interaction of person- and efficiency-centred orientations in people, this has to be weighed against the fact, that besides the author himself, no other researcher has delved directly in the area of person/efficiency orientations.

It may be worth restating that the person- and efficiency-issues was a chance finding in a field study (Maldé, 1976) which after detailed pursuit and application, has served the author in good stead through the years, as a neat way of representing people's relationship with their task encounters and situations.

Furthermore, person/efficiency issues offer interesting links with the general approach to design of work, and of technology for people, as the sections to follow will show.

5.4 TASK INTERPRETATION

In one way, the message of the preceding section on 'people', may be regarded as how the author interprets, and wishes his reader to do so as well, what the double-interaction task is.

Any design of technology is based consciously or sub-consciously, on a task interpretation. In most cases the design of technology, and that of advanced technology in particular, seems to base itself on a task interpreted only for its operational or mechanical elements. It fails to recognise the critical issue of a customer engaged in a task.

Chapter 4 demonstrated the difference both in design and in application of this distinction through the two versions of technology: customer-centred and operation- or system-centred.

This point may be further illustrated in an example extracted from the literature of how a group of researchers interpret the psychiatrist's task (Colby et al., 1966):

> "A human therapist can be viewed as an information processor or a decision-maker with a set of decision rules which are closely linked to short range and long range goals. He is guided in these decisions by rough empiric rules telling him what is appropriate to say and not to say in a certain context".

The authors then go on to declare an intention of setting up a 'computer psychiatrist' which would assume such a role. To point out the inadequacy of this task-interpretation, we may refer to Weizenbaum's (1976) comment on the matter:

> "What can the psychiatrist's image of his patient be when he sees himself, as therapist, not as an engaged human being acting as a healer, but as an information processor following rules, etc.?"

A customer-centred interpretation would extend more to behavioural rather than the purely mechanistic aspects of the task and include amongst its considerations, a role of the psychiatrist to provide comfort, guidance, and a 'good bedside manner'.

Let us attempt to develop the task parameter more fully.

In the final instance, the notion of 'task' that will lead to the provision of an adequate service may mean a consideration of all needs outlined in the section under 'people'.

To elaborate, if needs and aspirations may be classified in one way as primary, secondary, developed, orientation, operational, induced and imposed, then the task in a particular situation may have to be interpreted in terms of:

In the particular situation for which design is being undertaken,

a) what needs should be <u>specially</u> provided for?
b) what needs should <u>also</u> be provided for, as far as possible?
c) how much will the solution aggravate the needs of the remaining kind, and can anything be done about it?
d) are needs being induced or imposed at the expense of answering the real needs that already exist?

Hence the task interpretation of the kind conducive to the provision of an adequate service may depend on a 'loose' interpretation of the task bearing on a wide variety of needs of the public, than one which aims at a technical rigidity and specificity. Before we take up this point further, at this stage we may outline the kind of needs that the task may be particularly held to represent. This is attempted in Figure 18, in a flowchart form.

Customers' needs in a task occupy, and change over, a variety of stages: formation, formulation, definition, modification (including addition and subtraction), resolution, and revision.

An important feature to note is the implications of such a consideration on the subject of 'task complexity'. It may be useful to recognise that 'task complexity' may draw from 4 main parameters: 1) the operation, 2) the customer, 3) the intermediary, and 4) the system.

1. The Operation: the basic operation(s) needed to resolve a set of needs may be long and involved, e.g. choosing from a vast number of houses and personal and written consultations with solicitor, estate agent, building society, surveyor, etc.

2. The Customer: the customer may not know what he wants, may have difficulty in expressing himself, may want to change his mind, etc.

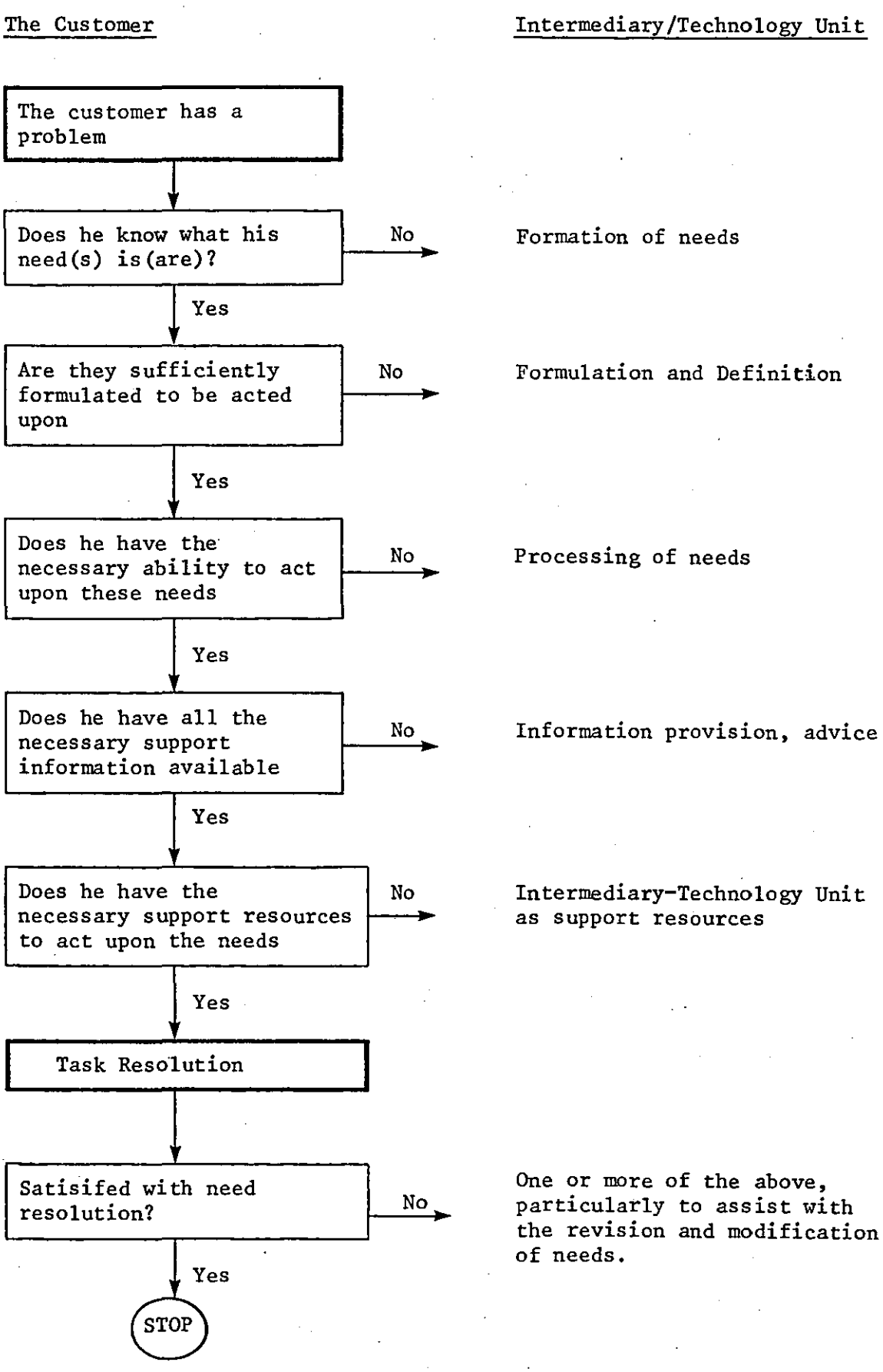


Figure 17 : Different levels and kinds of Customers' Task Needs leading to Double-interaction

3. The Intermediary: the intermediary is not equipped with the right skills and/or support resources for dealing with guidance, translation, execution, readjustment, understanding, etc. required of his role.

4. The System: the design of technology may aggravate, rather than alleviate, the nature of needs and participation of customer and intermediary.

Besides the nature of task complexity, it may be important to recognise the special nature of a customer's task. Any one customer's task may occupy only a specific point within the overall task which attempts to serve a wide number of such customers, each with a different set of needs. Hence the designer's objective is to interpret the overall task in a way that accommodates this considerable diversity. To this end, it may be particularly important in the context of double-interaction, as well as generally, that a task is considered:

1) to be dynamic, not static.

2) to have flexible, not fixed boundaries.

The task is dynamic, not static

The task is dynamic in the sense that the customer, the intermediary, and the system are actively engaged in the resolution of customer's needs. Needs may change and new needs may arise as a natural progression of the task.

The task has flexible, not fixed, boundaries

Depending on the nature of customer's needs and disposition, a different task will ensue. There may therefore be wide variations within what is otherwise considered as the same class of tasks, e.g. house-hunting.

Hence the designer's objective must be to provide for a task that is dynamic and flexible, and particularly to keep its complexity to its natural minimum through the provision of the 'right' technology, rather than for technology to add to it. The resulting technology, in the form of a single solution addressing a wide range of problems, may indeed give rise both to a technology that is complex to operate, as well as to a solution that is incomplete in its own right. This highlights the unique role that a human intermediary may be called upon to provide, to alleviate both these problems. We will take up the issues of the intermediary and of the 'right' technology, in due course.

5.5 EVALUATION CRITERIA

By 'evaluation criteria' is meant those measures employed to test the success of a solution, which are often related to the measures employed in studying the problem in the first place.

Hence, if 'task interpretation' is regarded as 'problem definition', then 'evaluation criteria', as a practical means of defining and solving a problem, become the next important issue to consider.

The first point to note is that if services or technology attempt to satisfy the customer in some way, then there must be a conscious attempt to evaluate the resulting technology and/or service. This is to say, only evaluation will tell you whether a solution has in fact succeeded.

The second point, and closely related, is that this evaluation must be based on the customer himself, as directly as possible, and on a sample approximating as closely as possible the actual people whom services or technology purport to serve. This is to say, there may be a limited relevance to an evaluation of a solution which is based on a sample of students, if the solution aims at serving the general public.

Thirdly, for the kind of situations double-interaction deals with, it may be insufficient to base the evaluation only on the technology supporting the task. It may be more important to extend the evaluation, to the service as a whole, of which technology may only be one of a number of major factors.

Fourthly, we come perhaps to the most important point about evaluation studies. This is the nature of the evaluation criteria themselves. The impressions that the author has gained over his research experience since 1974, leads him to believe that evaluation studies when they are carried out, only answer one aspect of the problem. If the criteria for an adequate service may be classified as 'Efficiency' and 'Pleasure', then it seems evaluation criteria are mostly Efficiency-related and rarely Pleasure-related. (The reader may note that the discussion here of the 'pleasure/efficiency' concept is somewhat different from the person/efficiency concept developed in Chapter 2. 'Efficiency': Is the basic operation being served easily, quickly and accurately? 'Pleasure': Does serving the basic operation give rise to a pleasurable experience?) If the aim is to create efficient and pleasant situations, then the evaluation measures must incorporate both 'hard' (speed, accuracy, duration) and 'soft' measures (satisfaction, preferences, etc.).

Engineers, and even human scientists to an extent, need little advice about providing technology that is Efficient. Indeed, many such professionals adopt speed and accuracy as the primary basis both for design and subsequent evaluation of technology. However, they do not exploit the full potential of their art when they come up with solutions which are for the most part based on operational efficiency.

Sometimes the 'Pleasure' is achieved by providing 'Efficiency'. To cite two examples, the efficient solution would prove more suitable for the efficiency-centred person, than for the person-centred person. At another level, the application of environmental and layout ergonomics, where it succeeds in creating pleasing environments, may do so in the form of incidental benefits.

When it comes to Pleasure measures such as User Acceptability and User Preference, these are often given a passing glance, if not neglected altogether, mainly because of their relative complexity and difficulty of measurement. Chapanis (I976), for example, in a comprehensive paper outlining the findings of his man-computer interaction studies extending over a number of years, talks about the medium of communication that produces least errors and the one which achieves the shortest solution time. However, we do not know from his work about the medium that would provide people with the greatest pleasure to work with and those that prove strenuous. He has reported in conversation, that he has not been able to look at this aspect mainly because of the measurement and other problems of such questions as whether first impressions do indeed produce lasting impressions.

If one measure is more difficult to explore than another, this does not undermine its importance. In the final instance, it is possible that even half answers of one kind of measure (e.g. 'soft' measure) may prove more beneficial in the long run, than the apparently 'absolute' answers of another measure (e.g. 'hard' measure).

The war-time need, for efficiency at all costs, seems to have outrun its course and it can be argued that peace-time, if nothing else, merits a certain relaxation of this criterion, and even an adoption of another kind of criterion, namely Pleasure.

To recap then, the success of services and/or technology must rest on an adequate evaluation by the people actually to be served, and that this evaluation must particularly reflect the pleasure- and efficiency-nature, both of the double-interaction situation, and of societal needs of the times in general.

5.6 THE HUMAN INTERMEDIARY

A critical issue to the provision of adequate service is related to the existence and the role of the human intermediary in the context of the public use of computers. In many ways, the differing emphasis placed on the role of the human intermediary in the public use of computers by various system-designers, seems to stem directly from the way they interpret the task at hand.

5.6.1 Introduction

By 'public use of computers' is meant a service or assistance rendered to a set of needs of the public, by the computer, directly or through an intermediary. The first will be referred to as

'direct man-computer interaction'. The latter, where man-man interaction and man-computer interaction occur jointly, will be referred to as 'double-interaction'.

The apparent intention of many systems designers is that ultimately the public will be interacting directly with the computer. The reasons for this objective are not quite clear to the author, but seem to be based on a restrictive task interpretation which may not take sufficient account of the real nature of the task. Once the decision has been made that a computer needs to enter the lives of the public, we need to tread very carefully on how we proceed with this intention, since this will have a direct bearing on how far we succeed in providing an adequate service to the public.

5.6.2 The Current State of Art

In 1969, in a discussion on Man-Computer Interaction, Shackel mentioned, when addressing the issue of the Public users, that

> "A standard solution at present of course, has to be to provide a suitable trained 'buffer' between the public and the Computer ..." (Shackel, 1969).

Continuing this argument, the intermediary should be thought of as a 'link' between the public and the computer, serving a far more important function than a mere 'temporary solution' and one which direct man-computer interaction fails to replace.

Recently, a study by Georgia University on computer-aided Library Information Retrieval concluded:

> "Another significant finding of the study is that the intermediary is an integral component of the interface and is essential to the adaptive capability of the interface". (Carmon, 1975).

There is evidence of the suitability of the intermediary, even for relatively simple tasks such as form-filling. In a project on the public use of computers in the area of Social Security (Adler and Feu, 1975), difficulties were experienced relating to the incomplete and erroneous filling in of forms by the public, forms which were to be fed into the computer. These difficulties were satisfactorily resolved by the introduction of the intermediaries in the form of "trained clerkesses" and the researchers concluded in particular, that "the system would only be feasible if assessment forms were filled in with the assistance of trained personnel". In another form-filling task, this time in the area of Driving License Applications, Dawson (1977) tested 4 experimental conditions:

1. direct man-computer interaction, with a conversational program bearing 'encouragement' phrases.
2. direct man-computer interaction, with a conversational program bearing 'admonishment' phrases.
3. direct man-computer interaction, with a conversational program bearing both 'encouragement' and 'admonishment' phrases.
4. double-interaction where a human intermediary interviewed the subject and operated the terminal.

Dawson's finding was that conditions most acceptable to the subjects were interacting with an intermediary, and interacting

directly with a computer where the conversational content reflected both 'encouragement' and 'admonishment' qualities. When one relates this to her other finding that encouragement-only or admonishment-only programs were generally rated inferior by the subject, then this seems to suggest that subjects align with conditions approximating the content and quality of 'natural language' which may comprise both encouragement-related and admonishment-related phrases. This raises the question of whether it may be wasteful to attempt to develop conversational programs in the cases where a human intermediary is available who in his natural form brings in a vast reserve and talent of human qualities, including 'natural language'.

Opposing this view, Evans at a recent conference on Man-Computer Interaction (Evans, 1976) disputed the significance of the intermediary in his Patient-Computer Dialogue System. His argument ran as follows. When a person was left in the room where the patient was interacting with the computer, the patient seemed to turn frequently to the second person for assistance. When the person was left out, the patient was forced to tackle the task of interacting with the computer himself, and hence got on with the job much better.

Unfortunately this finding was not the result of a comparative test of direct man-computer interaction versus double-interaction. It was a bi-product of an evaluation exercise of a direct man-computer system. The observation was on a person 'left in the room', who 'hovered over the patient', and who was, from the beginning, dispensable. For any useful study of the problem, the intermediary must be studied as an integral part of the system, and as a genuine 'link' between the patient and the computer.

Another system currently being developed in the Health area, at the University of Sheffield, bears a different emphasis, and the focus is on double-interaction arising from patient-doctor-computer interaction.

A number of considerations need to be employed when deciding whether to plan the public use of computers through double-interaction, or direct man-computer interaction.

5.6.3 Direct Man-Computer Interaction

What are the kind of situations for which direct man-computer interaction may be justified? It seems there are three such situations:

a) where the task concerned is, what may be called, 'simple', i.e. one that is relatively short and is easily, readily and quickly executed. One way of assessing a task for its simplicity is by considering the address required to the various stages of customer needs, as outlined earlier (e.g. formation, formulation, definition, modification, resolution and revision). To the extent that a specific address is required to only one, or to only a small component of this needs structure, a task may be considered 'simple'.

b) where a simple task serves to supplement the execution of a similar or more complex task through double-interaction, that is to say wherever possible, let customers have a choice in the matter. For example, you can choose to draw a limited amount of money from a bank, either by pressing a few keys outside, or doing so through a human intermediary, inside.

c) where a simple task serves to complement the more complex task executed through double-interaction. For example, where the derivation of house-buying needs as well as information retrieval of a selection of possible houses based on this specification, is carried out through double-interaction. But the calling up of information on individual house numbers, at a separate terminal, may be executed through direct man-computer interaction.

5.6.4 Double-Interaction

However, when it comes to the rendering of a 'complex' task, the issue is not all that straightforward.

By a complex task - and there are a considerable number of this type - is meant one which is long, involved, and not easily, or easily, executed. An important contributant to task complexity, as was seen in the section under 'task-interpretation', is the nature of customer needs. To the extent that a task involves a specific address to some or even all of the various stages of customer needs (e.g. formation, formulation, definition, modification, resolution, and revision), a task may be considered 'complex'.

For such tasks, the prescription for the public use of a computer is through a human intermediary. The following sections will attempt to argue why this is so, by examining various issues - some of them straightforward, others not so straightforward.

a. Overview

First, as an overview one may elaborate on the point made by Shackel (1969). It seems we are years away from an understanding of the human which is sufficient for us to press ahead, in a clear conscience, with the idea of direct man-computer interaction. We are still in doubt about the various processes involved in man-man interaction and about the long-term impact of computers on the public, on their styles of behaviour, and on their life-styles in general. A 'safe bet' is a human intermediary trained to interact with the computer and the customer, who would cushion the impact the computer would have on the public.

More specifically, let us examine the various parameters that are involved in situations likely to be computerised, to highlight the suitability of the human intermediary.

b. System Expertise

A lot of situations involve not only straightforward information retrieval, but also an expert knowledge of the various options open in operating the computer system as well as the aspects of the computational service available. Library Information Retrieval is one of the many examples. Linking with an overseas data-base would involve going through a telephone operator. At another level, various facilities exist for you to try out different combinations of the subject-headings on which you seek information. Such operations would be complex and even cumbersome to public users but not to a trained intermediary. Raising the level of public user to that of being both an expert on conducting the task as well as operating the computer involves practical as well as ethical issues. Training an intermediary to reach the same level is easier to accomplish, and is a far more attractive proposition.

c. Task Expertise

Most situations involve, first and foremost, a derivation of needs before anything further can take place. Examples are, career guidance and employment bureaus. The members of the public i these situations do not always know exactly what they want, of if they do, how to proceed with the achievement of them. There are many aspects of the public that have to be carefully handled, and in a way specific to each individual, such as the wide variety of ways in which people:

i) express themselves,

ii) ask for information,

iii) and make decisions.

The desired role here of a 'task expert' may be very attractively tackled by a highly adaptable, well trained, human intermediary.

d. Professional Expertise

Many situations involve the public seeking help and advice (e.g. career guidance, citizens' advice). Here the needs sought of an individual are those unique to his training, his occupation, and his experience. There is much that could fall short of such needs and expectations of the public, if they were to be given a computer-professional, rather than a human-professional who could provide his professional service so much more effectively, with the aid of a well designed computer system.

e. Professional Style

Closely associated with the last point is the issue of 'professional style'. By this is meant a certain way of conduct which is implicit in the practice of a particular profession. There may be professions (e.g. therapeutic, counselling, etc.) which require 'a good bedside manner', this is to say, where it is just as important to maintain a good and close, customer-sympathetic human contact, as it is to arrive at a particular solution or diagnosis. Wherever human contact is a highly desirable aspect of a profession, it would be wrong to place all the emphasis on a

computer to provide this professional service. Whereas, if the computer was designed to assist and support the human intermediary - in this case the professional - in the rendering of his service to the public, then this approach shows a considerable amount of promise.

f. Context

Next, there are the many 'little things' that a computer could not answer, things that supplement the main issue at hand, and which makes the picture complete for the customer. For example, when seeking information on train travel and following the initial enquiry, the customer might want to know why a particular service was cancelled, the expected duration of or reasons behind a strike, or even where he could catch the bus to town and whether a bus was a good idea at all. These relevant side-issues could however be tackled by the intermediary, well within the context, and as a natural extension of the main issue at hand.

g. User-orientation

It was seen in chapter 3 how people participating in task encounters seem to orient themselves to Person or Efficiency aspects of the situation. For example, a Person-centred person will attach priorities to his subjective feeling, the social qualities of the conversation, and the qualities of the other person, i.e. the Person-centred person look for 'the social factor' in his transactions. The Efficiency-centred person will be interested primarily in an efficiently executed transaction.

Earlier research also suggests the desirability of optimizing the Person and the Efficiency aspects of the System and the Service offered, for optimal customer satisfaction. Whereas a computer is good at enhancing the Efficiency aspect of a transaction, the intermediary is good at providing the 'social factor', and hence at enhancing the Person-aspect.

h. The Computer-Intermediary Working Unit

The complementary nature of the Computer-Intermediary pair makes this pair a superior working unit to the case where only one component or participant is present. The computer is good at producing answers quickly, accurately, and after scanning through a large number of options. The intermediary is good at exercising discretion and at adapting to different situations and needs of the customers. Working together they form a very attractive unit, with the computer enhancing the Efficiency context of a transaction and the intermediary enhancing the Person context. Table 46 (based on Eason, 1977) illustrates this point simply and succinctly. However, there is one important feature which becomes a relevant part of the task at hand, when dealing with the member of the public. This is 'the social factor' discussed earlier. The human intermediary provides the public with the facility with which to identify themselves, not to have to adopt novel forms of interaction, and to face situations with which they are more or less familiar. The 'social factor' becomes a significant component of the task when dealing with the member of the public, and is hence added to Eason's list.(Table 46 is hence slightly different from Table 1 on page 13.)

The Computer is good at:-	Man is good at:-
Mass storage of information	Pattern recognition
Fast and accurate retrieval	Goal formulation
Fast and accurate information processing	Identifying new ideas
Following predefined instructions	Resolving ambiguity and uncertainty
	Providing the 'social factor'

Table 46: Allocation of Function between Man and Computer and the Desirability of the Human Intermediary in the Public Use of Computers

(Adapted from Eason's "Allocation of Function between Man and Computer" in a paper "The Potential and Reality of Task Performance by Man-Computer Systems", 1977.)

It is not to suggest necessarily that double-interaction is the ONLY way. However the foregoing discussion does seem to suggest that for the most part, an adequate service to the public can be better achieved through double-interaction, than through direct man-computer interaction.

5.6.5 Double-interaction versus direct Man-Computer Interaction

The issue of double-interaction versus direct man-computer interaction is of course not just confined to the public use of computers. For example, there is considerable debate over the suitability of the intermediary in the area of manager-computer interaction (e.g. Dew and Gee, 1973).

Widening the scope, therefore, another method is suggested here as an aid to determine the issue. It is in many ways a summary of the foregoing considerations in sections 5.6.3 and 5.6.4, but in its condensed form, may offer a more practical guide.

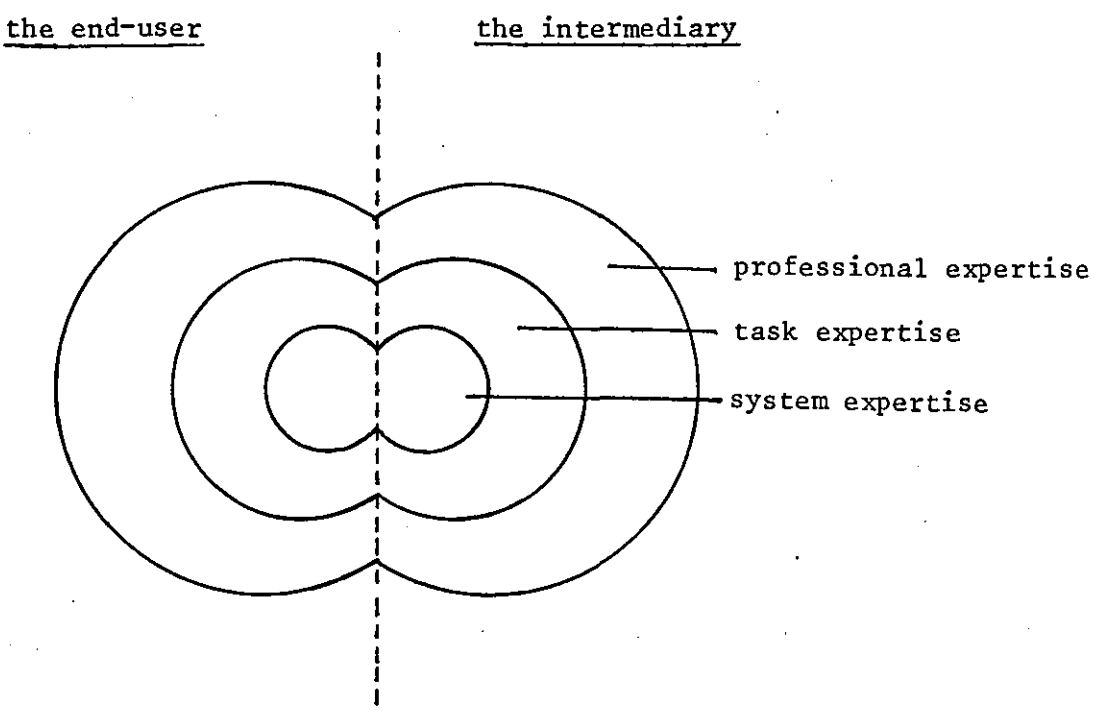


Figure 18: A framework for determining the suitability of the human intermediary in the use of computers

Figure 18 outlines the rationale for this method, and it is thought that its suitability extends over a wide variety of end users of which the public may be only one major sub-set. The 'end user' here is the 'customer' to whom the thesis makes a repeated reference, but may also be the manager, the doctor, the accountant, etc., for whom a computer service is being planned.

The rationale condenses the major arguments into 3 main parameters - all of which may be considered as relating to the task needs of the particular situation that a designer is faced with. These parameters may be called, in order of decreasing specificity, system, task, and professional expertise.

System expertise may include all the skills needed to operate the terminal. Task expertise may include a range of abilities such as interpreting a customer's needs, translating these in a way that they can be acted upon, and guiding a customer through various options and decision points in order to attain the required level of task resolution. Finally, professional expertise, in some ways the most general of the three, may be seen as all those aspects relating to a person's profession, borne of training and experience, such as decisions, recommendations, and even exercising certain standards and ethics required of the profession. It may be noted that the three categories may overlap each other's boundaries, but that they are treated as separate categories, for convenience.

The first consideration is to note how many of three categories of expertise are relevant to the particular situation one is faced with, and the extent to which each is relevant. (Most situations, it is thought, would need all three levels of expertise, although to differing extents within each level.)

Next, confine yourself to the categories thought relevant and now assess how much of the required level of expertise within each category can be satisfied by a) the end-user, and b) the intermediary.

Proceeding in this way, one may end with a rough idea of how much can be allocated to the end-user side and how much to the intermediary side (figure 18). Clearly, the greater the allocation to any one side, the greater the suitability of related approach. For example, consider the use of a computer by a specialist, say an electrical engineer tackling a networks design problem. Such a person may have the required level of expertise on all three fronts: system, task, and professional expertise. Here the function of the intermediary would be redundant on all three accounts, and the prescription might be one for direct man-computer interaction. On the other hand, if the end-user is a student in need of specialist vocational guidance, then the required level of expertise in all three categories may be better satisfied by a career guidance officer, who is supported in his task by a suitably designed system. Accordingly, the prescription would be for double-interaction, i.e. for the end-user (the student) to interact with an intermediary (the career guidance officer) supported by computer technology.

For most cases, however, the two-way allocation may not be clear-cut as all that, with some allocation made to the left and some to the right. This would still enable the designer to weigh up one prescription against another to see which one is likelier to succeed in meeting the needs and aspirations of the end-user, and whether he ought to consider training either the end-user or the intermediary into a set of skills, to increase the advantages of any one prescription. For example, it may be that

a manager may have both the required level of professional and task expertise but not the system expertise. This raises the problem cited in literature (Eason, 1976). Does one introduce an intermediary in the form of a manager's assistant, trained to operate the terminal? Or does one train the manager to operate the terminal? The designer would then have to weigh up the advantages and disadvantages of either approach, as well as the practical constraints governing each approach, by working closely with both the manager and his assistant.

To recap, using figure 18 as a guide,

a) consider the relevance and the required level of each of the three categories; system, task, and professional expertise in turn, with special reference to the particular situation in which the use of computers is being planned.
b) assess whether the required level of expertise can be better attained by the end-user or the intermediary, for the selected categories.
c) assess the overall allocation to decide which prescription will better serve your own objectives and what measures are further needed to improve the prescription.

5.6.6 Conclusions

At the planning stage that we are in when we should be considering ways and means of achieving best results in the public use of computers, double-interaction must be considered not only as a viable, but a powerful alternative to direct man-computer interaction, particularly in situations where the task may be considered as 'complex'. Planners must have the intermediary-concept consciously 'tried and tested'.

In the final instance, the right solution may lie not in 'how can we remove the intermediary?' but in 'how can we improve the work of the intermediary, in order for him to tackle the customer's needs more effectively?'

The latter proposition has a direct bearing on the provision of the 'right' technology, which we will take up in the next section.

5.7 THE 'RIGHT' TECHNOLOGY

A major prerequisite to the provision of an adequate service is for technology to be of the right kind. What are the principles governing the design of the 'right' technology? We may now be in a position to answer this question, by outlining a set of propositions which are conveniently cast into 7 categories but which are not necessarily mutually exclusive.

5.7.1 Technology that attempts to meet people's needs and aspirations

The role of technology is as a tool at mankind's disposal. As such, it must aim at satisfying people's needs and aspirations. If it serves any other function, it must leave itself free from interfering with the needs and aspirations of people.

5.7.2 Technology based on a customer-centred task interpretation

This is a corollary of the first proposition. A first step for technology to answer to the needs and aspirations of people, lies in an adequate understanding of these needs and aspirations, of which the task needs become an important sub-class. This means understanding the task in terms of a human being engaged in a task rather than the task merely consisting of a number of operational components.

5.7.3 Customer's, rather than the Designer's needs and aspirations

This brings us to the closely related issue of 'Whose needs and aspirations?' If the designer finds the actual process of designing a system or piece of technology personally satisfying, this is a welcome feature, but only if the ensuing design is also of satisfaction to the customer and the intermediary who are actually going to use the technology. The designer's role must

extend to the needs and aspirations of society at large, and of the customer and the intermediary in particular, if he is to produce the 'right' technology. His foremost duty can be argued to be to the user of the technology, and then only to himself. However, an exciting vocation is possible for the designer whose mission it is to design for the people, since in such a case he would be designing both for himself as well as for the users.

As such, it is as much the role of the designer to include in his study, the wider context of the problem. The situation is often like a difficult piece in a large jig-saw puzzle. Coming up with the right piece may relate both to an overall idea of the picture as a whole, as well as to a more specific study of the pieces immediately surrounding the right one.

As an example of the 'wider context', if patients start to prefer a computer to a human, or if the public start to prefer a computer to a social security officer, it is as much the role of the designer to recognise the possibility that the service offered by the doctor or the social security officer in question has degraded to the extent that people start to prefer interacting with machines. If the societal need is one of improving the conditions of doctors or social security officers, then the introduction of a computer that is even marginally better than its human counterpart may be acceptable but may do little to solve the real problem.

Whether the design of technology is of the right kind will depend on how far the designer is prepared to recognise that the needs and aspirations of people, who are to use and benefit from technology, take precedence over his own needs and aspirations.

5.7.4 The previous technology is not all bad

Many computer transplants of manual technology, seem to take place as complete transplants.

To explain, there is a danger in thinking that if a problem or a set of problems exists as part of a larger situation, then the whole situation is to blame. As a result, there may be an associated danger in thinking that a totally new situation is needed to replace the old one. What is often not recognised is that by replacing the old technology in its entirety, there is a distinct danger of throwing away the baby with the bath water.

The old technology may contain a wealth of useful information. There are three main aspects to recognise.

Firstly, except in extreme cases, there may be pleasures as well as aches associated with working the previous technology. Suitable studies of the customers and the intermediaries should enable the designer to gain an insight into what these might be, and his first objective should be to consider how far it is possible for the new technology to retain the pleasures, while replacing the aches.

Secondly, the previous technology, despite its operational inadequacy may have shaped itself as an integral and even acceptable part of the rest of the organisation. A complete replacement may be difficult to blend in with the rest of the organisation, while any technology that approximates the previous situation may be better placed to retain the continuity and context.

Finally, human relationships and a work climate may have been built around the previous technology which the new technology should aim at retaining as far as possible.

Hence, the 'right' technology is thought to be one that extends from, and builds around, the lessons of the previous technology.

5.7.5 A Balanced Allocation of Functions

Computer technology is already well advanced to assume a wide variety of human activities and functions. It is not the aim of this section to present a yet another Fitt's list (Fitts, 1951) which would offer a checklist of what functions to allocate to a machine, and which ones to man, but to question the danger of overplaying this exercise. As more and more facilities provided by technology become possible, it has become a trend with many designers to exploit this as far as it can go, and to treat all other intervening situations, including even the involvement of humans, as merely stop-gap mechanisms. Weizenbaum (1976) refers to this as "instrumental reason" and argues against what he terms as "the imperialism of instrumental reason".

There are mainly three reasons why the pursuit of technology that is operation-centred or ruled by the "instrumental reason", takes place. Let us briefly mention these reasons before discussing the implications.

One is the fascination of the designer with his toy: the computer. For him, the problem may have become one of 'how much can I make my computer do?' rather than the more real life issue of 'what functions can we attempt with a computer which currently cannot be undertaken, or are not preferred by humans, but which would further the needs and aspirations of humans?'

The second problem is that the designer may be pressurised by his employer to seek ways of minimizing costs, leading to moves to replace costly labour with technology (e.g. Youngs, 1977). While we may not be in a position to control the activities of the designer and his employer, we may nonetheless point out the dangers that exist in such thinking, as was seen particularly in the discussion on the question of direct-interaction versus double-interaction.

The third reason lies in the way problems seem to be solved, as was seen in an earlier discussion, where the wider context other than the problem immediately at hand is often given only a cursory consideration. This may be an illustration of Zipf's law (1949) of Least Effort in action.

The main implication of the tendency to over-allocate functions to the computer, links to the work and role of the intermediary.

It may be important to recognise those functions which the intermediary regards as important elements of his work and role, and for technology to build around this feature, and secondly to attempt to assume only those functions, which the intermediary cannot perform, or finds displeasing to perform.

The case in point, borrowed from a parallel situation although not in double-interaction, is the finding that with computerisation the process controller's task is reduced to boring, monotonous aspects relating either to long periods of non-activity between emergencies, or to mere pushing of knobs, and watching of dials (e.g. Withers, 1976). A situation even more close to home is the recent upsurge in word processing technology. Although it is too soon to know, it is suspected that as more and more manufacturers 'push' their product through an increased number of facilities being automatically or readily provided by the new technology, this will produce a related detriment to the role and the work of the operator.

It is the discretionary role of the intermediary, as has been stated earlier, which brings special advantages to double-interaction in its ability to serve a wide range of customers. This role of the intermediary is linked to the extent to which he can deal with a particular customer's needs himself, and the extent to which he can draw on the services of the computer. The intermediary-computer relationship therefore, will vary widely from one customer's needs to another's. Hence the position here is

rather like the one suggested by Singleton (1974), who argues for the allocation of functions to be such that the human operator has the flexibility of function allocation.

It may be better to think of ways to establish the right level of symbiosis between intermediary and technology, so that he finds:

a) his work more pleasant,

b) his role better supported, and

c) his presence an important and integral part of the situation.

With the intermediary thus equipped, the designer and the employer may be in a strong position to expect a better service to the customer.

5.7.6 Technology that supports rather than substitutes

As computer technology attains an increasing capacity to assume more and more human activities, it also grows more and more complex. An observation may be made that the development of technology is outpacing the development of the public at large.

Let us accept as one primary feature of man's existence, maintaining links with his environment and of mastering his environment. If we recognise also that technology is a part of this environment, then technology that is ever-increasing in complexity, stands to jeopardize this link with his environment. Complex technology, coupled with its dominating influence in shaping man's environment, may drive him to feel that he is no longer the master of his own situation and environment.

At the same time, advanced technology seems ideally placed to contribute to man's links with his environment. Many things that are now possible with the new technology, have not been possible in the past.

It is the way we will steer the course between allowing technology to do 'too much', and to do 'too little', that will dictate whether or not we will succeed in achieving society's and individual's needs and aspirations, and whether or not individuals become better or worse masters of their own tasks and environments.

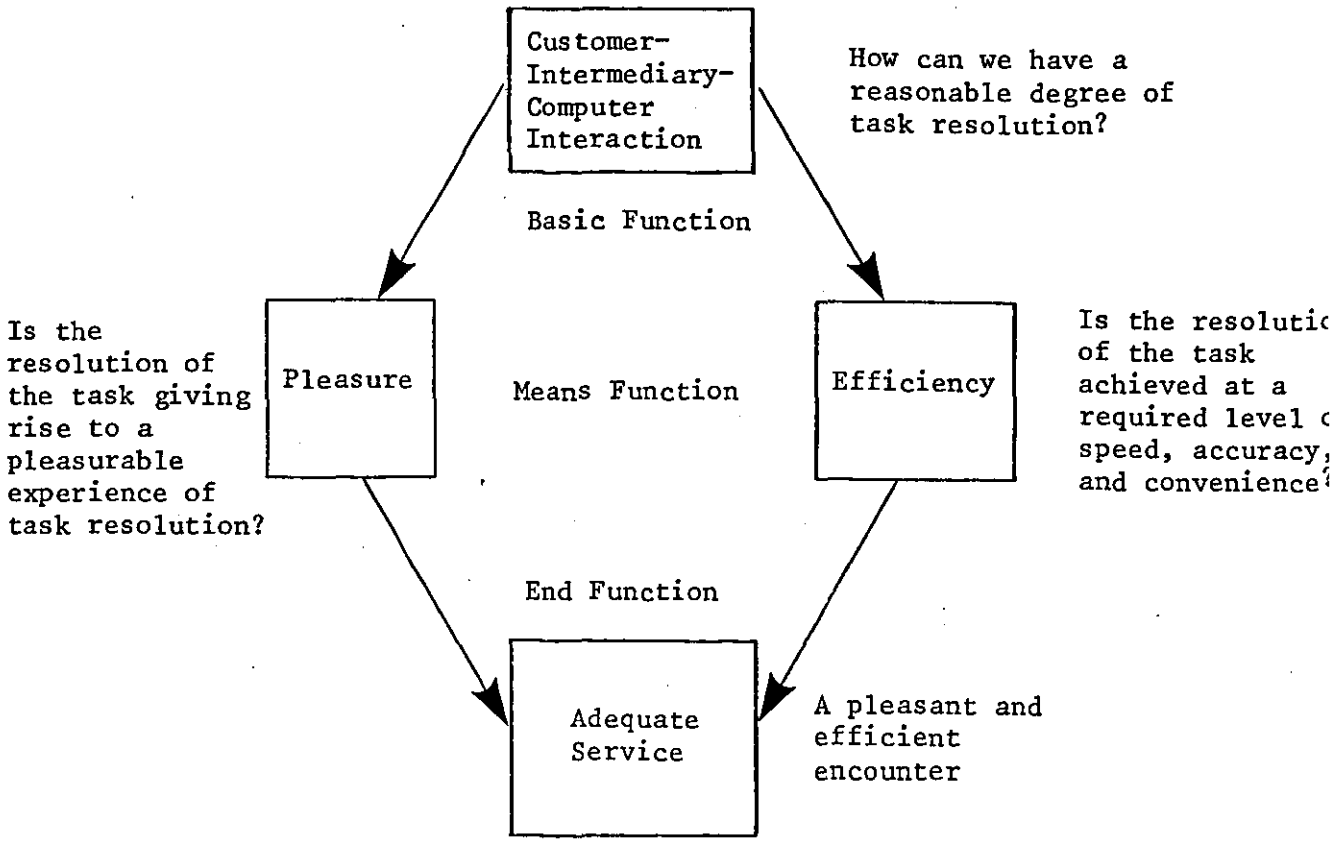


Figure 19: Provision of Adequate Service in Double-Interaction

5.8 SUMMARY

The gist of this chapter may be cast as in figure 19. Although it bears close resemblance to the person/efficiency paradigm, it should not be confused with the essence of the person/efficiency model.

Essentially it begins with the 'basic function' as the consideration of the question 'How can a reasonable degree of task resolution be achieved?'

In the 'means function' the considerations focus on the joint optimisation of Pleasure and Efficiency principles, i.e. how the task may be resolved to provide the required level of pleasure and efficiency to the participants of double-interaction.

Finally the 'end function' represents the outcome when it is thought that the success with which the questions in the basic and the means function are answered, will have a direct bearing on whether an adequate service will be provided to the customer.

We will summarise the main conclusions of this thesis in the next chapter.

5.9 LIMITATIONS

There may be limitations to this research of many kinds, but we may confine ourselves to two main ones.

1. Relevance

As one moves from chapters 1 to 4, from general to specific, one may recognise that the relevance to specific double-interaction applications changes from chapter to chapter. In one sense, because the considerations move from the general to specific, the chapters become more and more directly relevant to double-interaction. On the other hand, being specific inevitably means having to focus, and the particular task adopted for the experimental study may focus on a different kind of double-interaction task to that in which a reader may be interested.

If we summarise as the central objective of the thesis, 'the planning for effective double-interaction', then the thesis covers a set of issues which may be considered as central to double-interaction in general. If the research had been devoted to a specific double-interaction situation, then for the most part, the results would have served that particular situation only. In the way it has been approached, it is thought that the thesis could serve, at least in part, the central considerations governing the planning of any double-interaction situation.

Despite its overall generality, it is hoped that the thesis delves sufficiently deeply on occasions (e.g. Chapter 4) to provide a specific as well as a general understanding of the more important issues.

2. Contribution

It may be noted finally, that the success of the thesis depends not on the extent to which new knowledge has been provided, but on the extent to which new knowledge of the right kind has been provided. The author can only hope that he has succeeded to the latter.

5.10 THE FUTURE

The prospect of the public benefitting from advanced technology is bright if computer technology is treated rather like medicine:

a) Taken in right dosage, it can be wholly beneficial.

b) Overdose may be detrimental.

c) It is not a complete cure for everything. Occasionally, primitive methods may produce better results (i.e. Previous or manual technology in some instances may be quite adequate and even better-suited to the task being carried out).

At another level, the future looks promising as more and more scientists (and technologists) of various kinds begin to consider themselves as human scientists as seen in the recent major works by Schumacher (technologist/economist) (1974), Papanek (industrial designer) (1977), and Weizenbaum (computer scientist) (1976).

Plan for Thesis

1 Introduction
2 Impact of Advanced Technology on Work Satisfaction
3 The Public in relation to their Task Encounters
4 Task Interpretation, System Design, and the Customer
5 Discussion
6 Conclusions

Plan for Chapter 6

6 CONCLUSIONS
6.1 Double-interaction
6.2 People, Tasks and Technology
6.3 People and Work
6.4 People and Task Encounters
6.5 People and Tasks
6.6 People and Technology
6.7 The Human Intermediary
6.8 Conclusions

CHAPTER 6: CONCLUSIONS

6.1 Double-interaction

This refers to the simultaneous conduct of man-man and man-computer interaction. There is a growing likelihood that more and more widely ranging public tasks will be served by intermediaries with the help of computer technology, in the not too distant future. This thesis is devoted to the planning of effective double-interaction especially that arising from customer-intermediary-computer engagements.

Some examples of public tasks from which double-interaction may derive, and on which the thesis primarily focusses are: employment placement, career guidance, citizens' advice, insurance, library information retrieval, house-hunting, mortgages, and unemployment benefits.

6.2 People, Tasks, Technology

Double-interaction may be usefully considered under the parameters of people, tasks, and technology. Effectiveness in double-interaction may be based on the extent to which people, tasks, and technology can be made to be mutually compatible. To this end, while people and tasks may be treated as relatively fixed variables, technology may be considered as the most controllable of the three.

Much of the thesis is devoted to the comparison of this approach to the alternative approach, whose compatability is sought by treating technology as the fixed variable, and tasks and people as the more controllable variables.

6.3 People and Work

The literature was reviewed to explore the needs and aspirations of people in their work and life in general, and the expected role of technology in this context. While mostly dealing with the intermediary, the focus was also extended to the customer.

The following main conclusions were derived. Double-interaction technology should attempt:

a. to provide a desirable level of task resolution,

b. to provide a pleasurable experience of task resolution,

c. to foster, without straining, man's links with his environment.

6.4 People and Task Encounters

Task encounters refer to meetings between customers and representatives of service-giving organisations, from which almost all double-interaction encounters derive. With the aim of double-interaction primarily to provide for the customer, this study attempted to develop as fully as possible a model of the customer's expectations in a task encounter, which would then serve as a basis on which the planning of double-interaction might be undertaken.

20 customers drawn from mixed occupations, and 8 customers drawn from a specialist class within the general public, participated in repertory grid studies. Each study was based on 5 recent task encounters that the customer had engaged in. The constructs elicited from the customer, based on the inter-relationship of the task encounters, were reviewed to test the hypothesis that people may be person- or efficiency-oriented in the way they relate to their task encounters.

The following conclusions were derived:

a. The experiments offered considerable support to the existence of person-centred and efficiency-centred customers. The characteristic difference between the two is that the person-centred customer assesses an encounter in terms of its person-aspects (the Self, the Other Person, the Relationship between the Self and the Other Person, and the Novelty of the Encounter). By contrast, the efficiency-centred customer assesses an encounter in terms of its efficiency aspects (Time and Speed, Convenience, Ease of Execution, and the requirements of Transaction).

b. Although an individual may have both person-related and efficiency-related constructs, it was generally found that for any one customer, constructs of one kind took precedence over constructs of the other kind.

c. Certain situations, such as Employment Exchange, Unemployment Benefits and Hospitals, may require special attention in the way the service is provided. Unless it takes into account the particular predicament of the individual involved, the service provided will fall short of meeting the full expectations of the customers.

d. Some specific sections of the general public, may as groups, align themselves to person- or efficiency-centred orientations. The design of systems, for specific use by such groups, may have to bear this feature in mind.

e. In general, the recommendation is the joint optimisation of person- and efficiency-centred thinking into the design of systems and services. This particularly means the provision of an intermediary not just selected or trained on efficiency grounds, but on person-centred grounds.

6.5 People and Tasks

The general public represent a wide variety of customers with a wide variety of needs.

The literature was reviewed on 'customer behaviour' to distil a way of representing this diversity.

Two major dimensions which may influence both the diverse kinds of customers, and their diverse needs, were derived as:

1. the experience/non-experience dimension.
2. the person/efficiency dimension.

6.6 People and Technology

This study attempted a detailed exploration into the impact on customers of design of technology based on alternative interpretations of the task.

An experiment was undertaken to test the general hypothesis that a significantly greater number of customers drawn from the general public, engaging in double-interaction, would prefer deriving support in their task from technology that is designed on customer-centred principles, rather than from technology designed on system-centred principles. Both approaches, to different degrees are either currently practised, or are a strong possibility for the near future.

a. Two computer systems were designed to support house-hunting, as representative of a major class of real life consumer tasks which combine aspects of problem-solving and decision-making.

b. The first was undertaken on a customer-centred interpretation of the task. This interpretation treated the customer as a centrepoint of the task, and took into account the various needs of customers reflecting their person- and efficiency-centred orientations, their experienced/non-experienced status, as well as their general characteristics as human beings.

c. The second was based on a system-centred interpretation of the task. This treated the system as a centrepoint of the task. This approach interpreted the task, in the simplest possible way, as a transfer from a fixed finite set of factors attributable to house-hunting, to a retrieval of matching houses from a data bank. In addition, the design of this technology was modelled on a house-hunting system currently on the market.

d. 42 customers derived from the general public took part in the experiment. They were classified along person- and efficiency-orientations as one dimension, and along experienced and non-experienced status as another dimension.

e. Each customer engaged in hunting for a house of his own choice, bound by his current real life circumstances, first supported by one technology, then by the other. He was served in both studies by the same intermediary, whose role was restricted to that of a terminal operator. A self-report questionnaire formed the basis of a detailed evaluation of the 2 overall technologies encountered, as well as of the specific features that defined each technology.

The following conclusions were reached:

a. A significantly greater number of customers favoured working with customer-centred technology.

b. One of the 4 cells representing the customers seemed specially attracted to the system-centred technology (these were the non-experienced efficiency-centred customers). In contrast, the rest of the 3 cells opted overwhelmingly for the customer-centred technology. This finding however is attributable at least in part to an artificial condition applied to the experiment, of making the two technologies as disparate as possible.

c. At a higher level, there were inter-group differences in the acceptability of the two technologies. In particular, the customer-centred technology seemed specially suited to the experienced person-centred customer, and least suited to the non-experienced efficiency-centred customer.

d. On the one hand, computer technology has the potential to provide a common base on which a wide range of customers may operate. On the other hand, technology alone does not provide for the full variety of aspirations of individual customers. This highlights the unique role of the human intermediary in enabling customers to derive fuller satisfaction, particularly in resolving tasks of a complex nature.

6.7 The Human Intermediary

A major consideration affecting the way the public will benefit from advanced technology derives from the decision to plan for a direct use of the computer by the public (direct-interaction) or for an involvement of the human intermediary (double-interaction).

A review of the advantages and disadvantages suggests that especially in the execution of complex tasks (long, involved, and occupying a range of customer needs), an effective and a complete service to the customer, may be better provided by double-interaction, than by direct-interaction.

6.8 Conclusions

6.8.1 People

Customers who engage in encounters such as double-interaction come from a wide ranging general public. They are faced in such situations with wide ranging needs and aspirations (e.g. primary, secondary, developed, orientation, operational, induced, and imposed).

They have differing requirements with regard to the means defining task-resolution. Some require a person-related means, others an efficiency-related means.

6.8.2 Tasks

Double-interaction may serve a wide range of tasks. A critical variable in the planning of effective double-interaction is the way the task is interpreted.

a. the 'right' task interpretation must include, generally and specifically, the customer needs referred to in section 6.8.1, and in addition may depend on making sure that artificial needs are not being induced or imposed at the expense of true needs.
b. Task interpretation must extend to the general as well as the specific needs of the intermediary.
c. Task interpretation must particularly have to account for the way in which the intermediary-computer unit can deal effectively with the various kinds and stages of customer needs, e.g. formation, formulation, definition, modification, resolution, and revision.
d. The task must be considered as dynamic, not static, and to have flexible, not fixed, boundaries.

6.8.3 Technology

The provision of the technology which will produce effective double-interaction relates to the following propositions:

a. the technology should attempt to meet people's needs and aspirations.

b. it should be designed on customer-centred, rather than system- or operation-centred task interpretation.

c. it should support the customer-centred role required of the intermediary.

d. the users', rather than the designer's needs and aspirations, should take precedence.

e. the previous technology is not all bad.

f. the symbiotic potential of man-computer relationship should be exploited rather than the question of 'how much can I design into my computer?' which has the danger of developing on its own inherent logic.

g. technology should support, rather than substitute, man's tasks, in order for man to become a better, rather than worse, master of his own task and environment.

It is hoped that the approach, conclusions, guidelines, ideas, and recommendations of this thesis will provide a basis for the kind of double-interaction by which all parties concerned may achieve a reasonable degree, as well as pleasurable experience, of task resolution.

Let us hope also that we shall succeed in the years to come, in deploying the considerable benefits that computer technology has the potential to provide, to a distinct advantage of people. A vital pre-requisite to this mission may lie in making sure we do not get dazzled by computer technology to the extent that the true needs of people at large become of secondary importance. To this end, the evolution of technology must be in tune with that of mankind.

REFERENCES

ADAMS, E.W. and FAGOT, R., 1959, 'A Model of Riskless Choice'. Beh. Sci., Vol. 4, pp.1-10.

ADLER, M. and du FEU, D., 1975, 'A Computer Based Welfare Benefits Information System: The Iverclyde Project'. UKSC 0078, IBM, Peterlee.

ARGYLE, M. and DEAN, J., 1965, 'Eye Contact Distance and Affiliation', Sociometry, Vol.28, p.289-304.

ARNDT, J., 1969, 'Advertising to the Problem Solving Consumer', ADMAP, October.

BAKER, C.A., 1977, 'An Investigation of Man-Computer Interaction in an On-Line Bibliographic Information Retrieval System', LUT/LIB Report 13, Loughborough University of Technology, England.

BANNISTER, D and FRANSELLA, F., 1971, 'Inquiring Man', Penguin.

BENDER, I.E. and HASTORF, A.H., 1953, 'On Measuring Generalized Empathic Ability (Social Sensitivity)', J. Abnorm. Soc. Psychol., 48, p.503-506.

BERKELEY, E.C., 1977, 'The Personality of the Interactive Programmed Computer'. Computers and People, Vol.26, No.2, p.24-26.

BIBBY, K., 1976, 'Human and organisational Problems of Production Control'. In proceedings of IFAC Workshop on Productivity and Man, p.35-38, Frankfurt: RKW.

BILKEY, W.J., 1951, 'The Vector Hypothesis of Consumer Behaviour'. J. of Marketing, Vol.16, p.137-151, October.

BLAKE, R.R. and MOUTON, J.S., 1964, 'The Managerial Grid'. Gulf Publishing: Houston, Texas.

CANTER, D., BROWN, J. and RICHARDSON, H.P., 1976, 'Study of House Buying', A Brief Report, House Research Unit, University of Surrey, England.

CARMON, J.L., 1975, 'Model of the User Interface for Multi-disciplinary Bibliographic Information Network'. Final Report to the National Science Foundation Office of Computing Activities, University of Georgia, Athens, Georgia.

CHANDOR, A., 1970, 'A Dictionary of Computers', Penguin.

CHAPANIS, A., 1971, 'Prelude to 2001: Explorations in Human Communication', Am. Psychol., Vol.26, p.949-961.

CHAPANIS, A., 1976, 'Interactive Human Communication'. Paper presented at NATO ASI on Man-Computer Interaction, Mati, Greece, September.

CIS, 1976, 'Who is next for the chop', CIS Report 114, Counter-Information Service, England, p.9-10.

COLBY, K.M., WATT, J.B. and GILBERT, J.P., 1966, 'A Computer Method of Psychotherapy: Preliminary Communication', J. of Nervous and Mental Disease, Vol.142, No.2, p.148-152.

CONRATH, D.W., 1977, 'A Procedure for evaluating the usefulness of Telecommunication Services in the Commercial Market'. In Proceedings of International Symposium on Human Factors in Telecommunications, Cambridge, England, September, p.77-83.

DAVIS, L.E., CANTER, R.R. and HOFFMAN, J., 1955, 'Current Job Design Criteria', In L.E. Davis and J.C. Taylor (eds.): 'Design of Jobs', Penguin, 1972, p.65-82.

DAVIS, L.E. and CHERNS, A.B., 1975, 'Enhancing Quality of Working Life: Introduction', In A.B. Cherns and L.E. Davis (eds.): 'Quality of Working Life', Volume I, Free Press.

DAWSON, M., 1977, 'Computer Dialogue and Naive User Attitudes'. A postgraduate diploma dissertation, Department of Social Sciences, Loughborough University of Technology, Loughborough, March.

DE CHARMS, R., 1968, 'Personal Causation', NY: Academic Press.

DEW, B. and GEE, K.P., 1973, 'The Choice of Management Control Information - Further Findings', Management International Review, Vol. 1, p.47-52.

DOCHERTY, P. and STYMNE, B., 1977, 'How to Succeed with Systems Development', Research Report 6085, Economic Research Institute, Stockholm School of Economics, Stockholm.

DUBIN, S.S., BURKE, L.K., NEEL, R.G. and CHESLAR, D.J., 1954, 'Characteristics of Hard and Easy Raters', U.S.A. Persona. Res. Br. Note, N.36.

EASON, K.D., 1976, 'A Task-Tool Analysis of Manager-Computer Interaction'. A paper presented at the NATO ASI on Man-Computer Interaction, held at Mati, Greece, September.

EASON, K.D., 1977, 'The Potential and Reality of Task Performance by Man-Computer Systems', In 'Computer and People' Proceedings ed. A. Parkin, p.55-62, Edward Arnold.

EASON, K.D., DAMODARAN, L. and STEWART, T.F.M., 1974, 'A Survey of Man-Computer Interaction in Commercial Applications', LUTERG No. 144, Department of Human Sciences, Loughborough University of Technology, England.

EHRENBERG, A.S.C., 1972, 'Repeat buying, Theory and Application', Amsterdam and N.Y.: North-Holland Publishing Company.

EMERY, F.E. and THORSRUD, E., 1969, 'Form and Content in Industrial Democracy', London: Tavistock.

EMERY, F.E. and TRIST, E.L., 1960, 'Socio-technical systems'. In C.W. Churchman and M. Verhulst (eds.): 'Management Sciences: Models and Techniques', Oxford, Pergamon.

ENGEL, J.E., KOLLAT, D.T. and BLACKWELL, R.D., 1968, 'Consumer Behaviour', N.Y.: Holt Reinhart and Winston.

EVANS, C.R., 1976, 'What I have learned about Computer Communication and what Computers have taught me about Human Communication', paper presented to the NATO ASI on 'Man-Computer Interaction', Mati, Greece, September.

FELDMAN, S.S., 1959, 'Mannerisms of Speech and Gesture in Everyday Life', International University Press, U.S.A.

FESTINGER, L., 1957, 'A Theory of Cognitive Dissonance', Row, Peterson.

FISHBEIN, M. and AJZEN, I., 1975, 'Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research', Mass.: Addison-Wesley.

FITTS, P.M., 1951, 'Human Engineering for an Effective Air-Navigation and Traffic Control System', National Research Council.

FREED, A.M., 1961, 'The AZRAN modification in the AEW and C information processing system', Research Report, SM5616, System Development Corporation, Santa Monica, California.

FREED, A.M., 1962, 'Human Interactions in Man-Machine Systems', Human Factors, Vol. 4, No. 6, p.389-396.

GAGE, N.L. and CRONBACH, L., 1955, 'Conceptual and Methodological Problems in Interpersonal Perception', Psychol. Rev., 62, p.411-422.

GLASER, B.G. and STRAUSS, A.L., 1967, 'The Discovery of Grounded Theory', Chicago: Aldine.

GOFFMAN, E., 1967, 'Interaction Ritual'. Chicago.

GOFFMAN, E., 1972, 'The Presentation of Self in Everyday Life', Penguin.

GOODALE, J.G., HALL, D.T., BURKE, R.J. and JOYNER, R.C., 1975, 'Some Significant Contexts and Components of Individual QWL', In 'Quality of Working Life', Eds. A.B. Cherns and Louis E. Davis, Volume I, Free Press.

GUILDFORD, J.P., 1959, 'Personality', NY: McGraw-Hill.

HEBDITCH, D., 1977, 'Motorway Control System Case Study', a lecture on the Short Course on 'Computer Ergonomics', Loughborough University of Technology, Loughborough, September.

HEIDER, F., 1944, 'Social Perception and Phenomenal Causality', Psychological Review, 51, p.358-374.

HEIDER, F., 1958, 'The Psychology of Interpersonal Relations', NY: Wiley.

HERBST, P.G., 1974, 'Socio-technical design'. London: Tavistock.

HORNEY, K., 1945, 'Our Inner Conflicts', NY: Norton.

HOWARD, J.A. and SHETH, J.N., 1969, 'The Theory of Buyer Behaviour', NY: Wiley.

INNOCENT, P.R., 1977, 'Investigations of the Effect of different Computer Input Methods on Man-Computer Interaction', a Ph.D Thesis, Loughborough University of Technology, Loughborough, England.

ISTANCE, H., 1974, 'A Pilot Study for a Man-Computer Dialogue Project'. In 'Manniskor and Datorer' Proceedings, Nordic Ergonomics Society, Stockholm.

IVERGARD, T.B.K., 1972, 'An Ergonomics Study of the Check-out System for Self-Service Shop in Sweden', A doctoral thesis, Loughborough University of Technology, Loughborough, England.

IVERGARD, T.B.K., 1976, 'Man-Computer Interaction in Public Systems', Paper presented at NATO ASI on Man-Computer Interaction, Mati, Greece, September.

JAHODA, Marie, 1966, 'Notes on Work'. In R. Loewenstein, L. Newman, M. Schur and A. Solnit (eds.) 'Psychoanalysis: A General Psychology', NY: International University Press, p.622-33.

JONES, E.E. and DAVIS, K.E., 1965, 'From Acts to Dispositions: the Attribution Process in Person Perception'. In L. Berkowitz (ed.) 'Advances in experimental social psychology', Vol.2, NY: Academic Press.

KARLIN, J.E., 1977, 'The Changing and Expanding Role of Human Factors in Telecommunications Engineering at Bell Labs', in Proceedings of International Symposium on Human Factors in Telecommunications, Cambridge, England, September, p.329-333.

KELLEY, H.H., 1948, 'First Impressions in Interpersonal Relations', Unpublished doctoral dissertation, MIT, cited in J.S. Bruner and R. Tagiuri: 'The Perception of People', In G. Lindzey (ed.) 'Handbook of Social Psychology', Vol.2, Cambridge, Mass: Addison-Wesley, 1954.

KELLEY, H.H., 1971, 'Competition, Co-operation and Social Responsibility', B.Ps.S. Conference, Soc. Psychol. Section, Durham, England, September.

KELLY, G.A., 1955, 'The Psychology of Personal Constructs', NY: Norton.

KLAHR, D., 1970, 'A Study of Consumer's Cognitive Structure for Cigarette Brands', J. of Business, Vol. 3, No. 2.

KLEIN, L., 1977, 'New Forms of Work Organisation', London: Cambridge University Press.

LAING, R.D., 1971, 'The Self and Others', Penguin.

LICKLIDER, J.C.R., 1960, 'Man-Computer Symbiosis', I.R.E. Transactions on Human Factors in Electronics, Vol. HFE-1, March.

LITTLE, B., 1969, 'Studies of Psycho-specialists', Psych. Rep. 52.

LITWAK, E., and SZELINYI, I., 1969, 'Primary Group Structure and their Functions: kin, neighbours and friends', Am. Soc. Rev., Vol. 34.

LUCAS, Henry, C. Jnr., 1974, 'Systems Quality, User Reactions and the Use of Information Systems', Management Informatics, Vol.3, No. 4, p.207-212.

MALDE, B. 1975a, 'The Simultaneous Conduct of Man-Man and Man-Computer Interaction', A Masters Thesis, Loughborough University of Technology, Loughborough, England.

MALDE, B. 1975b, 'Research into the Simultaneous Conduct of Man-Man and Man-Computer Interaction', HUSAT Memo No. 98, Department of Human Sciences, Loughborough University of Technology, England.

MALDE, B., 1976, 'An experiment in Double-interaction', HUSAT Memo No. 113, Department of Human Sciences, Loughborough University of Technology, Loughborough, England.

MARKIN, R.J., 1969, 'The Psychology of Consumer Behaviour', N.J.: Prentice-Hall.

MASLOW, A., 1954, 'Motivation and Personality', NY: Harper.

MIDGLEY, D., and CHRISTOPHER, M., 1975 'Customers in Action', Bradford (U.K.): MCB Books.

MILLER, R.B., 1968, 'Response Time in Man-Computer Conversational Transactions', AFIPS Conference Proceedings, 33, Part 1, p.267-277.

MILLER, E.J. and RICE, A.K., 1967, 'Systems of Organisations', Chapter 7, London: Tavistock.

MUMFORD, E., 1965, 'Clerks and Computers', J. Man. Studies, Vol. 2, p.138-152.

NICOSIA, F.M., 1966, 'Consumer Decision Processes', New Jersey: Prentice-Hall.

PAPANEK, V., 1977, 'Design for the Real World', Paladin: St. Albans, Herts.

SCHOEFFLER, M.S., 1977, 'Customer Reaction to Delay in Placing a Telephone Call', In Proceedings of International Symposium on Human Factors in Telecommunications, Cambridge, England, September, p.263-271.

SCHUH, P. and SPRAGUE, P.A., 1976a, 'Findings and Implications of the Workshop; Chapter II: The Impact of Technical Change on the Working Process and the Worker's Role', In proceedings of IFAC Workshop on Productivity and Man Workshop, p.141-145, Frankfurt: RKW.

SCHUH, P. and SPRAGUE, P.A., 1976b, 'Findings and Implications of the Workshop; Chapter V: The Changing Pattern of Technical Change and Worker Response'. In proceedings of IFAC Workshop on Productivity and Man Workshop, p.151-152, Frankfurt, RKW.

SCHUH, P. and SPRAGUE, P.A., 1976c, 'Humanization of Work - A Challenge of Control Engineers'. In proceedings of IFAC Workshop on Productivity and Man Workshop, p.7-8, Frankfurt: RKW.

SCHUMACHER, E.F., 1974, 'Small is Beautiful', Abacus: London.

SHACKEL, B., 1969, 'Man-Computer Interaction - The Contribution of the Human Sciences', Ergonomics, Vol.12, No.4, p.485-499.

SHEPARD, R.N., 1964, 'On Subjectively Optimum Selections among multi-attribute alternatives', In Edwards, W. and Tversky, A. (eds.) 'Decision Making', Penguin, 1967, pp.257-283.

SIEGEL, S.S., 1956, 'Non-parametric Statistics for the Behavioural Sciences', N.Y.: McGraw-Hill, Tokyo: Kogakusha, pp.36-42.

SINGLETON, W.T., 1974, 'Allocations of Function', Chapter 2, in 'Man-Machine Systems', p.38-54, Penguin.

STRASSER, W., 1977, 'Interactive CATV - Services and Inherent Problems of Man-Machine Communications', In proceedings of International Symposium on Human Factors in Telecommunications, Cambridge, England, September, p.305-312.

TUCK, M., 1976, 'How do we Choose?', London: Methuen.

WEIZENBAUM, J., 1976, 'Computer Power and Human Reason', Freeman: San Fransisco.

'WHICH?', 1973, 'Buying carpets', p.132-139, May.

WITHERS, J., 1976, 'Management Aims and Objectives in Introducing New Technology', In proceedings of IFAC Workshop on Productivity and Man, p.11-19, Frankfurt: RKW.

W.R.U., 1976, Work Research Unit Demonstration Videotape 1, South Eastern Electricity Board Case Study, WRU, England.

YNTEMA, D.B. and TORGERSON, W.S., 1961, 'Man-computer co-operation in decisions requiring common sense', In 'Decision Making', Eds. W. Edwards and A. Tversky, p.300-314, Penguin, 1967.

YOUNGS, E.A., 1977, 'Effects of Automating operator services on Customers and Operators', In Proceedings of International Symposium on Human Factors in Telecommunications, Cambridge, England, September, p.251-255.

ZIPF, G.K., 1949, 'Human Behaviour and the Principle of Least Effort', Harper: N.Y.

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LIST OF APPENDICES

APPENDIX 1 : Glossary

Presented below are explanations of the main terms of reference used in this thesis. The glossary is provided so that the reader may refer to it from time to time as his needs dictate. Many of the terms are developed more fully in Chapter 5.

1. People: The People consideration is based on the following:
   a) firstly on any aspects relating to people in general in the context of this study.
   b) on the member of the general public, referred to as customer.
   c) on the intermediary, lying between customer and technology.
   d) on issues concerned with the needs, the aspirations, and the orientations, of interacting participants.

   Person- and Efficiency-orientations

   The phenomenon that people seem to orient themselves to their tasks in two different ways. The person-centred attach precedence to person-related aspects of task execution. The efficiency-centred attach precedence to an efficient execution of the task (Maldé, 1975a).

2. Tasks: Task refers to some or all aspects governing the formation, statement, interpretation, and execution of needs of the customer.

Total task refers to the process in its entirely, as compared to:

Component task, which refers to a component activity such as information-retrieval, decision-making etc.

The simple task may be described as one which is relatively short, is quickly, readily and easily executed, and which is normally, wholly computer-compatible.

The complex task, on the other hand, is long, not easily executed, involves various operations, and is generally of the kind which is only part computer-compatible or even not at all.

3. Technology: Technology is regarded as a tool that assists man to attain his goals in life. The primary focus is on computers, but where relevant, other advanced technologies such as telecommunications are also referred to.

System-centred technology: Technology designed on an interpretation of task which takes the computer system in double-interaction, as the centre-point of the task at hand. All other aspects of the situation surrounding the system are then expected to support and answer to the needs and behaviour of the system.

Customer-centred technology: Technology designed on an interpretation of task which takes the customer engaged in double-interaction, as the centre-point of the task at hand. All other aspects of the situation surrounding the customer are then expected to support and answer to the needs and behaviour of the customer.

4. Man-Man Interaction: Man-man interaction here, refers primarily to the interaction that arises in the execution of tasks. From time to time references may be made to man-man interaction of a more social nature, to assist an adequate understanding of task interaction.

Task Encounters: A major sub-set of man-man interaction of the above kind, and one on which this thesis primarily focusses. In particular, the task encounter with which the thesis is concerned is the kind of man-man interaction that occurs when members of the public (customers) engage with members (intermediaries) of service giving organisations, e.g. Banking, Insurance, Citizens' Advice, Purchase of items, etc. Many present-day double-interaction encounters derive from such task encounters, and an even greater number are likely to do so in the future.

5. Man-Computer Interaction: The focus is primarily on the 'on-line real-time' interaction between man and computer which characteristically proceeds through a terminal or interface. In experimental settings, the simulations may not, due to technical constraints, include 'real-time' characteristics while retaining the 'on-line' characteristics.

On-line Interaction: the dictionary definition of 'on-line' (Chandor, 1970) is "A part of a computer system is on-line if it is directly under the control of the central processor". 'On-line interaction' may be described as active, to and fro interaction between man and computer, during which time the computer provides a direct access or 'an open line' to its user.

Real-time Interaction: the dictionary definition of 'real-time' (Chandor, 1970) is the feature that "the processing of data input to the system to obtain a result, occurs virtually simultaneously with the event generating the data". 'Real-time' may be explained alternatively, as the 'updating of computer records as soon as any changes in the relative state of affairs takes place'.

6. Double-interaction: The simultaneous conduct of man-man and man-computer interaction. The main focus is when the customer and the intermediary are involved in face-to-face encounters. At the level of general review, however, the focus may extend to relevant aspects of man-man interaction that occurs through telecommunications channels.

7. Work Satisfaction: is to refer to all aspects of work that provide for the fulfilment of the aspirations of double-interaction participants. Work, additionally, may embrace aspects which the conventional usage of the term may not include. This is especially so in the case of the customer engaged in task encounters, for whom much of this kind of work, may be more closely associated with day-to-day life.

8. Needs and Aspirations: Wherever needs and aspirations appear together, they depict differing emphases: 'Needs' is to refer to a person's requirements relating to immediate context and relevance, commonly recognised as 'necessities'. 'Aspirations' is to refer to a person's requirements of a higher level, relating to a long-term context and relevance, and requirements that are not necessarily commonly recognised, but may be unique to each individual.

APPENDIX 2 : Sample of Customers : Sex and Occupations

Customer No.	Sex	Occupation
1	M	Technician
2	F	Housewife
3	M	Technician
4	F	Housewife
5	M	Designer
6	F	Dressmaker
7	M	Unemployed
8	M	Designer
9	M	Student: Auto Engineering
10	M	Student: Physics
11	M	Student: Civil Engineering
12	M	Student: Civil Engineering
13	F	Student: Physics
14	F	Student: Library Studies
15	M	Student: Ergonomics
16	M	Student: Unknown
17	F	Student: Business Admin and French
18	F	Student: Social Psychology
19	M	Illustrator
20	M	Manager/Editor

Customer: Occupation:

CONSTRUCTS	ELEMENTS					TRIAD
	A	B	C	D	E	
1.						ABC
2.						ADE
3.						BCD
4.						ABE
5.						CDE
6.						BDE
7.						ABD
8.						ACE
9.						CAD
10.						BEC
11.						

A =

B =

C =

D =

E =

APPENDIX 3 : RECORDING SHEET FOR REPERTORY GRID STUDY

APPENDIX 4: CUSTOMER FILE

Key to Appendix 4

Constructs Table

1. Construct Number - as referred in text, matrix and cluster graph.
2. Nature of construct - with preferred polarity in brackets.('n' refers to neutral.)
3. Row total - as derived from matrix. As row total decreases, strength of construct increases.
4. Dominant construct(s) - depicted by lowest row total(s) and represented by ✓✓. Where outright dominant is lacking, focus extended to most sensitive construct(s).
5. Most enjoyed to least enjoyed swing - the larger the swing, greater the sensitivity.
6. Sensitive construct(s) - depicted by largest swing, represented by ✓.
7. Classification - of the strongest constructs.

Key to Codes:

P = Person

P1 = the Self, the way I felt

P2 = the Other Person

P3 = relationship between the Self and the Other Person

P4 = novelty of event or encounter

P5 = to do with the person

B = Basic function: the task at hand

B1 = Priority

B2a = Type of Task: Descriptive aspects of T

B2b = Type of Task: Necessity v/s Pleasure

E = Efficiency

E1 = time taken, speed

E2 = distance

E3 = convenience

E4 = ease of execution

E5 = to do with the transaction

X1 = Success

8. Row total range - difference between highest and least row totals (see note 3 above). For low range, focus extended to all sensitive constructs.

Construct matrix - representing degree of association within each pair of constructs.

0 = absolute association

10 = no association

Cluster graph - graphic representation of constructs matrix.

1) lines depict high associates, of '1', '2', or '3'.
2) '0' is represented by overlapping constructs.
3) disjoint line represents some, though not high, association of '4'.
4) constructs not linked by lines, show low association. Roughly, the association gets weak as the distance between constructs get large.

APPENDIX 4: CUSTOMER FILE

Customer 1 Orientation: Person-centred

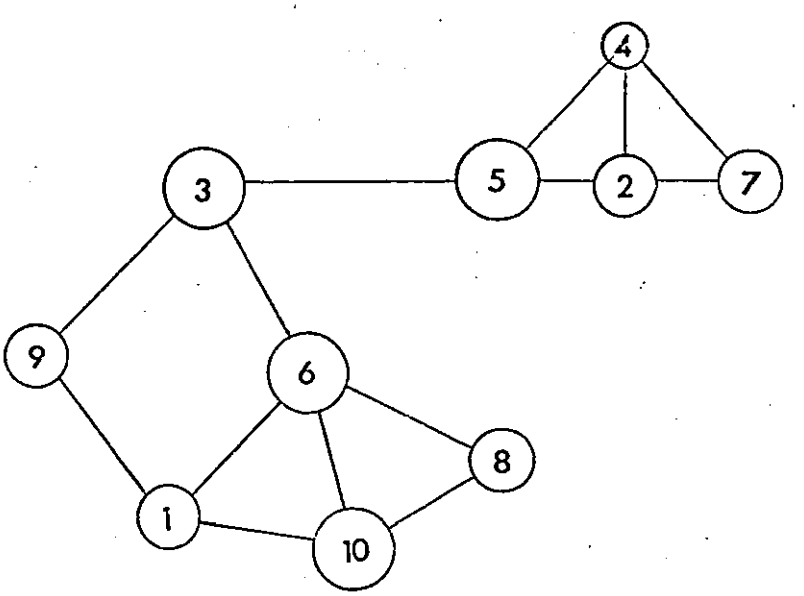
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	priority (high)	44		5 - 3	✓	B1
2	home v/s work (home)	47		5 - 3	✓	B2
3	complexity (n)	43		5 - 4		
4	negotiation (prefer negotiating)	47		5 - 3	✓	B2
5	handle myself carefully (prefer not to have to)	47		4 - 2	✓	P5
6	felt safe and covered (prefer feeling protected)	41	✓	5 - 2		P1
7	who approaches who (n)	61		5 - 4		
8	felt safe (prefer feeling protected)	49		5 - 2	✓	P1
9	information (n)	49		5 - 4		
10	enjoyed	47		5 - 2		
11						

range 20

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		6	4	6	7	3	7	4	3	3		44
2	6		6	0	3	7	3	8	7	7		47
3	4	6		6	3	3	9	4	3	5		43
4	6	0	6		3	7	3	8	7	7		47
5	7	3	3	3		6	6	7	6	6		47
6	3	7	3	7	6		8	1	4	2		41
7	7	3	9	3	6	8		9	8	8		61
8	4	8	4	8	7	1	9		5	3		49
9	3	7	3	7	6	4	8	5		6		49
10	3	7	5	7	6	2	8	3	6			47
11												



CLUSTER GRAPH

Customer 2 Orientation: Efficiency-centred

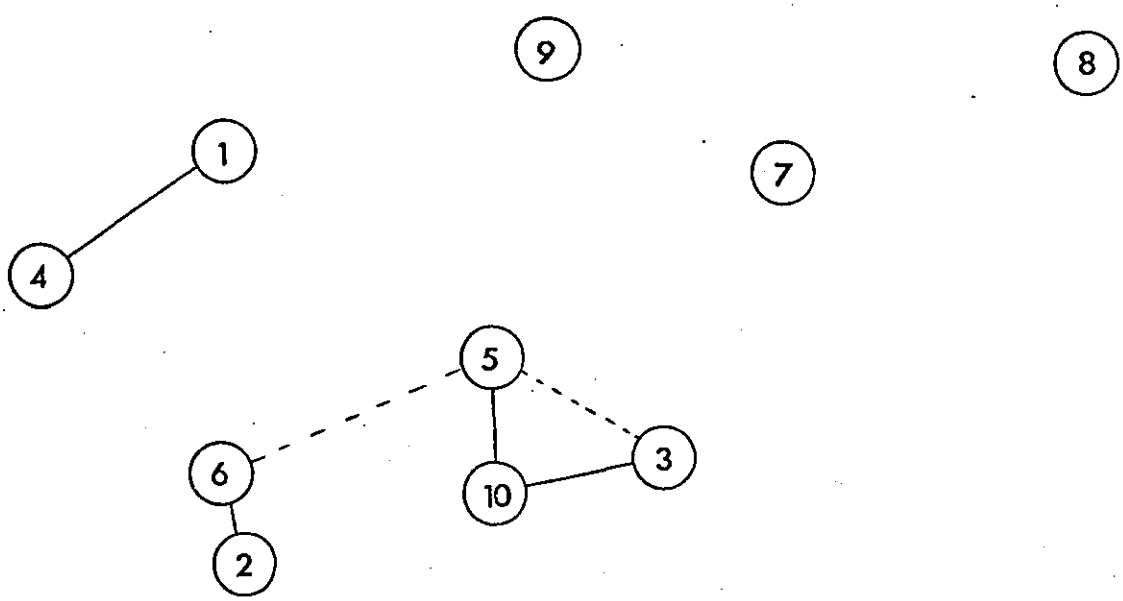
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	complexity (simple)	63		5 - 2	✓	E4
2	needs (n)	55		2 - 1		
3	type of task (info gathering rather than purchase)	51		4 - 1	✓	B2
4	financial (non-financial)	58		4 - 3		
5	'out to make a sale' (prefer those that do)	49	✓	4 - 1		E5
6	employee v/s official (n)	51		2 - 1		
7	complex it was v/s complex it was made out (prefer former)	61		5 - 1	✓	E4
8	needs (prefer for needs not to have to change)	65		5 - 5		
9	interruptions (prefer not to have any)	65		5 - 1	✓	E1
10	enjoy	51		4 - 1		
11						

range 16

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		9	8	3	8	8	8	7	6	6		63
2	9		5	6	5	1	7	8	7	7		55
3	8	5		7	2	6	6	7	8	2		51
4	3	6	7		7	5	9	8	9	5		58
5	8	5	2	7		4	6	7	6	4		49
6	8	1	6	5	4		8	7	6	6		51
7	8	7	6	9	6	8		5	6	6		61
8	7	8	7	8	7	7	5		9	7		65
9	6	7	8	9	6	6	6	9		8		65
10	6	7	2	5	4	6	6	7	8			51
11												



CLUSTER GRAPH

APPENDIX 4: CUSTOMER FILE

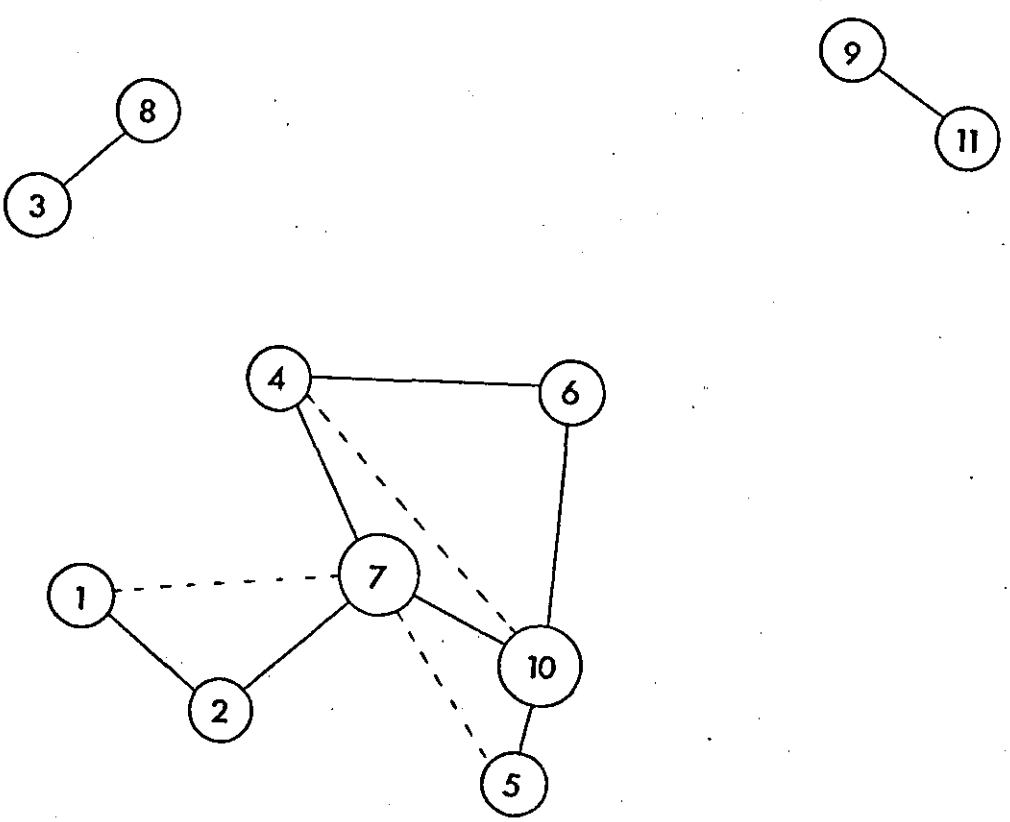
Customer 3 Orientation: Efficiency-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	success (in favour of)	58		5 - 1	✓	X1
2	time taken (shorter)	57		5 - 3	✓	E1
3	hassle (none)	70		5 - 5		
4	travelling (little)	59		4 - 4		
5	face-to-face v/s telephone (n)	60		5 - 5		
6	number of items (n)	63		3 - 2		
7	convenience (n)	50	✓	3 - 2		E3
8	cash involved (less)	66		5 - 3	✓	B2
9	number of people involved (fewer)	71		4 - 1	✓	B2
10	number of visits (fewer)	54		4 - 4		
11	enjoy	72		5 - 1		
	range	22				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		3	8	5	6	7	4	6	7	6	6	58
2	3		9	6	5	6	3	7	6	5	7	57
3	8	9		5	6	9	8	2	7	8	8	70
4	5	6	5		7	6	3	5	8	5	9	59
5	6	5	6	7		5	4	8	9	2	8	60
6	7	6	9	6	5		3	9	6	3	9	63
7	4	3	8	3	4	3		6	9	2	8	50
8	6	7	2	5	8	9	6		9	8	6	66
9	7	6	7	8	9	6	9	9		7	3	71
10	6	5	8	5	2	3	2	8	7		8	54
11	6	7	8	9	8	9	8	6	3	8		72



CLUSTER GRAPH

Customer 4 Orientation: Person-centred

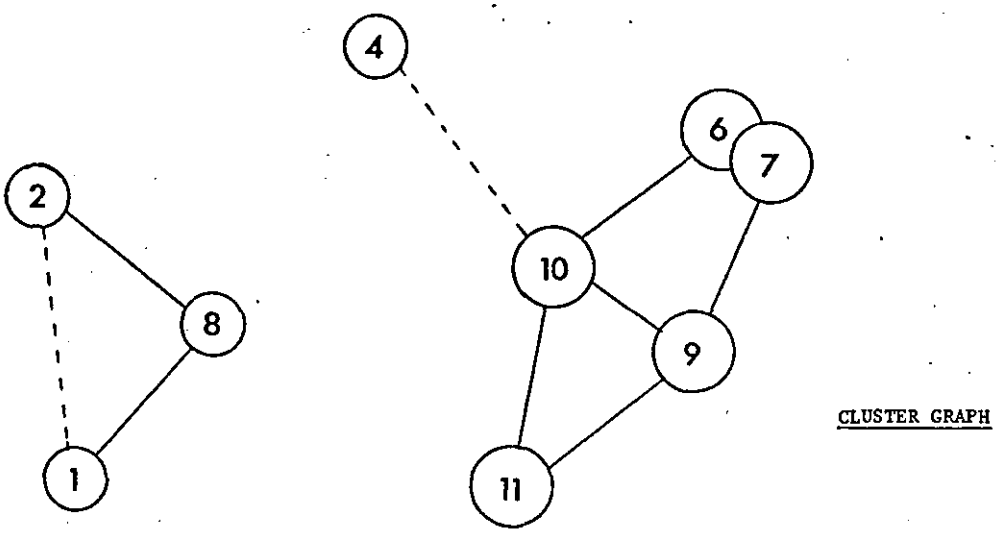
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	who goes to whom? (n)	61		(5,5)-(5,3)		
2	emotions (not involved)	71		(5,5)-(4,3)		
3	information (n)	68		(3,4)-(4,2)		
4	priority (low)	57		(5,5)-(1,4)		
5	type of transaction (n)	62		(4,3)-(5,1)		
6	self v/s external motivation (self)	50	✓	(5,3)-(1,2)		P1
7	casual v/s official (casual)	50	✓	(5,3)-(1,2)		P3
8	face-to-face v/s telephone (former)	48	✓	(5,5)-(4,2)		P3
9	urgency (low)	51	✓	(5,3)-(2,1)		P1
10	recreational v/s necessity (former)	51	✓	(5,4)-(1,1)		B2
11	enjoy	48		(4,4)-(2,2)		

range 23

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		4	6	6	5	7	7	3	8	8	7	61
2	4		8	6	9	9	9	3	8	8	7	71
3	6	8		8	5	7	7	5	8	8	5	68
4	6	6	8		7	5	5	5	6	4	5	57
5	5	9	5	7		6	6	6	5	7	6	62
6	7	9	7	5	6		0	6	3	3	4	50
7	7	9	7	5	6	0		6	3	3	4	50
8	3	3	5	5	6	6	6		5	5	4	48
9	8	8	8	6	5	3	3	5		2	3	51
10	8	8	8	4	7	3	3	5	2		3	51
11	7	7	5	5	6	4	4	4	3	3		48



CLUSTER GRAPH

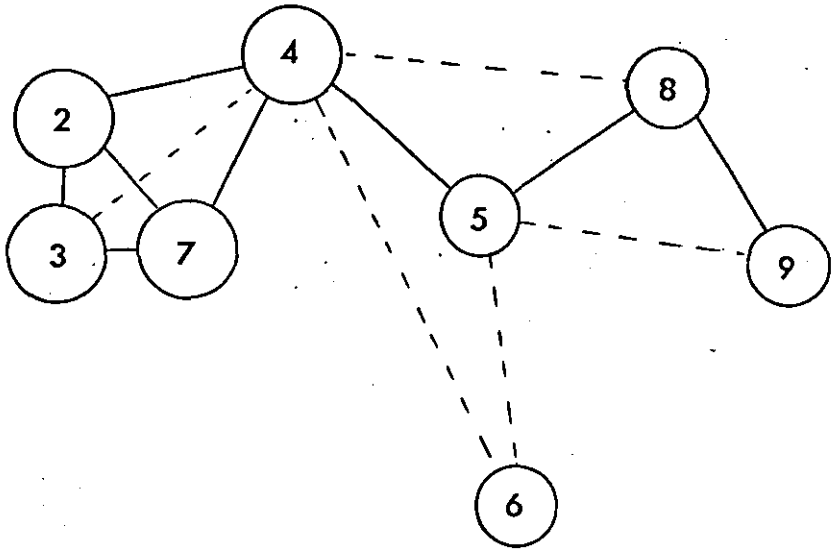
Customer 5 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	product v/s facility (product)	60		(4,3)-1		
2	pleasure v/s necessity (former)	38	✓	(4,5)-1		B2
3	enjoy (yes)	44		(5,5)-1	✓	P4
4	priority (low)	40	✓	(4,4)-1		B1
5	friendly (prefer so)	46		(2,5)-1	✓	P2
6	short-long term effects (n)	48		(3,4)-2		
7	memorable event (prefer so)	44		(5,4)-1	✓	P4
8	other person (prefer just anybody rather than prof.)	46		(3,5)-1	✓	P2
9	planning (prefer not to do any)	48		(3,5)-2		
10	number of people involved (n)	58		(3,1)-1		
11						
	range	22				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	ro to
1		6	7	7	8	7	6	7	6	6		6(
2	6		1	3	4	5	2	5	6	6		3(
3	7	1		4	5	6	1	6	7	7		4(
4	7	3	4		3	4	3	4	5	7		4(
5	8	4	5	3		5	6	3	4	8		4(
6	7	5	6	4	5		5	6	5	5		4(
7	6	2	1	3	6	5		7	8	6		4(
8	7	5	6	4	3	6	7		1	7		4(
9	6	6	7	5	4	5	8	1		6		4(
10	6	6	7	7	8	5	6	7	6			5(
11												



CLUSTER GRAPH

APPENDIX 4: CUSTOMER FILE

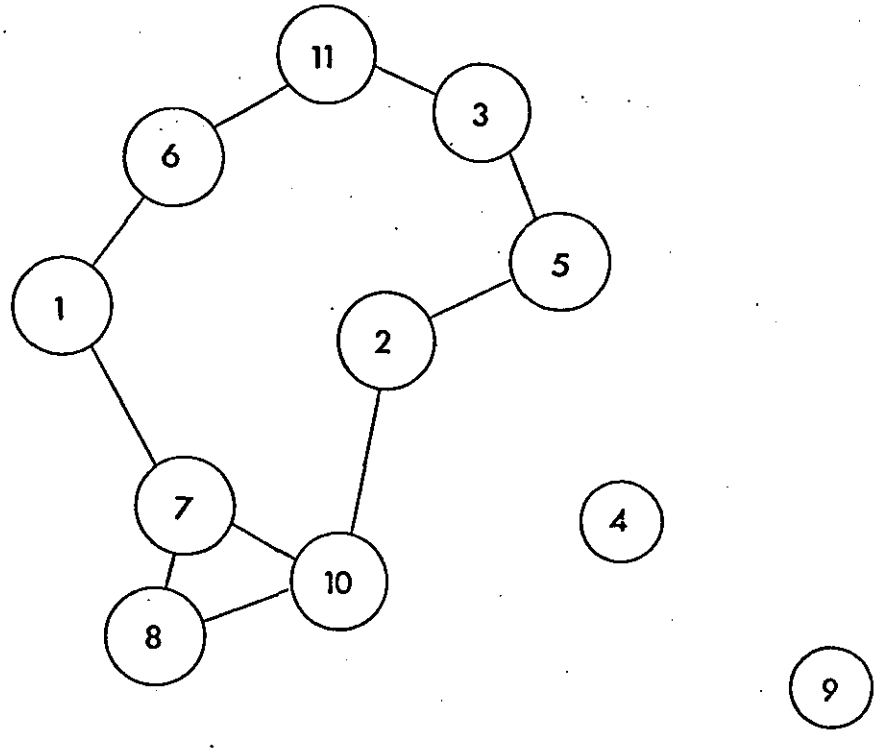
Customer 6 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	optimistic (prefer feeling so)	47	✓	5 - 1		P1
2	urgency (lack of)	47	✓	5 - 2		P1
3	independence (prefer so)	55		5 - 1		
4	type of enquiry (n)	70		5 - 4		
5	acceptable (prefer so)	55		5 - 2		
6	type of task (prefer decision making)	49	✓	5 - 1		B2
7	system efficient (n)	52		5 - 3		
8	human contact (n)	59		5 - 4		
9	least familiar (prefer so)	71		5 - 2		
10	treatment as customer (prefer special treatment)	56		5 - 3		
11	enjoy	55		5 - 1		
	range	24				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		4	4	9	6	2	3	4	6	5	4	47
2	4		4	5	2	4	5	6	8	3	6	47
3	4	4		9	2	4	7	8	8	7	2	55
4	9	5	9		7	7	8	7	5	6	7	70
5	6	2	2	7		6	7	8	8	5	4	55
6	2	4	4	7	6		5	6	6	7	2	49
7	3	5	7	8	7	5		1	7	2	7	52
8	4	6	8	7	8	6	1		8	3	8	59
9	6	8	8	5	8	6	7	8		9	6	71
10	5	3	7	6	5	7	2	3	9		9	56
11	4	6	2	7	4	2	7	8	6	9		55



CLUSTER GRAPH

Customer 7 Orientation: Person-centred

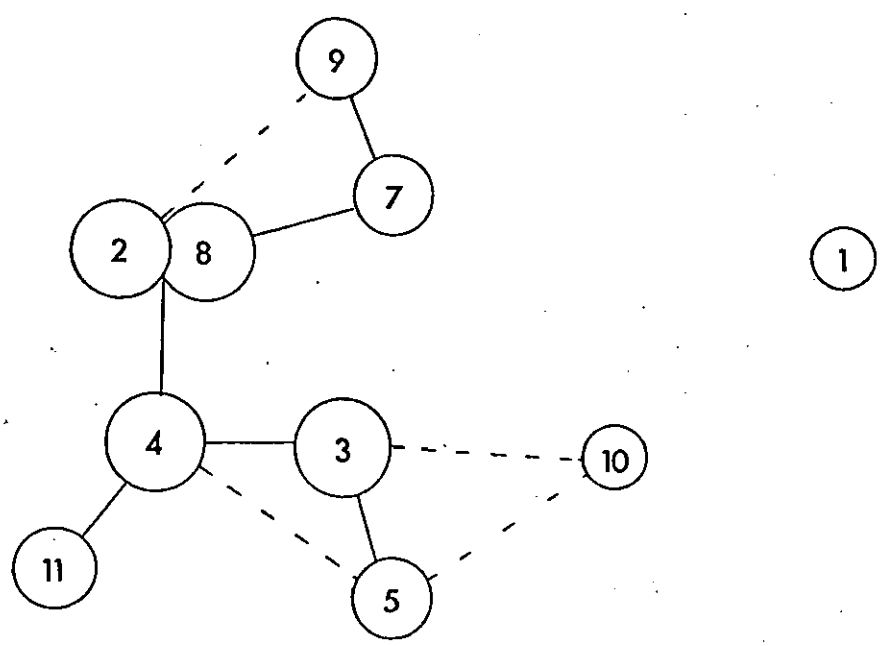
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	contact with how many (n)	71		5 - 4		
2	pleasant experience (yes)	44	✓	5 - 1		P4
3	success (yes)	44	✓	5 - 1		X1
4	personal dealing (yes)	44	✓	5 - 1		P3
5	helpful people (yes)	54		4 - 1		
6	information (n)	73		5 - 3		
7	social chat (yes)	44	✓	5 - 1		P3
8	made to feel at ease (yes)	44	✓	5 - 1		P1
9	access to right person (n)	58		3 - 1		
10	type of task (prefer abstract to concrete)	60		4 - 2		
11	enjoy	58		5 - 1		

range 29

construct - matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		7	7	7	9	8	5	7	7	5	9	71
2	7		4	2	6	7	2	0	4	8	4	44
3	7	4		2	2	7	4	4	6	4	4	44
4	7	2	2		4	9	4	2	6	4	2	44
5	9	6	2	4		5	6	6	6	4	6	54
6	8	7	7	9	5		7	7	9	7	7	73
7	5	2	4	4	6	7		2	2	6	6	44
8	7	0	4	2	6	7	2		4	8	4	44
9	7	4	6	6	6	9	2	4		6	8	58
10	5	8	4	6	4	7	6	8	6		8	60
11	9	4	4	2	6	7	6	4	8	8		58



CLUSTER GRAPH

6

APPENDIX 4: CUSTOMER FILE

Customer 8 Orientation: Mixed

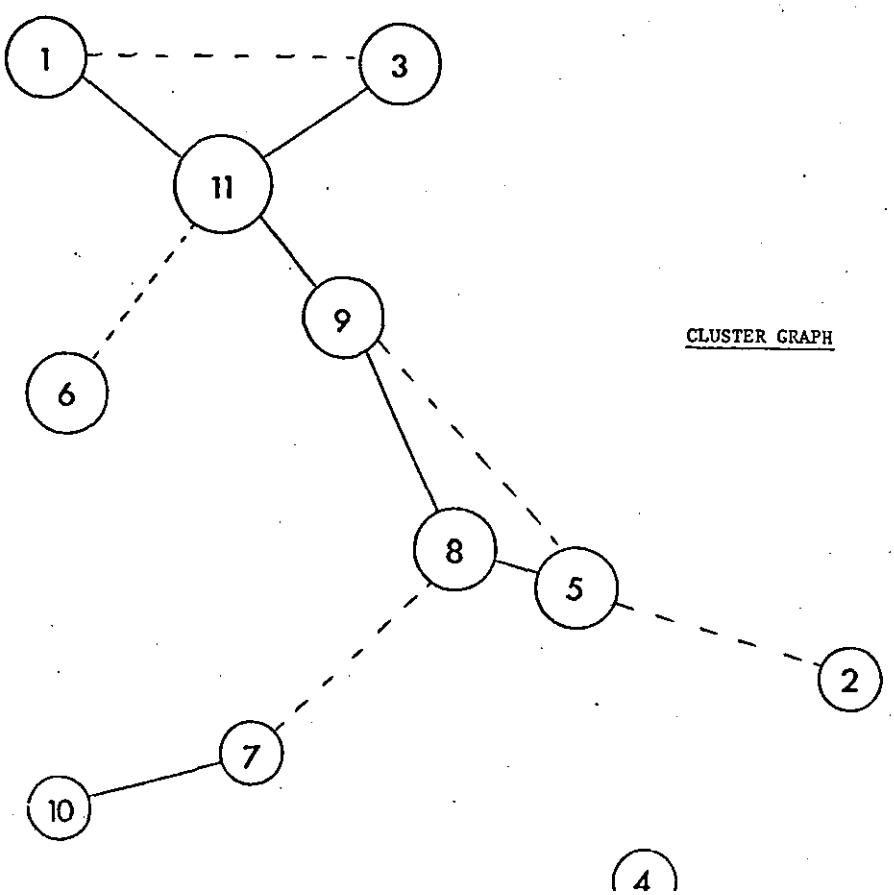
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	exchange of things (prefer nothing changing hands)	56		5 - 1	✓	B2
2	'fancy' v/s work (former)	59		5 - 3	✓	B2
3	type of enquiry (prefer concrete to abstract)	58		5 - 2	✓	B2
4	casual v/s busy (n)	67		4 - 3		
5	appearance of other person (n)	53		2 - 1		
6	who does the work? (them)	59		5 - 3	✓	E5
7	how I felt (normal rather than uneasy)	62		3 - 1	✓	P1
8	helpful - unhelpful (former)	54		3 - 1	✓	P2
9	impressions re: efficiency (positive)	58		4 - 1	✓	E5
10	thought processes (prefer not to have to think)	65		3 - 1	✓	X3
11	enjoy	53		5 - 1		

range 14 (narrow range and row totals generally high)

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	ro to
1		5	4	6	7	5	6	8	5	7	3	5
2	5		5	5	4	4	9	5	8	8	6	5
3	4	5		6	7	5	8	8	5	7	3	5
4	6	5	6		5	7	8	6	9	7	9	6
5	7	4	7	5		8	5	1	4	6	6	5
6	5	4	5	7	8		5	9	6	6	4	5
7	6	9	8	8	5	5		4	7	3	7	6
8	8	5	8	6	1	9	4		3	5	5	5
9	5	8	5	9	4	6	7	3		8	2	5
10	7	8	7	7	6	6	3	5	8		8	6
11	3	6	3	9	6	4	7	5	2	8		5



CLUSTER GRAPH

APPENDIX 4 : CUSTOMER FILE

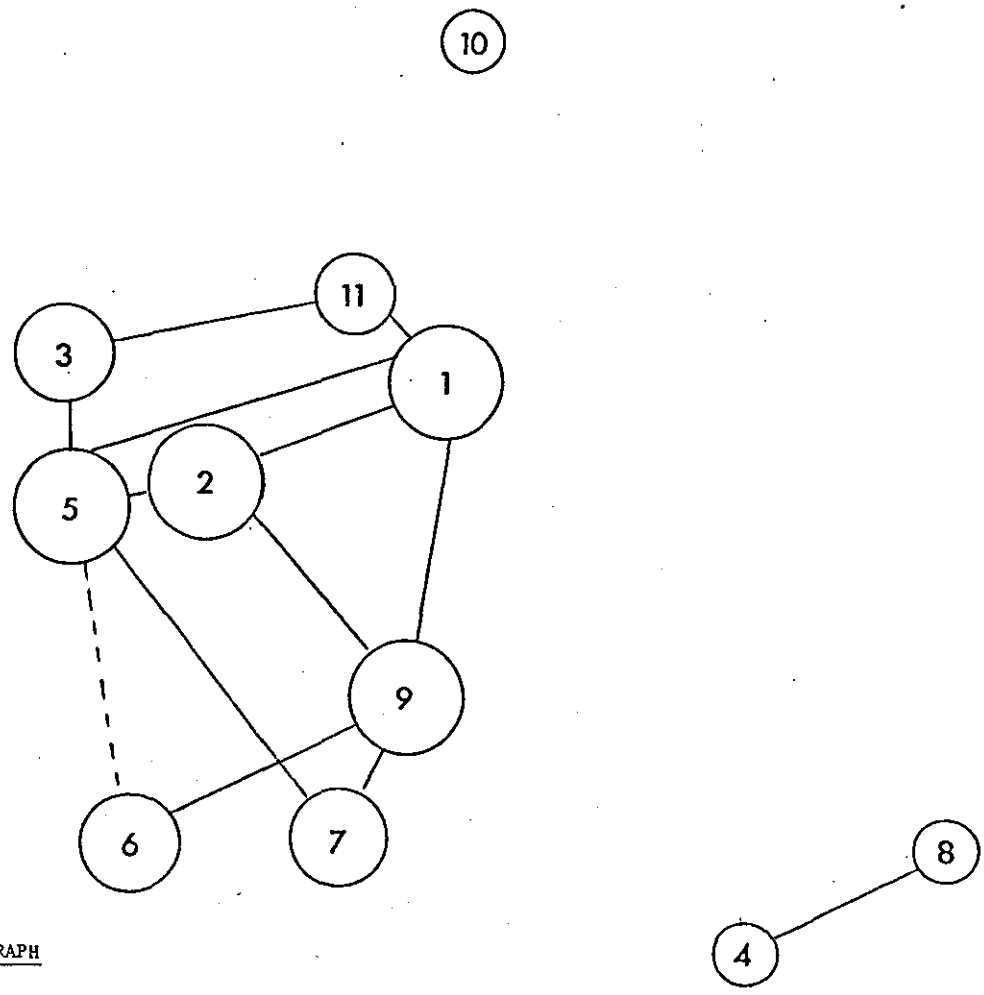
Customer 9 Orientation: Efficiency-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	needs (prefer exactness)	41		(5,5)-1		
2	duration (short)	39	✓	(4,5)-1		E1
3	selection of places (prefer none)	41		(5,5)-1		
4	choice (n)	70		(3,1)-1		
5	transaction requirements (prefer being assessed)	38	✓	(4,5)-1		E5
6	priority (high)	52		(2,5)-1		
7	knowledge about the process (prefer not knowing)	43		(3,5)-1		
8	selection (n)	71		(3,1)-1		
9	terms of agreement (prefer terms to none)	39	✓	(3,5)-1		E5
10	duration (long)	58		(5,4)-1		
11	enjoy	44		(5,5)-1		
	range	33				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		2	2	9	3	5	4	8	2	5	1	41
2	2		2	7	1	5	4	6	2	7	3	39
3	2	2		7	1	5	4	8	4	5	3	41
4	9	7	7		6	8	5	3	7	10	8	70
5	3	1	1	6		4	3	7	3	6	4	38
6	5	5	5	8	4		3	9	3	6	4	52
7	4	4	4	5	3	3		8	2	5	5	43
8	8	6	8	3	7	9	8		6	7	9	71
9	2	2	4	7	3	3	2	6		7	3	39
10	5	7	5	10	6	6	5	7	7		4	58
11	1	3	3	8	4	4	5	9	3	4		44



CLUSTER GRAPH

APPENDIX 4: CUSTOMER FILE

Customer 10 Orientation: Efficiency-centred

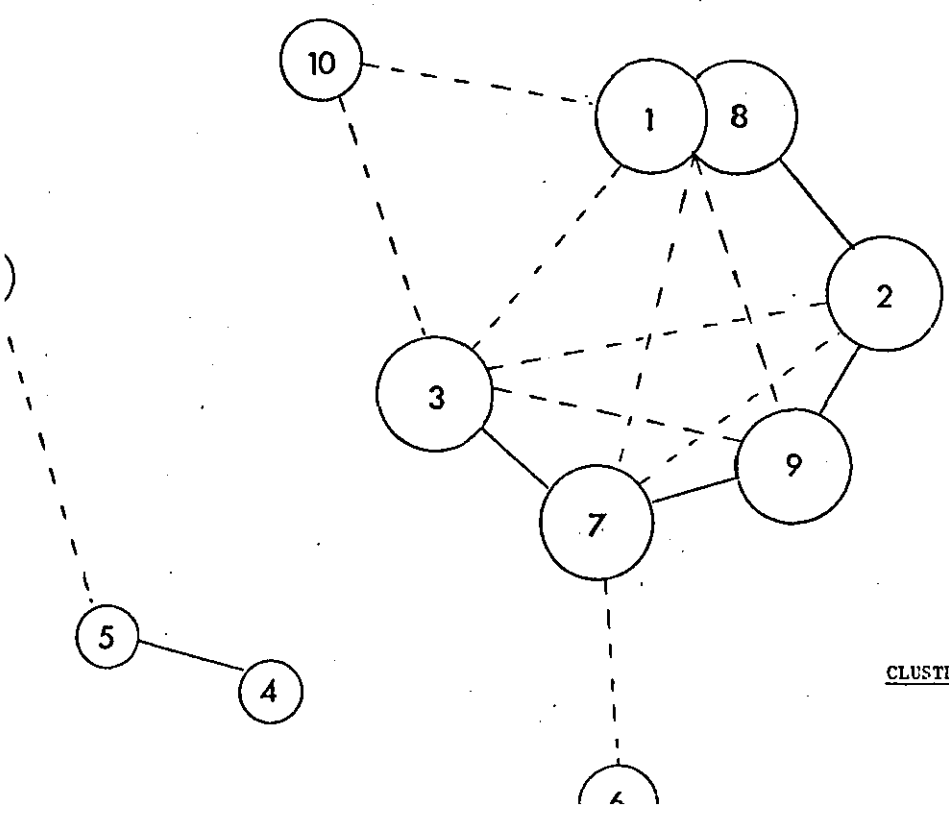
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	type of task (n)	46	✓	(5,1)-3		B2
2	type of task (n)	52		(2,5)-3		
3	choice (prefer so)	48		(2,5)-1		
4	negotiation (prefer not)	68		(5,4)-2		
5	whose decisions? (mine)	61		(4,5)-2		
6	necessity (yes)	70		(4,3)-1		
7	needs (prefer not knowing)	46	✓	(3,5)-1		E5
8	complexity (complex)	46	✓	(1,5)-3		E4
9	long term effects (mixed)	50		(3,5)-2		
10	pressure (n)	56		(5,1)-4		
11	enjoy	61		(5,5)-1		

range 24

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		2	4	6	7	8	4	0	4	4	7	46
2	2		4	8	7	8	4	2	2	6	9	52
3	4	4		8	7	6	2	4	4	4	5	48
4	6	8	8		3	8	8	6	8	8	5	68
5	7	7	7	3		7	7	7	7	5	4	61
6	8	8	6	8	7		4	8	6	8	7	70
7	4	4	2	8	7	4		4	2	6	5	46
8	0	2	4	6	7	8	4		4	4	7	46
9	4	2	4	8	7	6	2	4		6	7	50
10	4	6	4	8	5	8	6	4	6		5	56
11	7	9	5	5	4	7	5	7	7	5		61



CLUSTER GRAPH

Customer 11 Orientation: Efficiency-centred

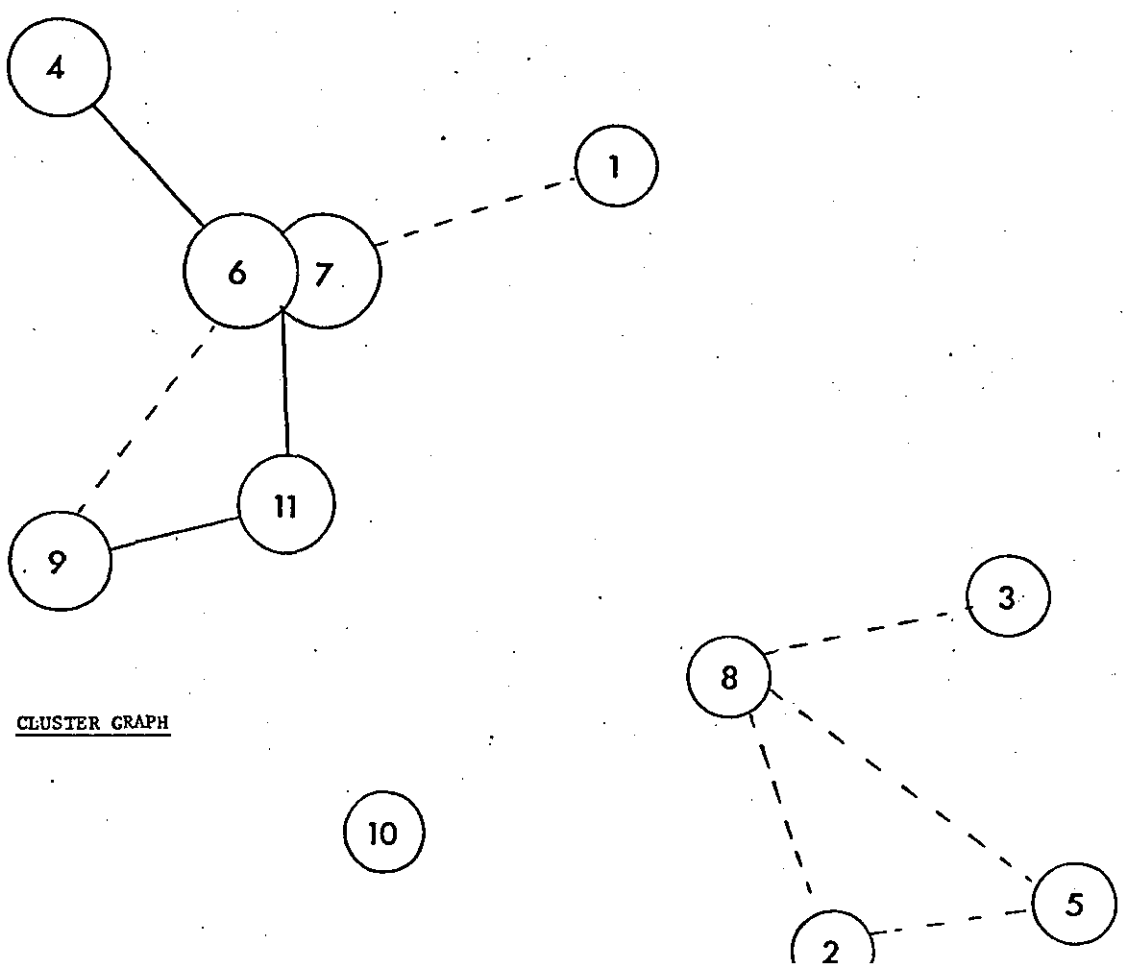
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	type of task (prefer general to specific)	61		(3,5)-2		
2	personal/impersonal (former, slightly)	69		(2,3)-1		
3	novelty (yes)	65		(5,2)-1		
4	choice (yes)	58		(5,5)-3		
5	regard for other person (high)	67		(2,2)-1		
6	whose decision? (mine)	53	✓	(5,5)-1		E5
7	pleasant surroundings (yes)	53	✓	(5,5)-1		X4
8	financial benefit (yes)	61		(4,3)-1		
9	convenience (yes)	59		(5,5)-1	✓	E3
10	motives (prefer not thinking about others)	74		(4,5)-3		
11	enjoy	56		(5,5)-1		

range 21

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		8	8	5	6	4	4	6	8	7	5	61
2	8		6	5	4	8	8	4	10	9	7	69
3	8	6		9	6	6	6	4	6	9	5	65
4	5	5	9		7	3	3	9	5	6	6	58
5	6	4	6	7		8	8	4	8	7	9	67
6	4	8	6	3	8		0	8	4	9	3	53
7	4	8	6	3	8	0		8	4	9	3	53
8	6	4	4	9	4	8	8		6	5	7	61
9	8	10	6	5	8	4	4	6		5	3	59
10	7	9	9	6	7	9	9	5	5		8	74
11	5	7	5	6	9	3	3	7	3	8		56



CLUSTER GRAPH

APPENDIX 4 : CUSTOMER FILE

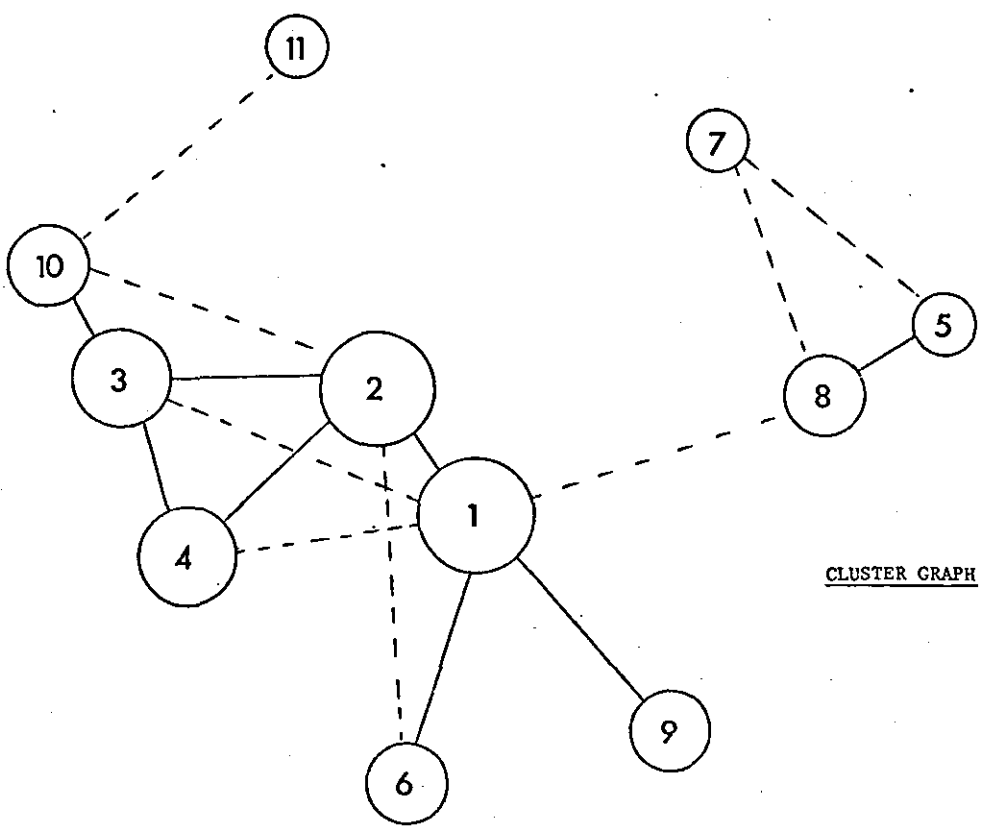
Customer 12 Orientation: Efficiency-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	execution of enquiry (simple)	45	✓	3 - (1,2)		E4
2	complexity (simple)	44	✓	4 - (1,2)		E4
3	informal/formal (former)	49		5 - (1,2)	✓	P3
4	ease of execution (easy)	51		4 - (1,1)	✓	E4
5	personal contact (little)	63		5 - (3,3)		
6	financial (prefer not)	54		3 - (2,1)		
7	discussion (prefer none)	63		5 - (3,2)		
8	pleasure v/s necessity (former)	59		5 - (3,4)		
9	dealing with how many (n)	64		3 - (5,1)		
10	emotions (none involved)	54		5 - (1,2)		
11	enjoy	62		5 - (1,1)		
	range	20				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		1	4	4	6	3	8	4	3	5	7	45
2	1		3	3	7	4	7	5	4	4	6	44
3	4	3		2	8	5	6	8	7	1	5	49
4	4	3	2		8	3	8	8	7	3	5	51
5	6	7	8	8		5	4	2	7	9	7	63
6	3	4	5	3	5		9	5	6	6	8	54
7	8	7	6	8	4	9		4	7	5	5	63
8	4	5	8	8	2	5	4		7	9	7	59
9	3	4	7	7	7	6	7	7		8	8	64
10	5	4	1	3	9	6	5	9	8		4	54
11	7	6	5	5	7	8	5	7	8	4		62



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APPENDIX 4 : CUSTOMER FILE

Customer 13Orientation: Efficiency-centred

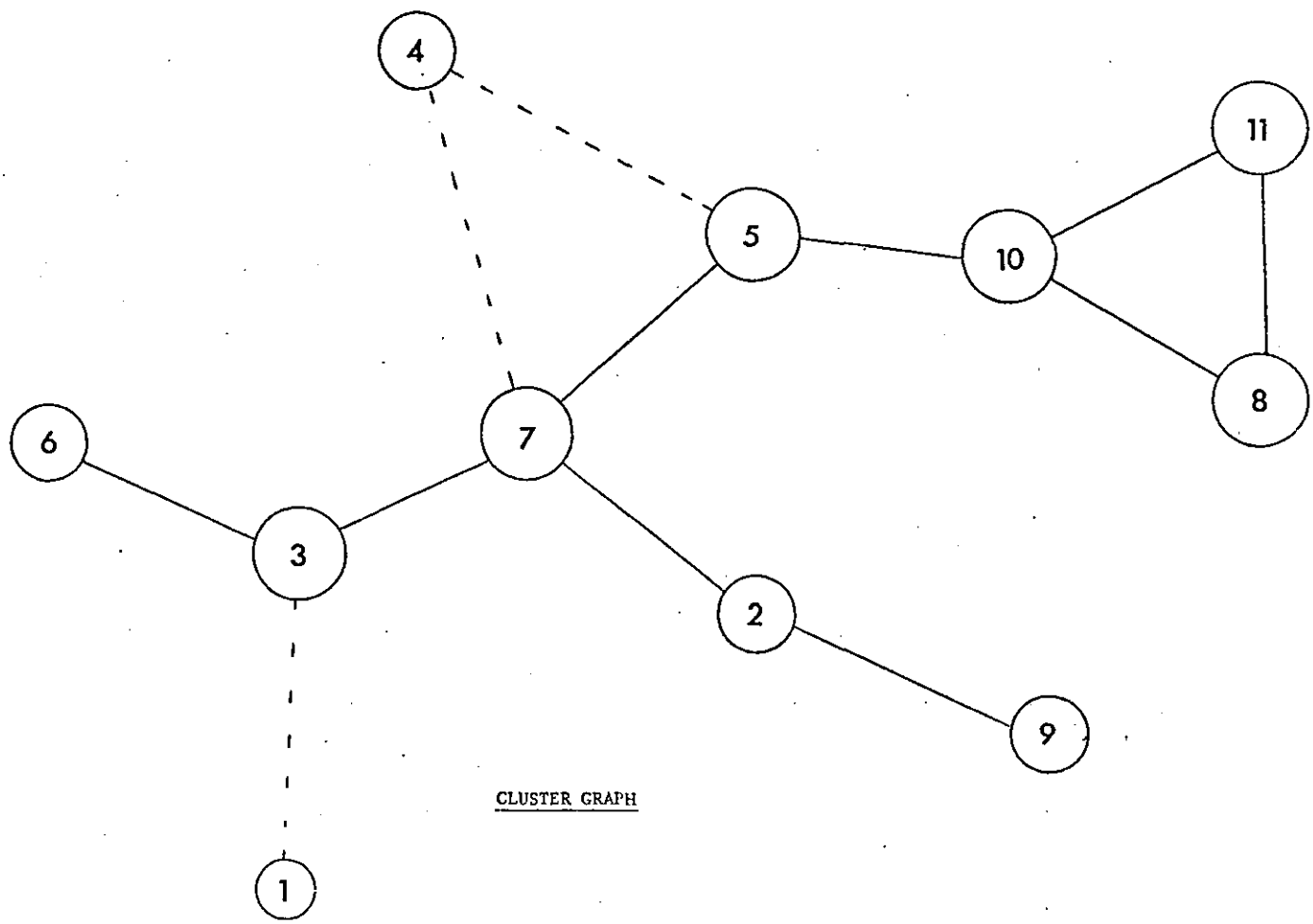
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	sincerity of other person (n)	67		5 - 5		
2	type of task (routine)	61		4 - 2		
3	certainty/uncertainty (n)	51		2 - 1		
4	duration (lengthy)	60		5 - 3		
5	other person's role advisory (prefer advise to tell)	60		4 - 1	✓	E5
6	voluntary v/s had to (latter)	64		3 - 1		
7	conversational v/s non-conversational (n)	53		3 - 2		
8	other person's function (to deal with ME)	62		5 - 1	✓	E5
9	needs (exactness)	56		4 - 1	✓	E5
10	decision making (in favour of)	59		5 - 1	✓	B2
11	enjoy	58		5 - 1		

range (16) (narrow range and row totals generally high)

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		6	4	5	9	7	7	9	5	8	7	67
2	6		6	5	7	7	3	7	3	10	7	61
3	4	6		5	5	3	3	7	5	6	7	51
4	5	5	5		4	8	4	8	8	5	8	60
5	9	7	5	4		8	4	6	8	3	6	60
6	7	7	3	8	8		4	8	6	7	6	64
7	7	3	3	4	4	4		8	6	7	8	53
8	9	7	7	8	6	8	8		4	3	2	62
9	5	3	5	8	8	6	6	4		7	4	56
10	8	10	6	5	3	7	7	3	7		3	59
11	7	7	7	8	6	6	8	2	4	3		58



CLUSTER GRAPH

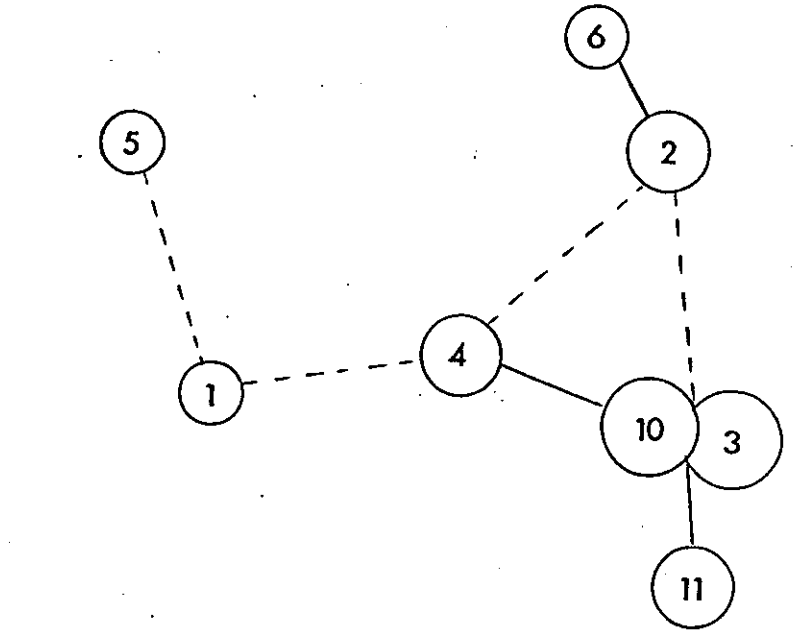
Customer 14 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	trouble taken by other person (n)	62		3 - 2		
2	seriousness of matter (serious)	54		4 - 1		
3	type of task (prefer buying to selling)	50	✓	5 - 1		B2
4	other person helpful (yes)	50	✓	4 - 1		P2
5	success (yes)	68		4 - 2		
6	long term effects (long to short)	62		4 - 1		
7	for whom? (myself)	70		5 - 4		
8	distance (n)	68		3 - 2		
9	other persons personality (prefer amusing)	68		5 - 3		
10	other persons conduct towards me (professional & charming)	50	✓	5 - 1		P2
11	enjoy	56		5 - 1		
	range	20				

construct: matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		6	6	4	4	8	8	6	6	6	8	62
2	6		4	4	8	2	8	6	6	4	6	54
3	6	4		2	8	6	6	8	8	0	2	50
4	4	4	2		6	6	8	6	8	2	4	50
5	4	8	8	6		6	6	8	6	8	8	68
6	8	2	6	6	6		8	6	8	6	6	62
7	8	8	6	8	6	8		6	6	6	8	70
8	6	6	8	6	8	6	6		6	8	6	68
9	6	6	8	8	6	8	6	6		8	6	68
10	6	4	0	2	8	6	6	8	8		2	50
11	8	6	2	4	8	6	8	6	6	2		56



CLUSTER GRAPH

Customer 15 Orientation: Person-centred

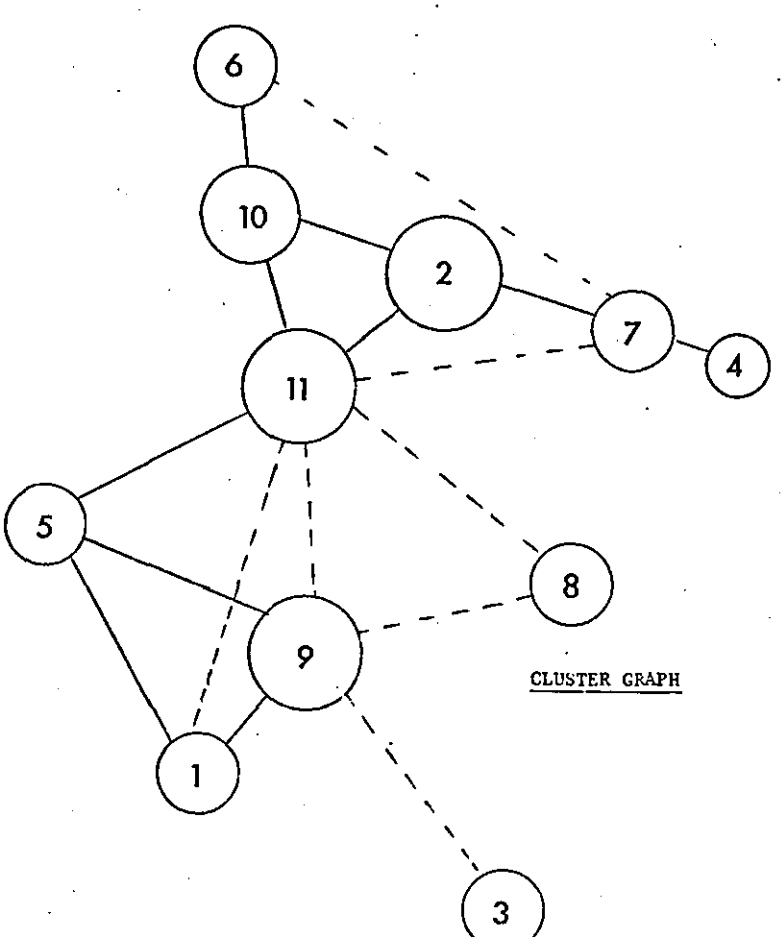
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	long term implications (long)	48		5 - 2	✓	B1
2	necessity v/s not (n)	38	✓	5 - 4		B2
3	necessity v/s pleasure (latter)	59		4 - 1		
4	other people involved (n)	53		5 - 4		
5	personal (yes)	51		5 - 2	✓	P1
6	duration (n)	50		2 - 1		
7	importance (n)	46		5 - 4		
8	enjoy (yes)	58		5 - 1		
9	motivation (positive)	46		5 - 1	✓	P1
10	uncertainty (prefer uncertainty)	46		5 - 5		
11	treatment as customer	40	✓	5 - 3		P1

range 21

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		4	6	5	3	6	6	6	2	6	4	48
2	4		8	3	5	2	2	6	4	2	2	38
3	6	8		7	5	6	6	6	4	8	8	59
4	5	3	7		8	5	1	7	7	5	5	53
5	3	5	5	8		7	7	5	3	5	3	51
6	6	2	6	5	7		4	8	6	2	4	50
7	6	2	6	1	7	4		6	6	4	4	46
8	6	6	6	7	5	8	6		4	6	4	58
9	2	4	4	7	3	6	6	4		6	4	46
10	6	2	8	5	5	2	4	6	6		2	46
11	4	2	8	5	3	4	4	4	4	2		40



CLUSTER GRAPH

Customer 16 Orientation: Efficiency-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	number of people to talk to (few)	67		3 - 1		
2	bureaucracy (none)	41	✓	5 - 1		E5
3	type of task (simple enquiry)	57		4 - 1		
4	who gets to whom (they to me)	52		5 - 1		
5	financial (prefer not)	52		5 - 1		
6	waiting (prefer not)	49		5 - 1	✓	E3
7	duration (short)	68		5 - 2		
8	informal/formal (former)	48		5 - 1	✓	P3
9	information needed (least)	48		5 - 1	✓	E5
10	information amount (less)	67		5 - 2		
11	enjoy	43		5 - 1		

range 27

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		6	4	7	7	6	7	9	5	10	6	67
2	6		6	5	3	2	5	3	3	6	2	41
3	4	6		3	7	6	9	5	5	6	6	57
4	7	5	3		4	5	10	2	6	7	3	52
5	7	3	7	4		3	8	4	6	9	1	52
6	6	2	6	5	3		7	5	5	8	2	49
7	7	5	9	10	8	7		8	4	3	7	68
8	9	3	5	2	4	5	8		4	5	3	48
9	5	3	5	6	6	5	4	4		5	5	48
10	10	6	6	7	9	8	3	5	5		8	67
11	6	2	6	3	1	2	7	3	5	8		43

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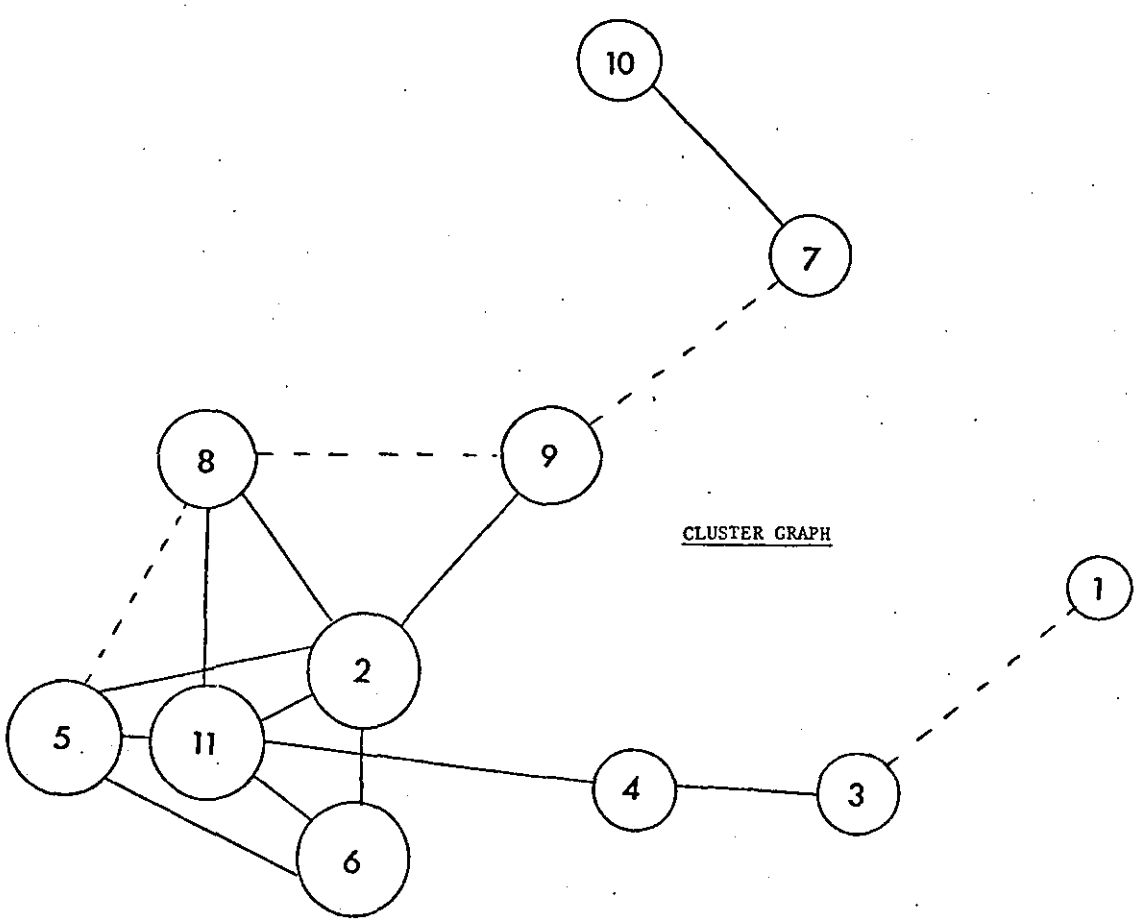


APPENDIX 4: CUSTOMER FILE

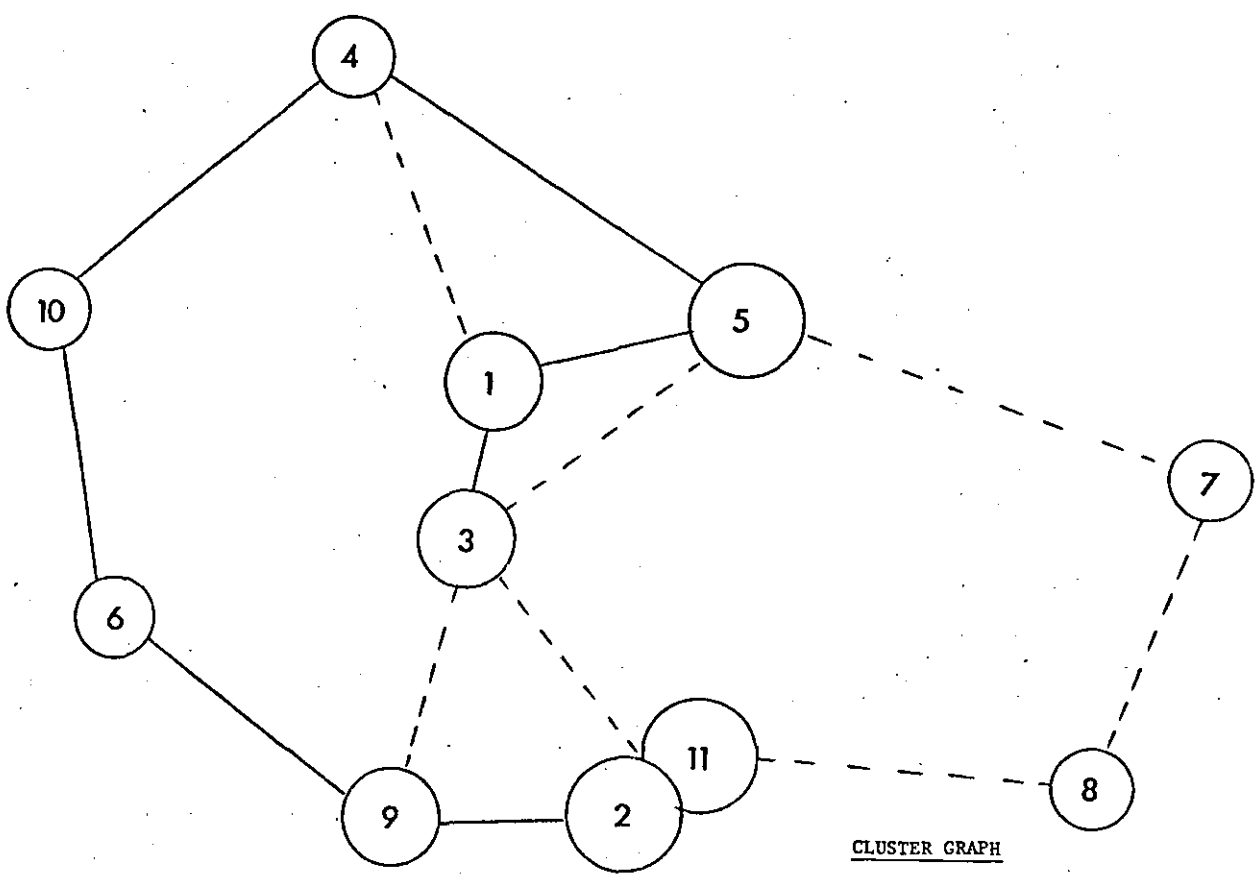
Customer 17 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	motivation (positive)	46	✓	5 - 2		P1
2	chat (nice to dull)	51		5 - 1	✓	P3
3	persuading (not for me to do too much persuading)	45	✓	5 - 2		E4
4	choice (n)	62		2 - 1		
5	indirect (direct)	53		5 - 4		
6	other person helpful (n)	56		4 - 3		
7	consideration for other person (prefer not to be bothersome)	69		5 - 3	✓	P2
8	satisfaction (yes)	59		5 - 1	✓	X1
9	other persons nature (polite)	55		5 - 1	✓	P2
10	type of enquiry (n) (personalised v/s business)	65		2 - 1		
11	enjoy	51		5 - 1		
	range	24				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		5	1	4	3	6	5	5	5	7	5	46
2	5		4	9	6	5	8	4	2	8	0	51
3	1	4		5	4	5	6	6	4	6	4	45
4	4	9	5		3	6	7	7	9	3	9	62
5	3	6	4	3		7	4	6	8	6	6	53
6	6	5	5	6	7		7	9	3	3	5	56
7	5	8	6	7	4	7		4	10	10	8	69
8	5	4	6	7	6	9	4		6	8	4	59
9	5	2	4	9	8	3	10	6		6	2	55
10	7	8	6	3	6	3	10	8	6		8	65
11	5	0	4	9	6	5	8	4	2	8		51



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APPENDIX 4: CUSTOMER FILE

Customer 18 Orientation: Person-centred

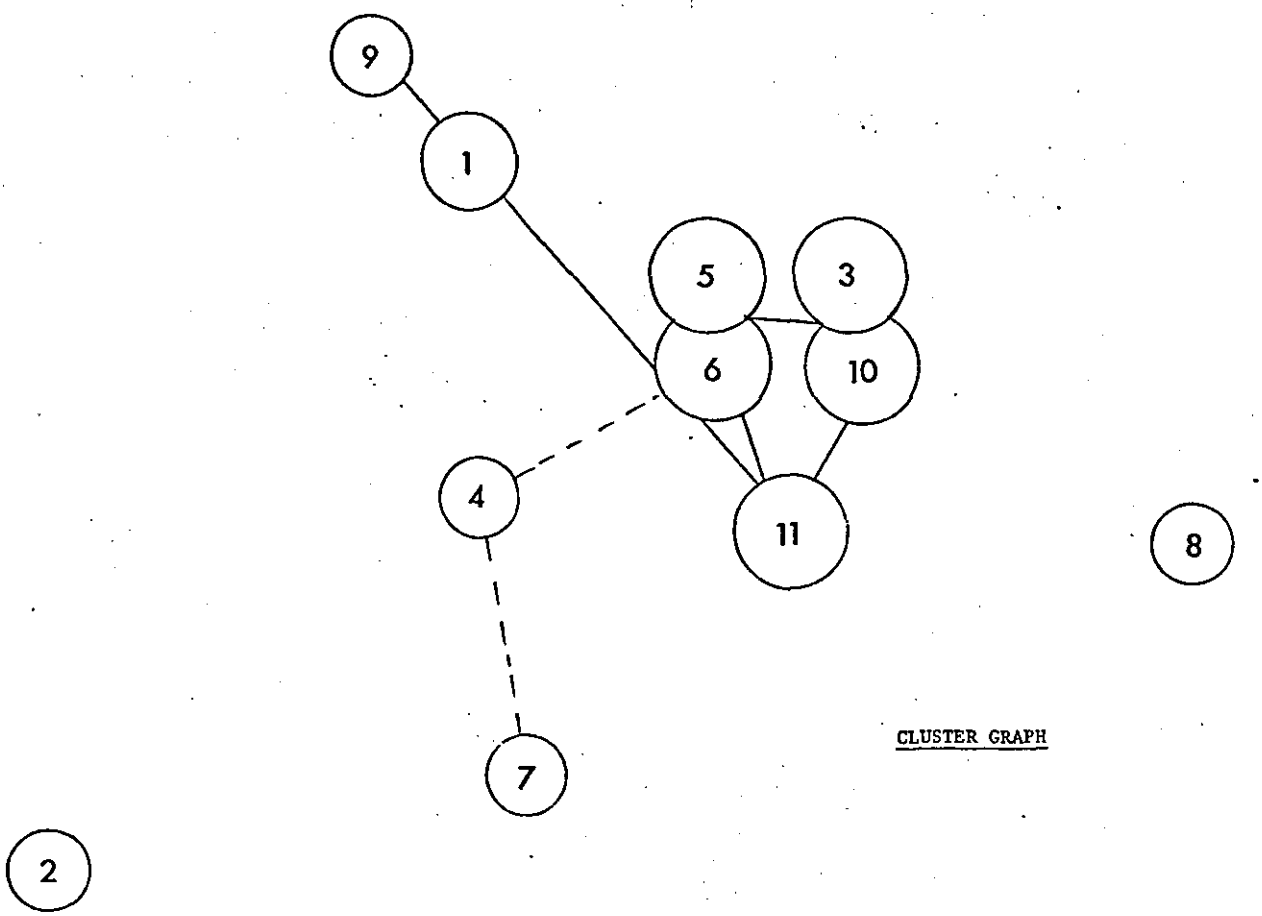
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	hassle (none)	50		(5,5)-2		
2	amount of interaction (n)	78		(5,4)-4		
3	other person helpful (Yes)	38	✓	(5,5)-1		P2
4	information (mixed)	59		(5,1)-5		
5	other person interested (prefer so)	35	✓✓	(5,5)-1		P2
6	success (yes)	35	✓✓	(5,5)-1		X1
7	importance (mixed)	65		(5,2)-1		
8	duration (long)	71		(2,5)-1		
9	other persons nature (pleasant)	57		(5,5)-3		
10	success (yes)	38	✓	(5,5)-1		X1
11	enjoy	38		(5,5)-1		

range 43

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		8	4	7	3	3	7	9	1	4	4	50
2	8		8	7	9	9	7	7	7	8	8	78
3	4	8		5	1	1	7	5	5	0	2	38
4	7	7	5		4	4	4	10	8	5	5	59
5	3	9	1	4		0	6	6	4	1	1	35
6	3	9	1	4	0		6	6	4	1	1	35
7	7	7	7	4	6	6		8	8	7	5	65
8	9	7	5	10	6	6	8		10	5	5	71
9	1	7	5	8	4	4	8	10		5	5	57
10	4	8	0	5	1	1	7	5	5		2	38
11	4	8	2	5	1	1	5	5	5	2		38



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APPENDIX 4: CUSTOMER FILE

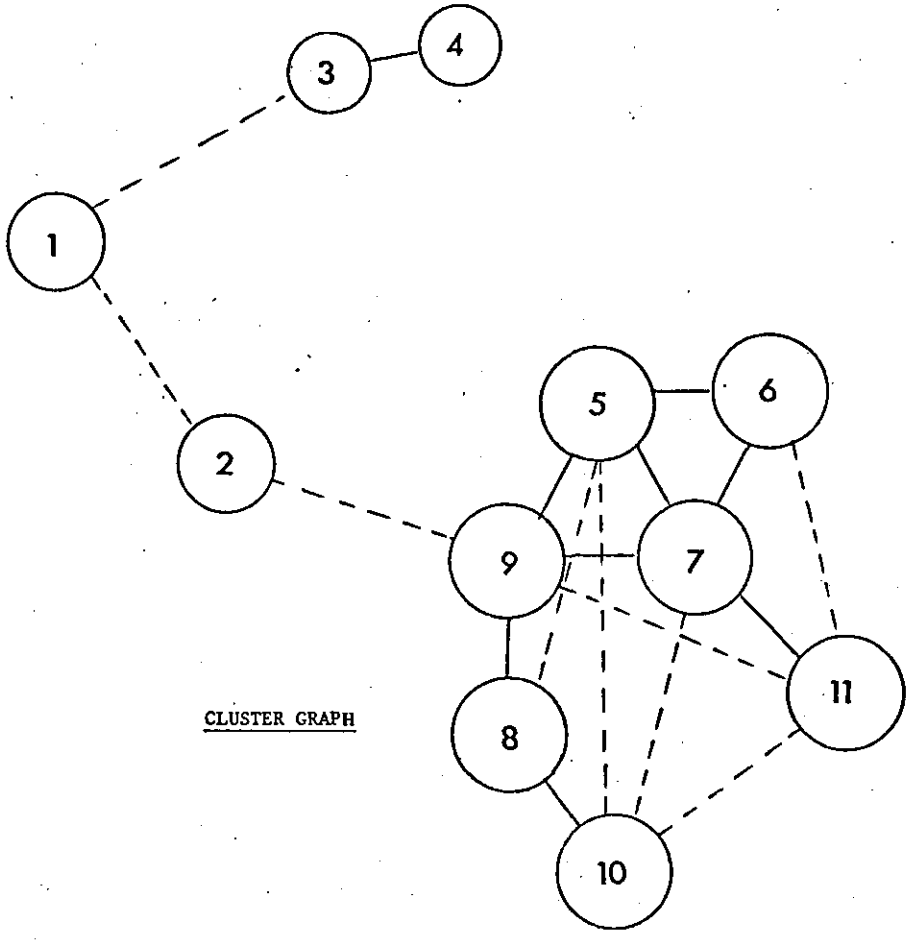
Customer 19 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	other person helpful (yes)	63		5 - 2		
2	other person honest (n)	65		5 - 4		
3	other person likeable (yes)	65		5 - 2		
4	other person relatable (yes)	70		5 - 3		
5	motivation (positive)	49	✓	4 - 1		P1
6	leisure vs/necessity (former)	55		4 - 1		
7	concern (prefer concern not involved)	45	✓✓	4 - 1		P1
8	thought process (prefer initial stages)	53		3 - 1		
9	felt in control (yes)	45	✓✓	3 - 1		P5
10	anticipation (correct)	53		4 - 1		
11	enjoy	49		5 - 1		
	range	25				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		4	4	5	8	8	6	8	6	8	6	63
2	4		8	7	6	8	6	6	4	8	8	65
3	4	8		1	8	8	8	8	8	6	6	65
4	5	7	1		9	7	9	9	9	7	7	70
5	8	6	8	9		2	2	4	2	4	4	49
6	8	8	8	7	2		2	6	4	6	4	55
7	6	6	8	9	2	2		4	2	4	2	45
8	8	6	8	9	4	6	4		2	2	4	53
9	6	4	8	9	2	4	2	2		4	4	45
10	8	8	6	7	4	6	4	2	4		4	53
11	6	8	6	7	4	4	2	4	4	4		49



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APPENDIX 4 : CUSTOMER FILE

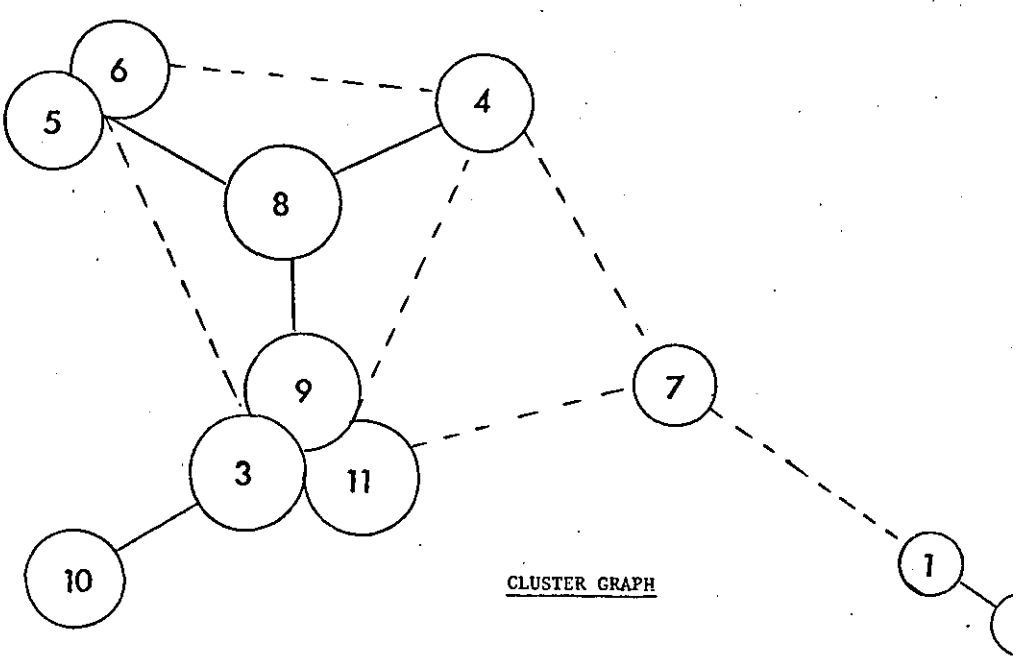
Customer 20 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	needs (prefer not knowing)	70		3 - 1		
2	general v/s specific (former)	66		3 - 1		
3	personal relationship (yes)	36	✓	5 - 1		P3
4	other person helpful (yes)	48		5 - 2		
5	interactive (yes)	44		4 - 2		
6	salesmanship (yes)	44		4 - 2		
7	motivation (positive)	50		4 - 1		
8	lively interaction (yes)	36	✓	5 - 2		P4
9	interesting (yes)	36	✓	5 - 1		P4
10	novel (yes)	50		5 - 1		
11	enjoy	36		5 - 1		
	range	34				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		2	8	8	8	8	4	8	8	8	8	70
2	2		8	8	6	6	6	6	8	8	8	66
3	8	8		4	4	4	4	2	0	2	0	36
4	8	8	4		4	4	4	2	4	6	4	48
5	8	6	4	4		0	6	2	4	6	4	44
6	8	6	4	4	0		6	2	4	6	4	44
7	4	6	4	4	6	6		6	4	6	4	50
8	8	6	2	2	2	2	6		2	4	2	36
9	8	8	0	4	4	4	4	2		2	0	36
10	8	8	2	6	6	6	6	4	2		2	50
11	8	8	0	4	4	4	4	2	0	2		36



CLUSTER GRAPH

APPENDIX 5 = X^2 Tests for Distribution of Prominent (Upper Analysis) and Weak (Lower Analysis) Constructs.

OBSERVED

CONSTRUCTS

CUSTOMERS		B	E	P		
P-centred	1:	14	2	46	=	62
E-centred	2:	7	27	3	=	37
	SUM:	21	29	49	=	99

B = Basic Function
E = Efficiency
P = Person

EXPECTED

1:	13	18	31
2:	8	11	18

1= Overall Distribution of Prominent Construc (S 0.001)

CHISQUARE

1:	Ø.Ø77	14.22	7.258=	21.56
2:	Ø.125	23.27	12.5Ø=	35.9Ø
SUM:	Ø.2Ø2 (3)	37.49 (4)	19.76= (5)	57.45 (1)

2= Overall Distribution of Weak Constructs (NS

DF FOR ROW TOTALS: 2

COLUMN TOTALS: 1

OVERALL TOTAL: 2

3= Distribution of Prominent Constructs within Basic Function (NS)

OBSERVED

CONSTRUCTS

CUSTOMERS		B	E	P		
P-centred	1:	21	1Ø	9	=	4Ø
E-centred	2:	15	12	12	=	39
	SUM:	36	22	21	=	79

4= Distribution of Prominent Constructs within Efficiency regi (S 0.001)

EXPECTED

1:	18	11	11
2:	18	11	1Ø

5= Distribution of Prominent constructs within Person region (S. 0.001)

CHISQUARE

1:	Ø.5ØØ	Ø.Ø91	Ø.364=	Ø.955
2:	Ø.5ØØ	Ø.Ø91	Ø.4ØØ=	Ø.991
SUM:	1.ØØØ	Ø.182	Ø.764=	1.945 (2)

DF FOR ROW TOTALS: 2

COLUMN TOTALS: 1

OVERALL TOTAL: 2

APPENDIX 6: CUSTOMER FILE OF SUPPORTING STUDY

Key to Appendix 6

As in Key to Appendix 3

But

elements were ranked rather than rated.

As such:

1) constructs matrix contrains Spearman's correlation coefficients:

   1.0 representing absolute association

   0 representing no association

2) cluster graph linked constructs show associations of:

   1.0 = overlapping constructs

   0.9 = very closely associated constructs

   0.8 = closely associated constructs

   0.7 = quite closely associated constructs

3) most enjoyed to least enjoyed swing

   is represented, appropriately, by ranks first converted to ratings. This is done because swings based on ranked differences (e.g. 1-5) would produce negative values which would be misleading.

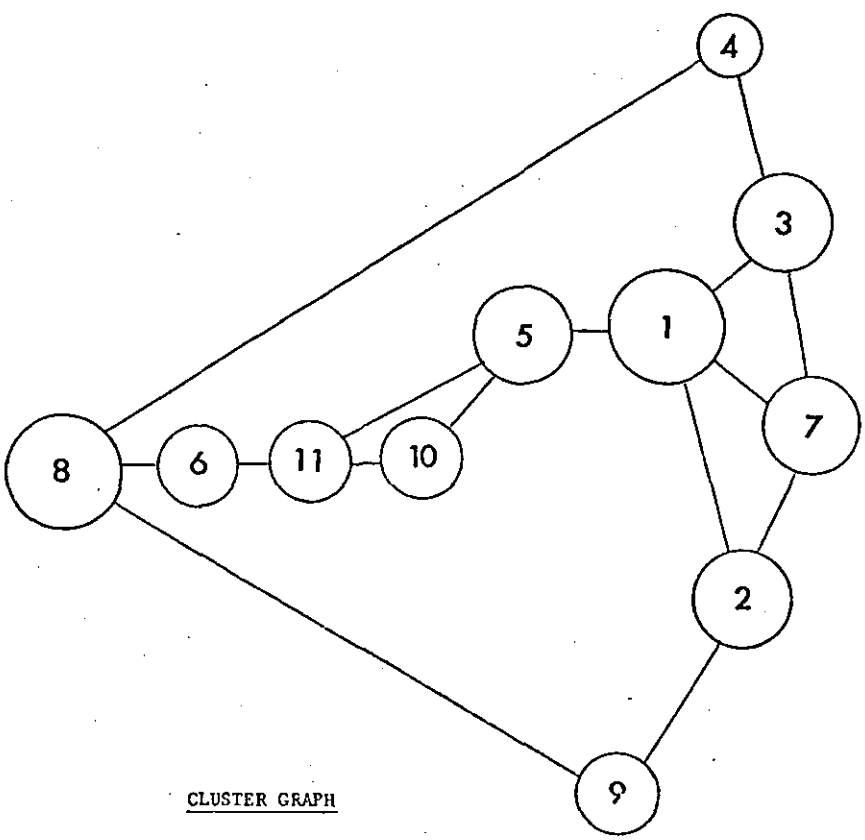
Customer 1 Orientation: Person-centred

constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	friendly - not friendly	5.7	✓	5 - 4		P2
2	aroused - not aroused	4.8		3 - 1		
3	formal - informal	5.7	✓	5 - 2		P3
4	acquainted - not acquainted	4.5		5 - 3		
5	produced aggression - didn't	5.4		5 - 3	✓	P1
6	not depressing - depressing	5.1		5 - 1	✓	P1
7	purposeful - accidental	4.6		2 - 1		
8	didn't achieve aim - achieved aim	4.8		5 - 1	✓	X1
9	financial - not financial	4.4		4 - 1		
10	bright - dingy	5.5	✓	5 - 2		P4
11	enjoyed - didn't enjoy	4.7		5 - 1		
	range	1.3				

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot
1		.7	.9	.5	.9	.3	.8	.1	.4	.7	.4	5.
2	.7		.5	.1	.6	.3	.7	.6	.9	.3	.1	4.
3	.9	.5		.8	.7	.4	.9	.3	.3	.6	.3	5.
4	.5	.1	.8		.3	.6	.6	.7	.2	.4	.3	4.
5	.9	.6	.7	.3		.5	.5	.2	.3	.9	.7	5.
6	.3	.3	.4	.6	.5		.0	.9	.4	.8	.9	5.
7	.8	.7	.9	.6	.5	.0		.1	.6	.3	.1	4.
8	.1	.6	.3	.7	.2	.9	.1		.7	.5	.7	4.
9	.4	.9	.3	.2	.3	.4	.6	.7		.1	.3	4.
10	.7	.3	.6	.4	.9	.8	.3	.5	.1		.9	5.
11	.4	.1	.3	.3	.7	.9	.1	.7	.3	.9		4.



CLUSTER GRAPH

Customer 2 Orientation: Person-centred

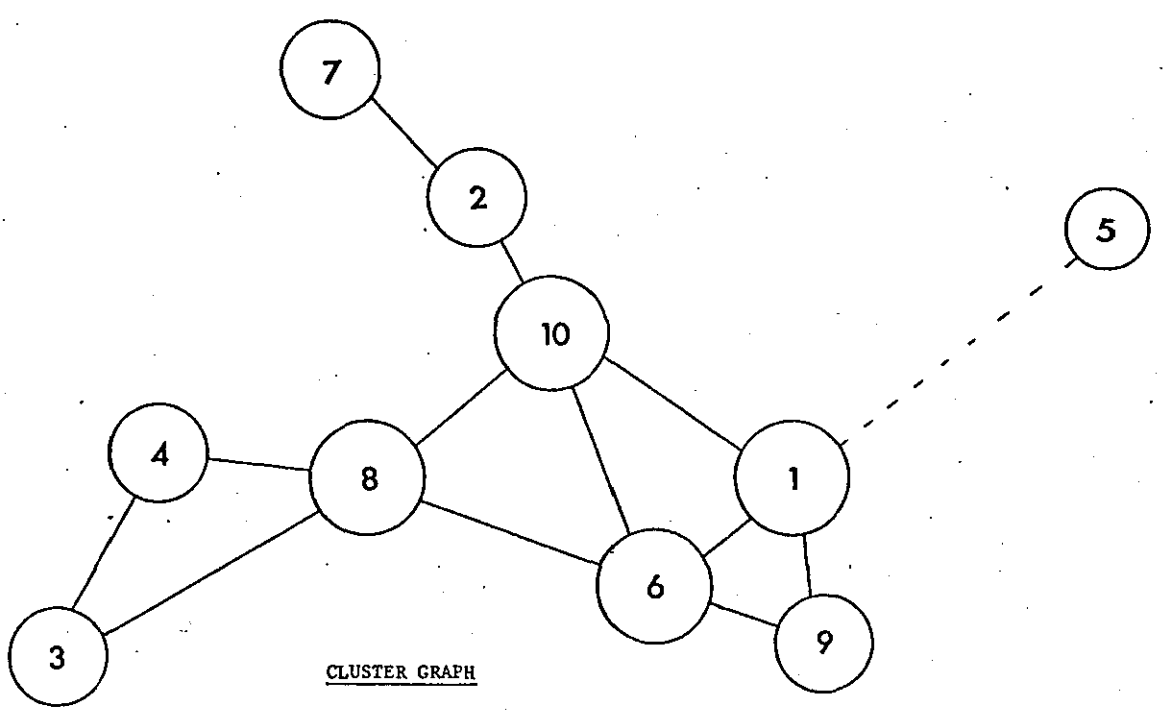
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	building - person	4.2		4 - 1		
2	loan - non-loan	4.5		5 - 2		
3	talks to - doesn't	2.5		3 - 1		
4	2 words - short words	3.6		3 - 2		
5	female - male job	2.6		5 - 2		
6	friendly - indifferent	4.8		3 - 1		
7	most recent - earliest	3.6		4 - 3		
8	bizarre - banal	5.0	✓	4 - 1		P4
9	best paid - worst paid	3.9		3 - 1		
10	enjoyment - non-enjoyment	5.3	✓	5 - 1		P4
11						

range 2.8

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	rol tol
1		.6	.0	.3	.6	.7	.1	.3	.9	.7		4.
2	.6		.1	.1	.3	.6	.8	.6	.5	.9		4.
3	.0	.1		.8	.1	.3	.1	.7	.1	.3		2.
4	.3	.1	.8		.5	.3	.4	.8	.1	.3		3.
5	.6	.3	.1	.5		.1	.3	.1	.2	.4		2.
6	.7	.6	.3	.3	.1		.5	.7	.9	.7		4.
7	.1	.8	.1	.4	.3	.5		.6	.2	.6		3.
8	.3	.6	.7	.8	.1	.7	.6		.4	.8		5.
9	.9	.5	.1	.1	.2	.9	.2	.4		.6		3.
10	.7	.9	.3	.3	.4	.7	.6	.8	.6			5.
11												



CLUSTER GRAPH

Customer 3 Orientation: Person-centred

constructs table

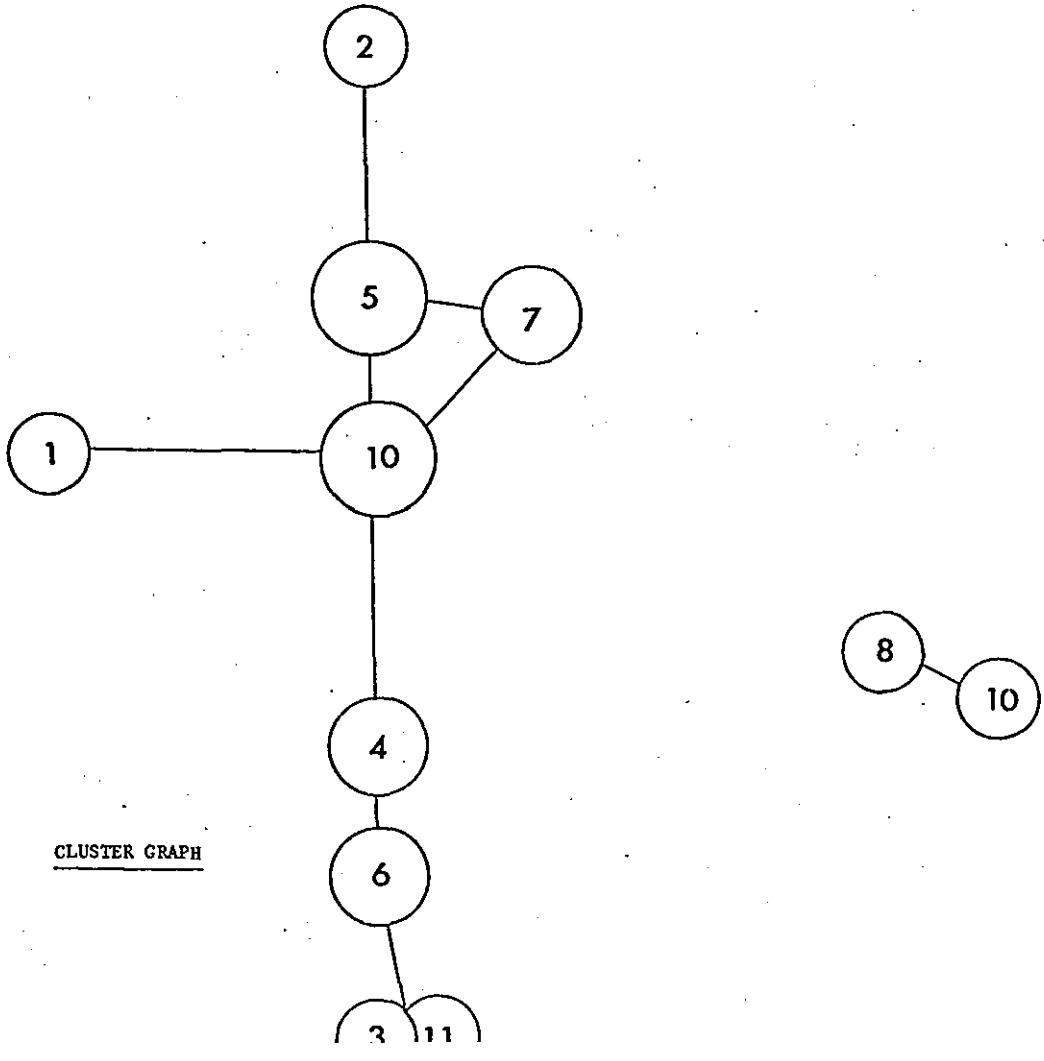
construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	people - place	4.6		5 - 4		
2	place - people	4.6		5 - 4		
3	study - job	3.5		5 - 1	✓	B2
4	money - not	4.9		3 - 2		
5	other person intelligent - not	4.5		5 - 4		
6	1st letter - not	4.2		4 - 2	✓	X*
7	high social status - low	4.4		5 - 4		
8	friendly - unfriendly	4.0		4 - 2	✓	P2
9	enjoy - not enjoy (day)	3.2		3 - 2		
10	respect for other person - not	4.6		5 - 3	✓	P2
11	enjoy - not enjoy	3.5		5 - 1		

range 1.7 (all row totals less than 5.0)

(X* indefinable construct)

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	ro to
1		.1	.3	.1	.7	.3	.6	.3	.6	.4	.3	4.
2	.1		.3	.1	.7	.3	.6	.3	.6	.4	.3	4.
3	.3	.3		.6	.0	.8	.1	.2	.1	.1	1.0	3.
4	.1	.1	.6		.6	.9	.5	.5	.3	.7	.6	4.
5	.7	.7	.0	.6		.3	.9	.3	.1	.9	.0	4.
6	.3	.3	.8	.9	.3		.1	.2	.1	.4	.8	4.
7	.6	.6	.1	.5	.9	.1		.5	.2	.8	.1	4.
8	.3	.3	.2	.5	.3	.2	.5		.9	.6	.2	4.
9	.6	.6	.1	.3	.1	.1	.2	.9		.2	.1	3.
10	.4	.4	.1	.7	.9	.4	.8	.6	.2		.1	4.
11	.3	.3	1.0	.6	.0	.8	.1	.2	.1	.1		3.



CLUSTER GRAPH

APPENDIX 6 : CUSTOMER FILE

Customer 4 Orientation: Person-centred

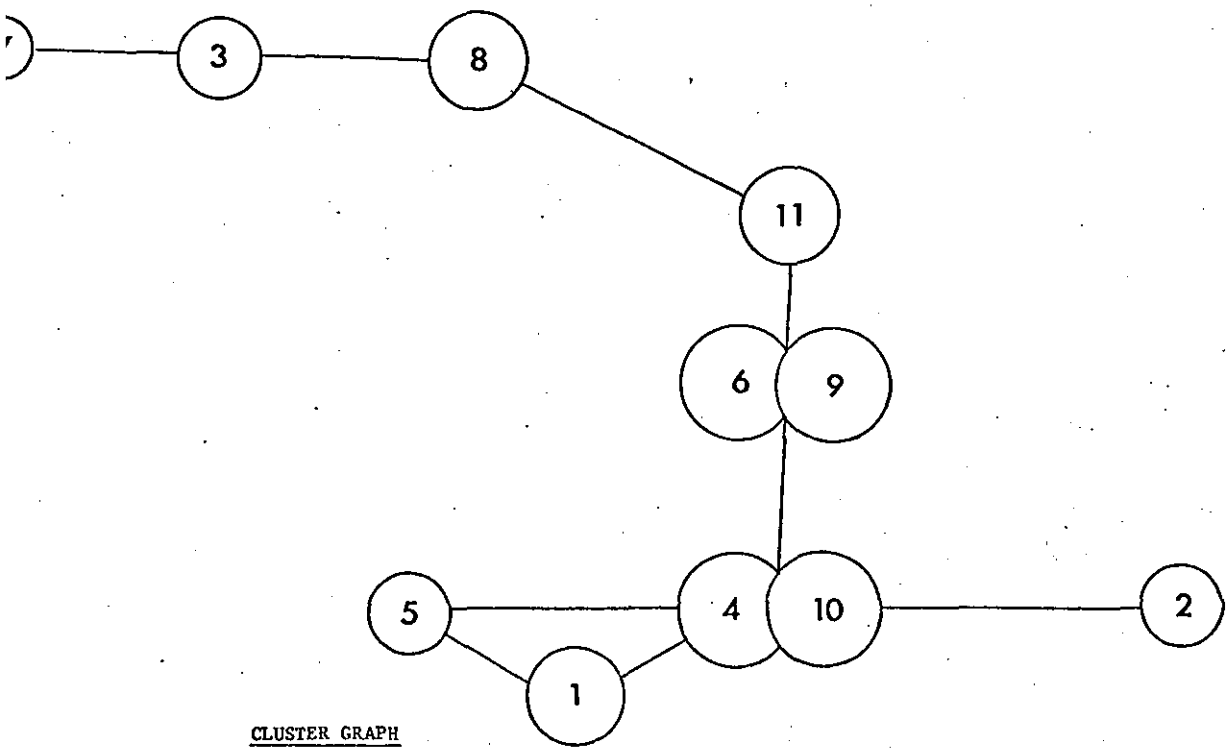
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	relaxed - formal	5.4		3 - 2		
2	public - private	4.7		4 - 3		
3	individual - group	3.6		3 - 1		
4	home - university	6.5	✓	4 - 2		B2
5	educational - financial	4.0		3 - 2		
6	welfare - development	6.0	✓	5 - 1		B2
7	standing - sitting	4.0		5 - 4		
8	masculine - feminine	3.5		4 - 1		
9	nervous - relaxed	6.0	✓	5 - 1		P1
10	sat - not sat	6.5		4 - 2		
11	enjoy - not enjoy	5.2	✓	5 - 1		B2

range 3.0

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		.4	.3	.9	.9	.6	.2	.3	.6	.9	.3	5.4
2	.4		.6	.7	.0	.5	.6	.1	.5	.7	.6	4.7
3	.3	.6		.4	.1	.1	.7	.7	.1	.4	.2	3.6
4	.9	.7	.4		.7	.8	.5	.1	.8	1.0	.6	6.5
5	.9	.0	.1	.7		.5	.1	.4	.5	.7	.1	4.0
6	.6	.5	.1	.8	.5		.4	.4	1.0	.8	.9	6.0
7	.2	.6	.7	.5	.1	.4		.3	.4	.5	.3	4.0
8	.3	.1	.7	.1	.4	.4	.3		.4	.1	.7	3.5
9	.6	.5	.1	.8	.5	1.0	.4	.4		.8	.9	6.0
10	.9	.7	.4	1.0	.7	.8	.5	.1	.8		.6	6.5
11	.3	.6	.2	.6	.1	.9	.3	.7	.9	.6		5.2



CLUSTER GRAPH

APPENDIX 6 : CUSTOMER FILE

Customer 5 Orientation: Unclassified (see note below)

constructs table

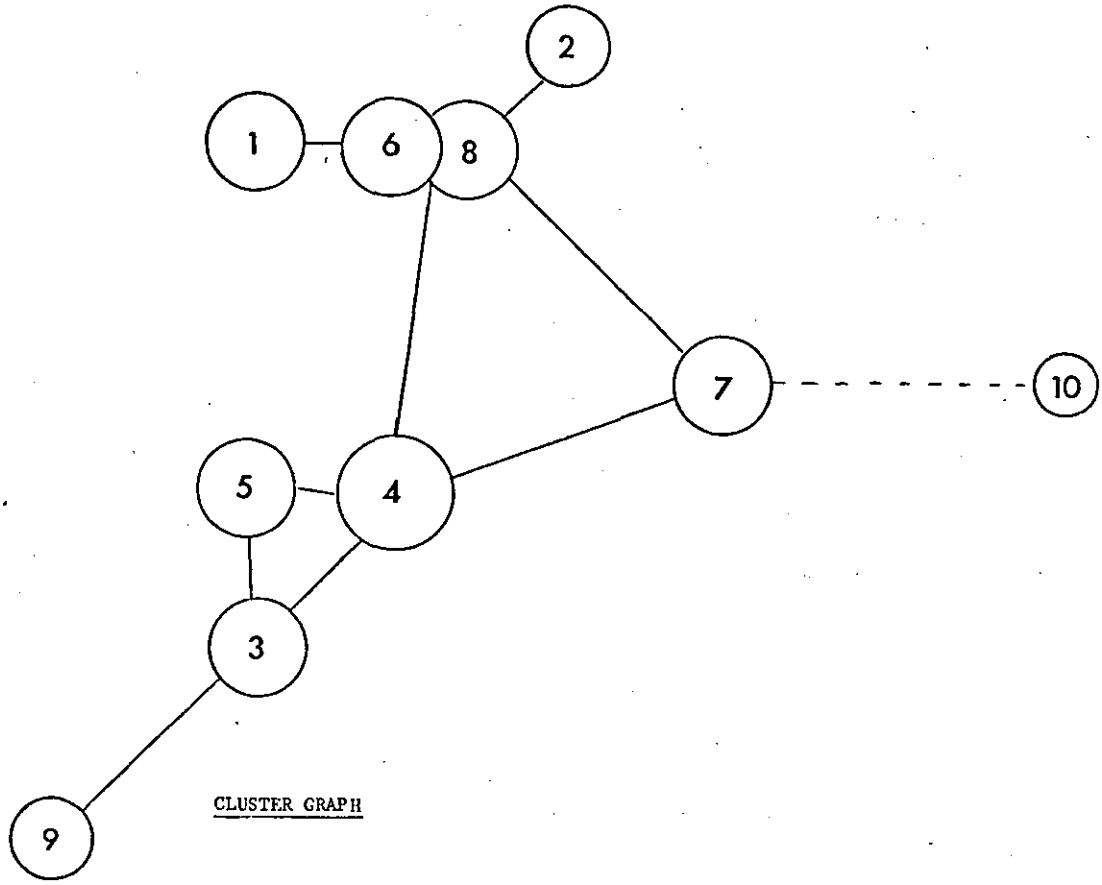
construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	O.P. meets all kinds of people v/s intelligent people	5.1		3 - 1		
2	work - not	5.1		3 - 1		
3	money - health	3.9		5 - 4		
4	individuals - books	3.9		4 - 3		
5	individual - group	5.1		4 - 3		
6	people - books	2.6		4 - 2		
7	work - money	5.9		5 - 4		
8	money - Loughborough	5.9		5 - 4		
9	institution - person	3.9		4 - 3		
10	money - books	5.5		4 - 1		
11	enjoy - didn't	4.7		5 - 2		

range 3.3

Note: subject unclassified as he has elicited elements in place of constructs.

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	ro to
1		1.0	.1	.0	.9	.3	.6	.6	.4	.7	.5	5.
2	1.0		.1	.0	.9	.3	.6	.6	.4	.7	.5	5.
3	.1	.1		.6	.0	.1	.7	.7	.7	.6	.3	3.
4	.0	.0	.6		.1	.7	.4	.4	.9	.3	.5	3.
5	.9	.9	.0	.1		.1	.7	.7	.3	.6	.8	5.
6	.3	.3	.1	.7	.1		.1	.1	.5	.3	.1	2.
7	.6	.6	.7	.4	.7	.1		1.0	.2	.9	.7	5.
8	.6	.6	.7	.4	.7	.1	1.0		.2	.9	.7	5.
9	.4	.4	.7	.9	.3	.5	.2	.2		.1	.2	3.
10	.7	.7	.6	.3	.6	.3	.9	.9	.1		.4	5.
11	.5	.5	.3	.5	.8	.1	.7	.7	.2	.4		4.



CLUSTER GRAPH

Customer 6 Orientation: Person-centred

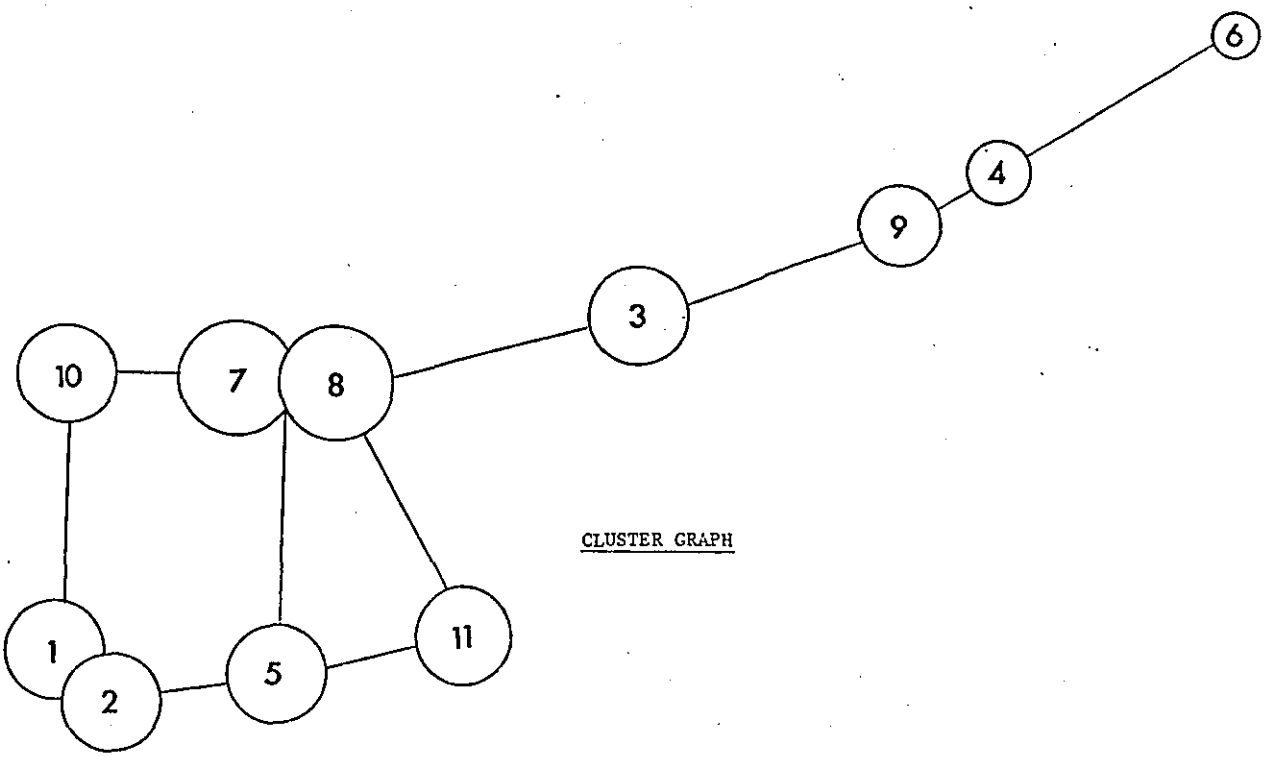
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	formal - informal	5.3		3 - 1		
2	looking forward to - not looking forward to	4.3		4 - 1		
3	interesting - boring	5.3		5 - 3		
4	talkative - receptive	5.9	✓	4 - 3		P2
5	friendly - less friendly	5.4		4 - 3		
6	open - confined	5.6	✓	3 - 1		B2
7	high respect - low	5.4		5 - 4		
8	personal - impersonal	5.6	✓	3 - 1		P3
9	enjoy - not enjoy	3.6		5 - 1		
10	noisy - quiet	2.6		5 - 2		
11						

range 3.3

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row tot.
1		.7	.6	.6	.7	.9	.6	.9	.1	.2		5.3
2	.7		.1	.5	.3	.9	.4	.9	.5	.0		4.3
3	.6	.1		.8	.9	.5	.8	.5	.7	.4		5.3
4	.6	.5	.8		.9	.7	.7	.7	.5	.5		5.9
5	.7	.3	.9	.9		.6	.6	.6	.6	.2		5.4
6	.9	.9	.5	.7	.6		.7	1.0	.2	.1		5.6
7	.6	.4	.8	.7	.6	.7		.7	.3	.6		5.4
8	.9	.9	.5	.7	.6	1.0	.7		.2	.1		5.6
9	.1	.5	.7	.5	.6	.2	.3	.2		.5		3.6
10	.2	.0	.4	.5	.2	.1	.6	.1	.5			2.6
11												



CLUSTER GRAPH

APPENDIX 6 : CUSTOMER FILE

Customer 7 Orientation: Person-centred

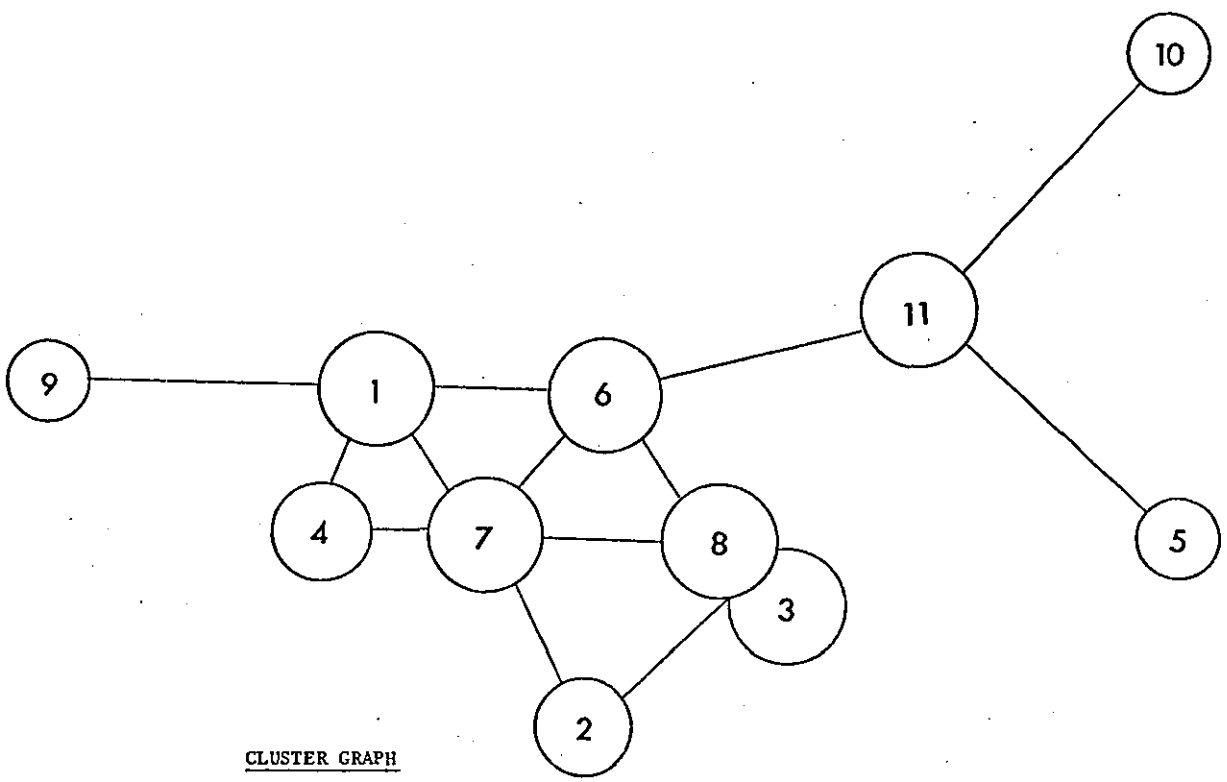
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	formal - friendly	5.1		4 - 2		
2	most frequent - least	4.4		4 - 1		
3	small social distance - large	6.2	✓	5 - 1		P3
4	academic oriented - not	4.2		3 - 2		
5	pally - clinical	2.0	✓	3 - 1		B2
6	material - healthy	6.4		5 - 1		
7	informative - routine	5.7		5 - 2		
8	sexually arousing - turning off	6.2	✓	5 - 1		P2
9	personal - impersonal	4.7		3 - 2		
10	near - far	3.9		5 - 2		
11	most enjoyed - least	4.6		5 - 1		

range 4.4

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		.1	.6	.9	.0	.8	.9	.6	.7	.3	.2	5.1
2	.1		.8	.3	.1	.5	.3	.8	.5	.6	.4	4.4
3	.6	.8		.3	.1	.9	.8	1.0	.6	.5	.6	6.2
4	.9	.3	.3		.1	.6	.8	.3	.4	.4	.1	4.2
5	.0	.1	.1	.1		.3	.1	.1	.3	.2	.7	2.0
6	.8	.5	.9	.6	.3		.9	.9	.5	.3	.7	6.4
7	.9	.3	.8	.8	.1	.9		.8	.6	.1	.4	5.7
8	.6	.8	1.0	.3	.1	.9	.8		.6	.5	.6	6.2
9	.7	.5	.6	.4	.3	.5	.6	.6		.3	.2	4.7
10	.3	.6	.5	.4	.2	.3	.1	.5	.3		.7	3.9
11	.2	.4	.6	.1	.7	.7	.4	.6	.2	.7		4.6



CLUSTER GRAPH

Customer 8 Orientation: Person-centred

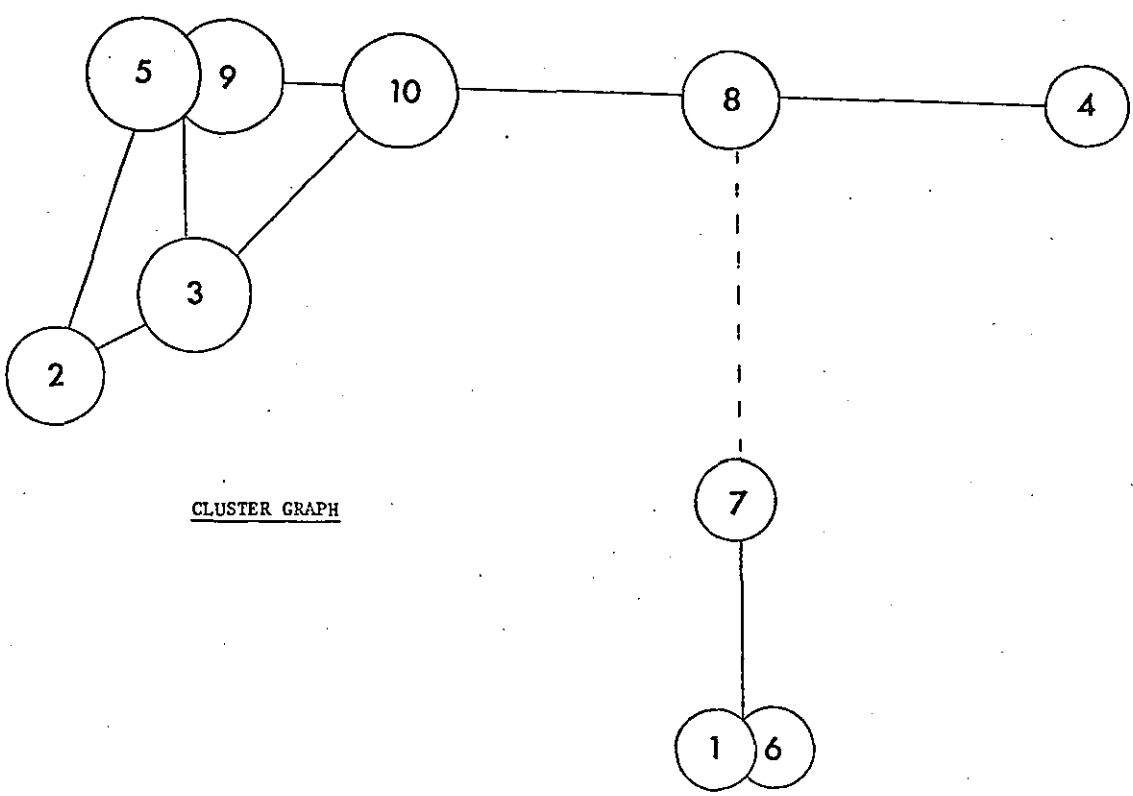
constructs table

construct number	nature of construct	row total	dominant	most enjoyed to least enjoyed swing	sensitive	classification
1	serious - flirting	3.5		5 - 3		
2	work - leisure	4.2		5 - 3		
3	formal - informal	4.6		5 - 2		
4	frustration - relief	2.5		4 - 2		
5	enjoyable - unenjoyable	6.5	✓	5 - 1		P4
6	masculine - feminine	3.6		5 - 3		
7	hurried - leisurely	3.3		3 - 2		
8	convenient - inconvenient	3.1		4 - 1		
9	consultant appealing - unappealing	4.8		5 - 1	✓	P2
10	consultant fed up - not fed up	4.8		5 - 1	✓	P2
11						

range 4.0

construct matrix

	1	2	3	4	5	6	7	8	9	10	11	row total
1		.3	.4	.4	.3	1.0	.7	.1	.3	.1		3.5
2	.3		.9	.4	.7	.3	.2	.1	.7	.6		4.2
3	.4	.9		.3	.9	.4	.1	.0	.9	.7		4.6
4	.4	.4	.3		.0	.4	.1	.7	.0	.2		2.5
5	.3	.7	.9	.0		.3	.3	.4	1.0	.9		6.5
6	1.0	.3	.4	.4	.3		.7	.1	.3	.1		3.6
7	.7	.2	.1	.1	.3	.7		.6	.3	.6		3.3
8	.1	.1	.0	.7	.4	.1	.6		.4	.7		3.1
9	.3	.7	.9	.0	1.0	.3	.3	.4		.9		4.8
10	.1	.6	.7	.2	.9	.1	.6	.7	.9			4.8
11												



CLUSTER GRAPH

APPENDIX 7: QUESTIONNAIRE FOR INTERVIEW WITH THE ESTATE AGENT

What proportion of Customers, roughly, have you come across in the past who displayed the following characteristics when looking for and/or buying a house:-

Please tick the right box alongside each description.

The Customers:

1. came in with exactly defined needs (e.g. price, number of rooms, location, etc.) and got a house exactly as specified

- ◯ None
- ✓ Not very many
- ◯ Some
- ◯ Quite a few
- ◯ Many
- ◯ The vast majority

2. came in with exactly defined needs and left when they could not have these met

- ◯ None
- ◯ Not very many
- ◯ Some
- ◯ Quite a few
- ✓ Many
- ◯ The vast majority

3. came in wanting a house but knowing very little if at all about the whole business of House-selecting and House-buying

- ◯ None
- ◯ Not very many
- ◯ Some
- ◯ Quite a few
- ◯ Many
- ✓ The vast majority

4. came in without any idea and they formed their ideas as they went along resulting in the final selection

- ◯ None
- ✓ Not very many
- ◯ Some
- ◯ Quite a few
- ◯ Many
- ◯ The vast majority

5. came in with some idea and they built up the final picture by taking on, altering or dispensing ideas as they went along

- ◯ None
- ◯ Not very many
- ◯ Some
- ✓ Quite a few
- ◯ Many
- ◯ The vast majority

6. whose needs kept on chopping and changing

- ◯ None
- ◯ Not very many
- ◯ Some
- ◯ Quite a few
- ✓ Many
- ◯ The vast majority

7. who were not clear themselves what they wanted

- ○ None
- ✓ Not very many
- ○ Some
- ○ Quite a few
- ○ Many
- ○ The vast majority

8. who just could not decide on a house mainly because
   - a ○ too wide a selection
   - b ○ many attractive options
   - c ○ they were the types who could not decide on anything

a	b	c	
○	○	○	None
✓	✓	○	Not very many
○	○	○	Some
○	○	✓	Quite a few
○	○	○	Many
○	○	○	The vast majority

9. came in with too wide a specification on which any particular selection could be made, so the specification had to be narrowed down

- ○ None
- ○ Not very many
- ○ Some
- ○ Quite a few
- ✓ Many
- ○ The vast majority

10. came in with too exact a specification; which had then to be widened in order to facilitate a selection

- ○ None
- ○ Not very many
- ○ Some
- ○ Quite a few
- ✓ Many
- ○ The vast majority

11. who distinctly seemed to prefer making up their minds by talking to you or other officials and preferred personal assistance, to being left on their own with documents and information to read

- ○ None
- ○ Not very many
- ○ Some
- ○ Quite a few
- ✓ Many
- ○ The vast majority

12. who distinctly seemed to prefer making up their minds by wanting to be on their own with documents and information to read through, rather than be personally assisted by an official

- ◯ None
- ✓ Not very many
- ◯ Some
- ◯ Quite a few
- ◯ Many
- ◯ The vast majority

13. who fell somewhere between the above two (i.e. description 11 and 12)

- ◯ None
- ◯ Not very many
- ✓ Some
- ◯ Quite a few
- ◯ Many
- ◯ The vast majority

14. in summary, please assign rough percentage figures according to the proportion of Customers you meet:

a whose needs remain the same throughout the entire transaction	15 %
b whose needs gradually undergo substantial refinement/changes during the course of the transaction	42½ %
c whose needs gradually undergo slight refinement/changes during the course of the transaction	42½ %
Total	100 %

Comments:

Please describe any other features about house buying Customers which I have not tackled but which you feel would be relevant in a study of their decision-making styles. Any other comments would also be welcome.

1. "If you compared the final house they buy with what they set out to buy in the first place, you wouldn't believe your eyes". And not necessarily because they couldn't get what they wanted to.

2. "Some stick to their guns right the way through."

3. Computer systems have not worked because
   1) have not accounted for the personal choice element
   2) straightforward retrieval has been impractical.
   3) in many cases, the system either "output 1 house, or something like 40 houses. In either case, the customer would be left somewhat dissatisfied."

APPENDIX 8 : Transcripts of the System- and Customer-centred Programs

```
SUBJECT          ?CUSTOMER24/FIXFAC
ENTER FACTORS
A.               ?TYPE
B.               ?FLOORS
C.               ?HEATING
D.               ?BUILT
E.               ?GARAGE
F.               ?BEDROOMS
G.               ?LOUNGE
H.               ?BATHROOM
I.               ?KITCHEN
J.               ?OTHER/ROOMS
K.               ?GARDEN
L.               ?PRICE
M.               ?OTHER/FEATURES
N.               ?LOCAM
O.               ?LEASE
P.               ?END


ENTER ATTRIBUTES OF THE FACTORS
A                TYPE ?DET
B                FLOORS ?2
C                HEATING ?GAS/C
D                BUILT ?PRE-1936
E                GARAGE ?DBL
F                BEDROOMS ?5
G                LOUNGE ?L
H                BATHROOM ?BATH/WC
I                KITCHEN ?L
J                OTHER/ROOMS ?DINING/LAUNDRY
K                GARDEN ?L
L                PRICE ?20
M                OTHER/FEATURES ?D/G/PHONE
N                LOCAM ?SCHOOL
O                LEASE ?FREE
```

Appendix 8a: Main Stages of a System-Centred Program

```
 NO OF EXAMPLES TO BE SHOWN  ?10R
REF    DETAILS
 9       TYPE(DET) FLOORS(2) HEATING(GAS/C) BUILT(OLD) GARAGE(DBL) BEDROOMS(5) LO
UNGE(M) BATHROOM(DOWN/WC) KITCHEN(M) OTHER/ROOMS(DINING /LAUNDRY) GARDEN(M) PRIC
E(22) OTHER/FEATURES(D/G/PHONE) LOCAM(CHURCH) LEASE(FREE)
 11      TYPE(HOUSE) FLOORS(2) HEATING(GAS/C) BUILT(1930) GARAGE(DBL) BEDROOMS(5
) LOUNGE(M) BATHROOM(BATH/WC) KITCHEN(L) OTHER/ROOMS(DIN ING/LAUNDRY) GARDEN(M)
PRICE(25) OTHER/FEATURES(D/G) LOCAM(SCHOOL) LEASE(99YRS)
 49      TYPE(DET) FLOORS(2) HEATING(MIXED) BUILT(1930) GARAGE(DBL) BEDROOMS(5)
LOUNGE(M) BATHROOM(UP/WC) KITCHEN(L) OTHER/ROOMS(DINING/ OTHER) GARDEN(L) PRICE(
17) OTHER/FEATURES(PHONE) LOCAM(SHOPS) LEASE(99YRS)
 33      TYPE(DET) FLOORS(3) HEATING(MIXED) BUILT(1930) GARAGE(INTEGRAL) BEDROOM
S(6) LOUNGE(L) BATHROOM(BATH/WC) KITCHEN(L) OTHER/ROOMS( DINING/LAUNDRY) GARDEN(
L) PRICE(17) OTHER/FEATURES(D/G/PHONE) LOCAM(SHOPS) LEASE(FREE)
 48      TYPE(SEM,I) FLOORS(2) HEATING(MIXED) BUILT(OLD) GARAGE(DBL) BEDROOMS(4)
 LOUNGE(L) BATHROOM(BATH/WC) KITCHEN(L) OTHER/ROOMS(DINI NG) GARDEN(L) PRICE(15)
 OTHER/FEATURES(D/G) LOCAM(SHOPS) LEASE(99YRS)
 47      TYPE(DET) FLOORS(2) HEATING(GAS/C) BUILT(OLD) GARAGE(INTEGRAL) BEDROOMS
(6) LOUNGE(M) BATHROOM(BATH/WC) KITCHEN(L) OTHER/ROOMS(D INING/LAUNDRY) GARDEN(L
) PRICE(25) OTHER/FEATURES(D/G/PHONE) LOCAM(CHURCH) LEASE(99YRS)
 44      TYPE(DET) FLOORS(2) HEATING(ELEC/C) BUILT(OLD) GARAGE(INTEGRAL) BEDROOM
S(4) LOUNGE(M) BATHROOM(BATH/WC) KITCHEN(L) OTHER/ROOMS( DINING/OTHER) GARDEN(M)
 PRICE(25) OTHER/FEATURES(D/G/PHONE) LOCAM(CHURCH) LEASE(FREE)
 26      TYPE(HOUSE) FLOORS(2) HEATING(MIXED) BUILT(1930) GARAGE(DBL) BEDROOMS(4
) LOUNGE(L) BATHROOM(UP/WC) KITCHEN(L) OTHER/ROOMS(DININ G/OTHER) GARDEN(L) PRIC
E(22) OTHER/FEATURES(D/G/PHONE) LOCAM(SCHOOL) LEASE(FREE)
 41      TYPE(SEM,I) FLOORS(2) HEATING(ELEC/C) BUILT(OLD) GARAGE(INTEGRAL) BEDRO
OMS(4) LOUNGE(L) BATHROOM(DOWN/WC) KITCHEN(L) OTHER/ROOM S(DINING/LAUNDRY) GARDE
N(L) PRICE(25) OTHER/FEATURES(PHONE) LOCAM(SCHOOL) LEASE(FREE)
 43      TYPE(DET) FLOORS(2) HEATING(GAS/C) BUILT(1940) GARAGE(DBL) BEDROOMS(4)
LOUNGE(L) BATHROOM(DOWN/WC) KITCHEN(L) OTHER/ROOMS(DININ G) GARDEN(L) PRICE(15)
OTHER/FEATURES(D/G/PHONE) LOCAM(SHOPS) LEASE(FREE)
 NO OF EXAMPLES TO BE SHOWN  ?END
NEXT OPERATION?
```

```
SUBJECT ?CUSTOMER24/FACTOR
ENTER FACTORS
A.      ?BEDROOMS
B.      ?KITCHEN
C.      ?LOUNGE
D.      ?GARDEN
E.      ?GARDEN/C
F.      ?LOCALITY
G.      ?BATH
H.      ?AGE
I.      ?PRICE
J.      ?AMENITIES
K.      ?LOCATION
L.      ?FURNITURE
M.      ?END
O.K?YES

ENTER ATTRIBUTES OF THE FACTORS
A       BEDROOMS? 3
B       KITCHEN? CUM/L
C       LOUNGE? L
D       GARDEN? L
E       GARDEN/C? TREES
F       LOCALITY? POPULATED
G       BATH? L
H       AGE? OLD
I       PRICE? 15 TO 25
J       AMENITIES? SHOPS/SCH/CHURCH
K       LOCATION? OUT/S
L       FURNITURE? BUILT-IN/CUP-B
O.K?NO
?A 3 OR 6
?FACTORS
ENTER FACTORS
M       ?TRANSPORT
N       ?MODCONS
O       ?END
M       TRANSPORT? BUS
N       MODCONS? PHONE
O.K?YES

ENTER CONSTRAINTS
A? NOT LOCALITY(REMOTE)
B?END
O.K ?YES
```

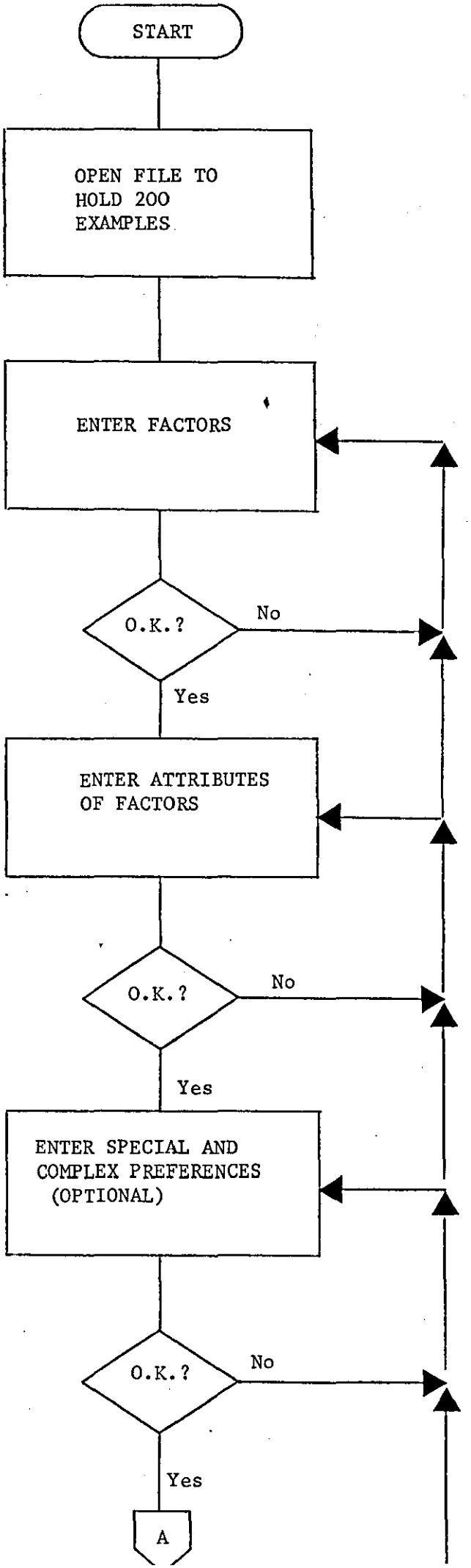
Appendix 8c: The Formulation of Needs Stages in the Customer-centred Program

```
RANK RATE OR EQUAL ?
RATE
IDENT    FACTOR
A        BEDROOMS(5 OR 6)
B        KITCHEN(CUM/L)
C        LOUNGE(L)
D        GARDEN(L)
E        GARDEN/C(L)
F        LOCALITY(POPULATED)
G        BATH(L)
H        AGE(OLD)
I        PRICE(15 TO 25)
J        AMENITIES(SHOPS/SCH/CHURCH)
K        LOCATION(OUT/S)
L        FURNITURE(BUILT-IN/CUP-B)
M        TRANSPORT(BUS)
N        MODCONS(PHONE)
O        NOT LOCALITY(REMOTE)
RATE THE FOLLOWING
IDENT
A?10
B?10
C?10
D?10
E?5
F?10
G?10
H?5
I?10
K?5
L?5
M?5
N?5
O?5
O.K.?YES
```

Appendix 8d: Weighting the Objectives in the Customer-centred Program

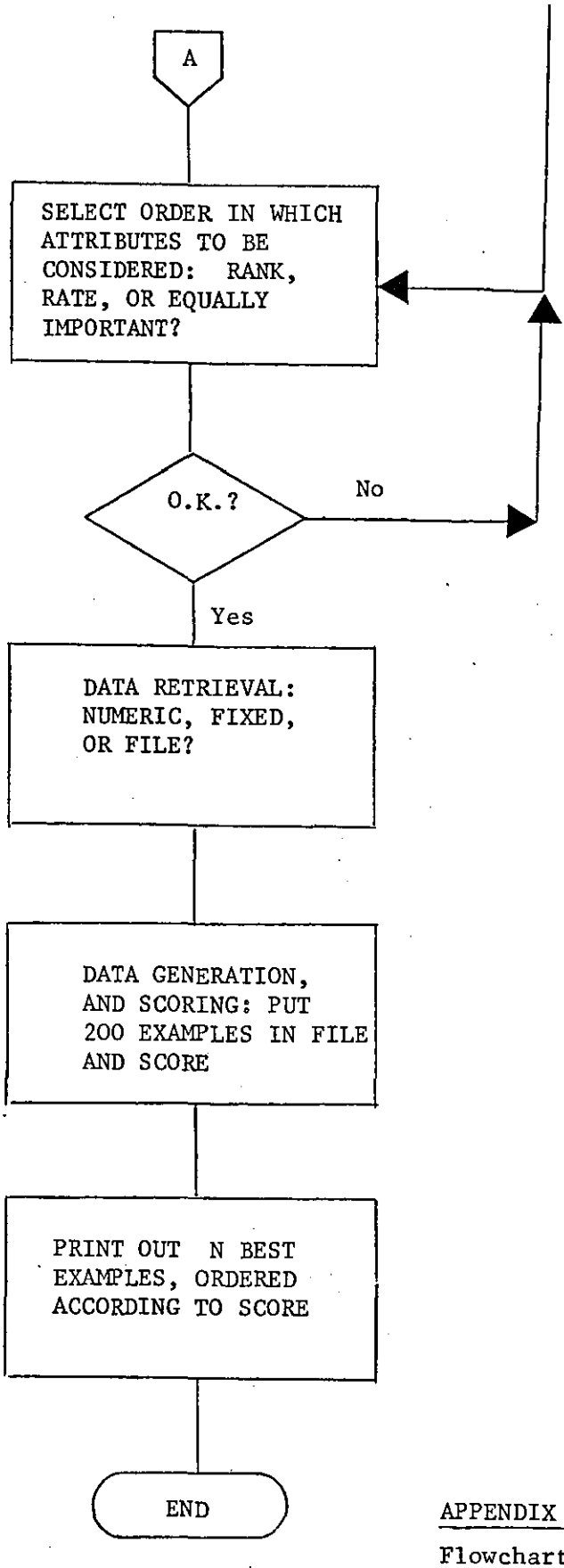
```
NO OF EXAMPLESTO BE SHOWN ?10
REF          SCORE          DETAILS
 11           70            BEDROOMS(6) KITCHEN(CUM/L) LOUNGE(L) GARDEN(L) GARDEN/C(
TREES) LOCALITY(SO-SO) BATH(L) AGE(MOD) PRICE(22) AMENITIES(SCH/CHURCH) LOCATION(
OUT/S) FURNITURE(SOME) TRANSPORT(BUS) MODCONS(PHONE)
 26           65            BEDROOMS(6) KITCHEN(SEP) LOUNGE(L) GARDEN(L) GARDEN/C(TR
EES) LOCALITY(OK) BATH(L) AGE(MOD) PRICE(16) AMENITIES(SHOPS) LOCATION(OUT/S) FUR
NITURE(SOME) TRANSPORT(BUS) MODCONS(PHONE)
 9            65            BEDROOMS(6) KITCHEN(CUM/L) LOUNGE(L) GARDEN(L) GARDEN/C(
PLOT) LOCALITY(SO-SO) BATH(M) AGE(OLD) PRICE(15) AMENITIES(SHOPS/CHURCH) LOCATION
(OUT/S) FURNITURE(BUILT-IN/CUP-B) TRANSPORT(BUS) MODCONS(PHONE)
 47           60            BEDROOMS(3) KITCHEN(CUM/L) LOUNGE(L) GARDEN(L) GARDEN/C(
TREES) LOCALITY(OK) BATH(L) AGE(NEW) PRICE(15) AMENITIES(SHOPS/CHURCH) LOCATION(S
UBURB) FURNITURE(SO-SO) TRANSPORT(TRAIN) MODCONS(PHONE)
 40           60            BEDROOMS(6) KITCHEN(SEP) LOUNGE(L) GARDEN(L) GARDEN/C(TR
EES) LOCALITY(POPULATED) BATH(M) AGE(OLD) PRICE(15) AMENITIES(SCH/CHURCH) LOCATIO
N(SUBURB) FURNITURE(SO-SO) TRANSPORT(TRAIN) MODCONS(D/G)
 37           60            BEDROOMS(6) KITCHEN(SEP) LOUNGE(L) GARDEN(M) GARDEN/C(TR
EES) LOCALITY(POPULATED) BATH(L) AGE(SEMI) PRICE(15) AMENITIES(SCH/CHURCH) LOCATI
ON(SUBURB) FURNITURE(SOME) TRANSPORT(NO) MODCONS(PHONE)
 20           60            BEDROOMS(4) KITCHEN(CUM/L) LOUNGE(L) GARDEN(L) GARDEN/C(
VEG) LOCALITY(POPULATED) BATH(M) AGE(SEMI) PRICE(25) AMENITIES(SHOPS) LOCATION(OU
T/S) FURNITURE(SOME) TRANSPORT(BUS) MODCONS(PHONE)
 8            60            BEDROOMS(6) KITCHEN(CUM/M) LOUNGE(L) GARDEN(L) GARDEN/C(
TREES) LOCALITY(POPULATED) BATH(M) AGE(OLD) PRICE(22) AMENITIES(SCH/CHURCH) LOCAT
ION(OUT/S) FURNITURE(SOME) TRANSPORT(NO) MODCONS(PHONE)
 4            60            BEDROOMS(3) KITCHEN(CUM/L) LOUNGE(L) GARDEN(L) GARDEN/C(
PLOT) LOCALITY(POPULATED) BATH(M) AGE(OLD) PRICE(25) AMENITIES(SHOPS/SCH) LOCATIO
N(SUBURB) FURNITURE(BUILT-IN/CUP-B) TRANSPORT(BUS) MODCONS(D/G)
 39           55            BEDROOMS(3) KITCHEN(CUM/L) LOUNGE(L) GARDEN(M) GARDEN/C(
VEG) LOCALITY(POPULATED) BATH(L) AGE(OLD) PRICE(25) AMENITIES(SCH/CHURCH) LOCATIO
N(SUBURB) FURNITURE(SOME) TRANSPORT(NO) MODCONS(D/G)
NO OF EXAMPLES TO BE GENERATED ?END
```

APPENDIX 9: FLOWCHART REPRESENTATION OF SYSTEM



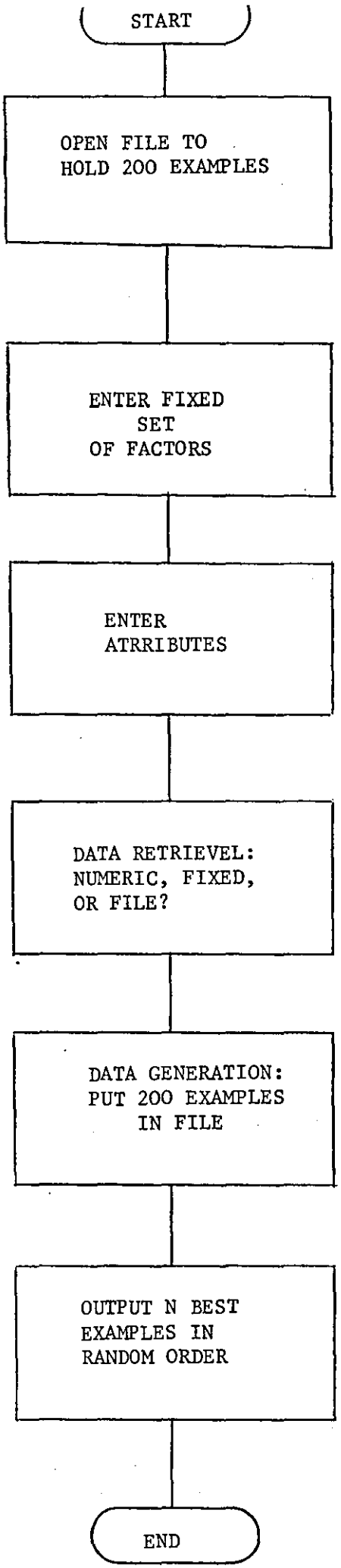
APPENDIX 9A:

Flowchart representation of System designed on Customer centred Task Interpretation



APPENDIX 9A (continued)

Flowchart representation of System designed on Customer-centred Task Interpretation



APPENDIX 9B:

Flowchart representation of System designed on System-centred Task Interpretation

APPENDIX 10: THE QUESTIONNAIRE FOR THE EXPERIMENT

PART A

Please fill in

Sex ☐ Marital Status ☐ Age ☐

Occupation: _____

1. From experience and/or expectations please tick the box that describes better your view regarding the following aspects of Estate Agents in general:

They are helpful	☐	☐	They are unhelpful
They guide badly	☐	☐	They guide well
They cannot be trusted	☐	☐	They can be trusted
They have a sophisticated approach to the assessment Customers' needs	☐	☐	They have a clumsy approach to the assessment of the Customers' needs
They lack adequate facilities to aid Customers	☐	☐	They provide ample facilities to help the customers
They do their best in their conduct with Customers	☐	☐	They can definitely improve their conduct with Customers

A SMALL SAMPLE OF HOUSE-SELECTING ASPECTS WITH TWO ALTERNATIVE OBJECTIVES ARE GIVEN BELOW. INDICATE YOUR PERSONAL PREFERENCES BY WRITING APPROPRIATE FIGURES IN THE BOXES TO THE RIGHT OF EACH ASPECT. FOR EACH ASPECT YOU HAVE THREE POINTS THAT YOU MAY DISTRIBUTE. FOR EXAMPLE

If you agree with (b) but not with (a), then: [0] a [3] b

OR

If you have a slight preference for (a) over (b), then [2] a [1] b

1. Where the entire transaction from start to finish
   a) is accomplished in record time without any deviations from, or interruptions in, the task at hand.
   b) involves a lot of social conversation not necessarily only related to House-buying.

   [ ] a [ ] b

2. A kind of house-buying which involves
   a) varied meetings with lots of different people.
   b) the least number of meetings with the different people involved.

   [ ] a [ ] b

3. I would try and conduct my house-selecting exercise, in such a way that at the end of the period,
   a) looking back on it, I could say "now that was a memorable experience which I enjoyed doing"!
   b) looking back on it, I would not attach any special feeling to the whole exercise, as long as I got the house I wanted!

   [ ] a [ ] b

PART B

Please tick the appropriate box for each statement that applies to you.

1. I have not, to date, owned a house. ☐

2. I own the house I live in. ☐

3. The last time I was involved in house-hunting or house-selecting was -

- 1 year ago ☐
- 6 months ago ☐
- 5 months ago ☐
- 4 months ago ☐
- 3 months ago ☐
- 2 months ago ☐
- 1 month ago ☐
- 1-3 weeks ago ☐

4. I am currently involved in house-hunting or house-selecting. ☐

5. I have never been involved in house-hunting or house-selecting. ☐

6. In a typical house-hunting enquiry I would look for the following qualities in both the service I receive as well as the person serving me:

   Please rank in order of importance, most important first.

- concise ☐
- interesting ☐
- friendly ☐
- accurate ☐
- personal ☐
- quick ☐

PART C

YOU HAVE JUST COMPLETED HOUSE-SELECTING VIA 2 APPROACHES. TO HELP US ESTABLISH THE SUITABILITY OF CERTAIN FEATURES INCORPORATED IN THE 2 APPROACHES, PLEASE TICK THE RELEVANT STATEMENTS THAT FOLLOW, TO RECORD YOUR PREFERENCES.

PLEASE STUDY ALL THE ALTERNATIVES BEFORE TICKING THE BOX OF YOUR CHOICE.

WHEREVER NECESSARY, THE RELEVANT PORTIONS OF THE 2 PROGRESS-SHEETS WILL BE PROVIDED TO ENABLE YOU TO COMPARE BETWEEN THE TWO.

1. I would prefer (Tick a or c. If you feel b is also appropriate, tick b as well)

   a) to come up with my own factors (e.g. PRICE, HEATING, etc.) in my own way ☐

   b) to come up with my own factors perhaps helped by a guideline containing examples of factors commonly attributed to House-selecting. ☐

   c) not to come up with any factors myself but to accept a short list of factors that the Computer put before me as the ones on which I should base my objectives. ☐

2.i) I would prefer (Tick a or c. If you feel b is also appropriate, tick b as well)

   a) to specify these factors in my own way (e.g. to PRICE, I would say £10,000, to HEATING, I would say GAS-CENTRAL etc.) ☐

   b) to specify these factors in my own way but perhaps helped, wherever necessary, by a guideline containing a few examples of the kind of attributes one could have ☐

   c) to specify these factors by selecting one attribute from a short-list of alternative attributes that the Computer attached to each factor. ☐

2.ii) I would prefer (tick one box only)

   a) to have one attribute only per factor to keep things 'nice and simple' (e.g. to TYPE? ... COTTAGE). ☐

   OR

   b) the option to have more than one attribute per factor as I am quite likely to have more than one preference (e.g. to TYPE? .. COTTAGE OR BUNGALOW). ☐

3.i) When all the factors have been specified with relating attributes,

I would prefer — Tick one box only

a) a further facility to state any special preferences I might have i.e. my house MUST have this or must NOT have that, as I am quite likely to have a number of these ☐

OR

b) not to have a further facility to state special preferences, as this would be an unnecessary complication ☐

3.ii) I would prefer — Tick one box only

a) not having a facility to change/revise/redefine my objectives whenever I wanted to, to keep things 'nice and simple' ☐

OR

b) having a facility to change/revise/redefine my objectives whenever I wanted to, as I would be more likely to arrive at a truer picture of my objectives, in this way ☐

3.iii) I would prefer — Tick one box only

a) having a facility to combine objectives or to have conditional objectives,
e.g. to be able to say:
If house type A exists, then preferred no. of rooms = 3
If house type B exists, then preferred no. of rooms = 6 ☐

OR

b) having all the objectives treated separately and without relation to other objectives.
e.g. House type A (whatever the other factors)
No. of room 3 (whatever the other factors)
Price £12,000 (whatever the other factors) ☐

4. I would prefer — Tick one box only

a) the Computer to carry out the search based on the objectives ranked or rated in the order of importance with which I hold them ☐

OR

b) the Computer to carry out the search based on the objectives assumed as being equally important ☐

5.i) When I am provided with the final selection of houses based on my objectives: — Tick one box only

I would prefer

a) a jumbled-up selection, i.e. a selection which was not ordered in any priority to suggest the degree of match with my own objectives ☐

OR

b) an ordered selection, i.e. a selection ordered according to the degree of match each selected house offered with my own objectives, the degree of match depicted by a score attached to each selected house ☐

Tick one box only

5.ii) a) In the event where there was no house available that met all my objectives, I would prefer a selection of the next best houses, rather than no selection at all. ☐

OR

b) In the event where there was no house available that met all my objectives, I would prefer no selection at all, rather than a selection of the next best houses. ☐

6. Without actually going by the details contained in the examples listed in the 2 selections, please study the 2 selections provided to fill in the following statement:-

I would feel much more confident basing my decision on Selection _____, than on Selection _____.

7a. Please study the 2 Progress Sheets to fill in the following statement:-

All in all, I felt much happier on the House-selecting exercise with Approach _____, than with Approach _____.

Why?:

7b. Is there any slight modification that might make the other approach even more attractive to you than the one you felt happier working with?

Yes No

If Yes, What?:

APPENDIX 11: HANDOUT TO THE CUSTOMER IN THE SYSTEM-CENTRED CONDITION

TYPE (Select one from the following alternatives)

Maisonette

Flat

House

Town House

Chalet

Bungalow

Cottage

Terraced

Semi-Det

Detached

FLOORS

1 Floor only

2 floor

3 floor

4 floor

4 +

HEATING (Select one from the following alternatives)

Gas Central

Electric Central

Oil Central

Warm Air Central

Solid Fuel

Mixed

Fire

BUILT (Select one from the following alternatives)

1974 - 1977

1971 - 1973

1960 - 1970

1950 - 1959

1936 - 1949

Pre 1936

GARAGE (Select one from the following alternatives)

Separate

Space

Double

Integral

Block

Car Port

BEDROOMS (Select one from the following alternatives)

1

2

3

4

5

Over 5

LOUNGE

Small

Medium

Large

BATHROOM

Bath only

With WC

Downstairs WC

Upstairs WC

Outside WC

KITCHEN

Small

Medium

Large

OTHER ROOMS (Select which one(s) you would like)

Dining

Reception

Hall

Other

Laundry

GARDEN (Select one from the following alternatives)

Small

Medium

Large

Communal

None

PRICE (Select one from the following alternatives)

£ 5,000

£ 6,000

£ 7,000

£ 8,000

£ 9,000

£10,000

£12,000

£14,000

£16,000

£18,000

£20,000

£25,000

£30,000

£35,000

£40,000

£50,000

OTHER FEATURES (Select which one(s) you would like)

Double Glazed

Telephone

Cul de Sac

Lift

LOCAL AMENITIES (Select one from the following alternatives)

Shops

School

Station

Bus-Coach

River Front

Recreation

LEASE (Select one from the following alternatives)

20 years

99 years

Freehold

APPENDIX 12: SEX, AGE, AND OCCUPATION OF HOUSE-HUNTING CUSTOMERS

Customer	Sex	Age	Occupation	Customer	Sex	Age	Occupation
1	M	24	Salesman	22	M	24	School Teache
2	F	24	School Teacher	23	F	34	Secretary
3	F	25	Bank Clerk	24	F	35	Housewife
4	M	27	Artist	25	F	21	Secretary
5	F	25	Fashion De Designer	26	M	27	Development/ Engineer
6	M	25	Car Salesman	27	F	34	Housewife
7	F	23	VDU Operator	28	F	27	Housewife
8	F	21	College Student	29	F	36	Housewife
9	M	25	College Lecturer	30	F	37	Librarian
10	F	19	IBM Composer Operator	31	M	19	Coalminer
11	M	23	Sheet Metal Worker	32	M	43	University Lecturer
12	F	31	Secretary	33	F	70	O.A.P.
13	M	37	Car Mechanic	34	F	24	Secretary
14	M	22	School Teacher	35	F	31	College Lecturer
15	M	29	Clockmaker	36	F	20	College Student
16	M	30	Writer	37	M	25	Printer
17	F	33	Secretary	38	F	25	Fashion Designer
18	F	41	Housewife	39	M	25	Publishing Officer
19	M	41	Managing Director	40	M	22	Librarian
20	F	31	Barmaid	41	F	24	Librarian
21	F	21	Married Student	42	M	24	Milkman

APPENDIX 13: DETAILED CUSTOMER FINDINGS

APPENDIX 13: DETAILED CUSTOMER FINDINGS (PART A)

Experienced Customer	Non-experienced Customer	Ranked Preferences for Person and Efficiency Qualities: concise	interesting	friendly	accurate	personal	quick	Person to Efficiency Ratio	Person-centred Customer	Efficiency-centred Customer	Answers to Questions (Part C of Questionnaire, Appendix 8): Q.1 a: Customer-generated factors	Q.1 b: factor guideline	Q.1 c: computer-generated factors	Q.2i a: customer-generated attributes	Q.2i b: attribute guideline	Q.2i c: computer-generated attributes	Q2ii a: one attribute only per factor	Q2ii b: optional attributes	Q3i a: special preferences	Q3i b: no special preferences	Q3ii a: not to redefine objectives	Q3ii b: redefine objectives	Q3iii a: complex preferences	Q3iii b: no complex preferences	Q.4 a: ranked or rated objectives	Q.4 b: equally important objectives	Q5i a: unordered selection	Q5i b: ordered selection
	*	3	5	6	2	1	4	9:12		*	*					*		*	*			*	*		*			*
	*	3	5	6	2	4	1	6:15		*		*	*		*	*		*	*			*		*	*		*	
	*	5	1	3	4	2	6	15:6	*		*	*				*		*	*			*		*	*			*
	*	3	5	2	1	6	4	8:13		*	*	*				*	*		*			*	*		*			*
	*	5	6	1	3	2	4	12:9	*		*			*			*		*			*	*		*			*
*		4	6	1	3	5	2	9:12		*			*			*		*	*			*	*			*		*
	*	5	1	4	2	6	3	10:11		*		*	*		*	*	*		*		*		*				*	*	
	*	3	6	2	1	5	4	8:13		*	*	*		*	*			*	*			*	*				*	*	
*		2	6	3	1	5	4	7:14		*		*	*	*	*			*	*			*	*			*			*
*		3	1	2	4	6	5	12:9	*		*			*	*			*	*			*	*				*	*	
*		5	3	4	2	6	1	8:13		*		*	*		*	*	*		*			*	*			*			*
*		6	4	1	3	2	5	14:7	*		*	*		*	*		*		*			*	*				*	*	
*		2	6	1	3	5	4	9:12		*	*	*			*	*		*	*			*	*			*			*
	*	2	3	5	6	4	1	9:12		*			*			*		*	*			*		*			*	*	
	*	2	5	6	1	4	3	6:15		*			*		*	*	*			*	*	*		*			*	*	
*		2	6	5	1	4	3	6:15		*	*	*		*	*			*	*			*	*		*				*
*		1	5	4	2	6	3	6:15		*	*			*				*	*			*		*		*			*
*		3	6	5	1	4	2	6:15		*	*	*		*				*	*			*	*				*	*	
*		2	1	6	3	5	4	9:12		*			*	*				*	*			*		*			*	*	
*		3	4	5	1	6	2	6:15		*	*			*				*	*			*		*		*			
	*	4	1	6	2	3	5	11:10	*		*	*		*	*			*	*			*	*			*			*

APPENDIX 13: PART A continued

Customer Number	Experienced Customer	Non-experienced customer	Ranked Preferences for Person and Efficiency Qualities						Person to Efficiency Ratio	Person-centred Customer	Efficiency-centred Customer	Answers to Questions (Part C of Questionnaire, Appendix 8)																			
												Q.1			Q.2i			Q2ii		Q3i		Q3ii		Q3iii		Q.4		Q5i	
												a	b	c	a	b	c	a	b	a	b	a	b	a	b	a	b	a	b
			concise	interesting	friendly	accurate	personal	quick				Customer-generated factors	factor guideline	computer-generated factors	customer-generated attributes	attribute guideline	computer-generated attributes	one attribute only per factor	optional attributes	special preferences	no special preferences	not to redefine objectives	redefine objectives	complex preferences	no complex preferences	ranked or rated objectives	equally important objectives	unordered selection	ordered selection
22		*	3	4	2	1	6	5	9:12		*	*	*				*		*	*			*	*		*		*		
23	*		4	3	5	1	2	6	11:10	*		*	*		*	*			*		*		*		*		*			
24	*		2	6	3	1	4	5	8:13		*		*	*		*	*			*		*		*		*				*
25		*	5	3	4	2	6	1	8:13		*			*		*	*			*	*	*				*				*
26		*	4	5	3	1	6	2	7:14		*	*	*				*	*		*			*		*	*				*
27	*		4	5	3	1	2	6	11:10	*		*	*		*	*			*	*				*	*		*			*
28	*		3	5	2	1	4	6	10:11		*	*	*		*	*			*	*				*		*	*			*
29	*		6	5	4	2	1	3	11:10	*		*			*			*		*		*			*	*				*
30	*		6	5	3	1	2	4	11:10	*		*	*		*	*			*	*				*	*		*			*
31		*	6	4	3	1	5	2	9:12		*	*	*		*	*			*	*				*	*		*			*
32	*		2	6	3	1	5	4	7:14		*	*					*		*	*		*			*	*				*
33	*		4	6	3	2	1	5	11:10	*		*	*		*	*		*		*				*	*			*		*
34	*		5	3	2	1	6	4	10:11		*	*	*		*	*			*	*				*	*		*			*
35	*		2	3	4	1	5	6	9:12		*	*	*		*	*			*	*				*		*	*			*
36		*	2	4	3	1	5	6	9:12		*	*	*		*				*		*			*	*		*			*
37		*	2	4	1	6	5	3	11:10	*		*	*		*	*			*	*				*		*	*			*
38		*	2	6	3	1	5	4	7:14		*		*	*		*	*	*		*				*		*		*	*		
39		*	2	6	4	1	3	4	10:11		*	*	*		*	*			*	*				*		*	*		*		
40		*	6	5	2	1	3	4	11:10	*		*	*		*	*			*	*				*	*		*			*
41		*	5	3	2	1	6	4	10:11		*	*	*				*		*	*		*			*		*			*
42		*	4	5	6	1	2	3	8:13		*	*	*		*			*		*			*	*		*				*

more confident with			overall preference for				
Customer-centred Selection	System-centred Selection	Reasons	Customer-centred Technology	System-centred Technology	Reasons	Aids that would improve non-preferred technology	Aids
	*	Itemizing		*	easier, less danger of missing out important factors		
	*			*	find it easier to choose from, rather than think up	*	guideline
*			*		because I can see at a glance what I am looking for, and knowing what I am looking for, I would decide more easily		
*			*		better chance of your ideals met, personalized, individual-centred, concise		
*			*		took account of personal details		
*			*		deals with me personally		
	*	it told me what I should look at		*	more to choose from, better organised		
	*	a more complete list		*	easy, already defined, clearer, more elaborate version of other approach		
*		more detailed	*		generally better		
*			*		enabled me to state my own objectives		
*			*		more detailed account of my requirements		
*			*		personal preference		
*			*		customer details fed in rather than fixed program submitted to customers		
	*			*	felt more at ease and sure		
	*			*	more concise "came on the right wavelength" generally suited me much better		
*			*		preferred thinking through the problem, the other approach imposed a structure which was at times artificial to my situation		
*			*		truer picture of house I require		
*			*		more searching, more descriptive		
*				*	easier	*	flexibility
*		registers quicker, more familiar		*	more efficient mentally "one can get confused after long deep descriptive views and therefore perhaps make the wrong choice of house"		
*			*		more efficient, as I wouldn't have to look at houses which only might be suitable		
	*	predefined listing more thorough		*	enabled me to select, at the same time not miss out, important factors	*	attribute guide
*		takes notice of my own requirements	*		freedom of choice, possibility of changing mind		
	*	more information		*	easier, factors already listed for you		

*			*		more personal details accounted for		
	*	more precise		*	less danger of overlooking something; options I had missed out (more than one option would have been nice)		
*			*		more flexibility in choosing factors (only this version took full account of our particular needs)		
*		my own constraints applied	*		the other not flexible enough, too narrow for such an important transaction, also forced response		
*			*		"I was choosing from my own experience in the light of previous experience, and knowledge of present needs"		
*			*		difficult to explain, more thorough		
	*			*	easier to choose from given list, also with the other version, might miss out	*	guideline
	*	can identify more clearly the form of the house	*		greater flexibility and qualification	*	more factors
*			*		definitions of my own choice		
*			*		open, relaxed, less regimented		
	*		*		the other didn't allow for certain features, too narrow, forced response	*	wider selection of alternatives
	*	contains factors which otherwise may have been missed	*		more flexible, personalized		
*			*		I could specify exactly what I wanted, I was not limited, and made me think more		
	*	might miss important factors with the other		*	List helpful to look at and choose from		
	*	gives much greater information	*		more flexible, "the customer who is buying a house is not looking for everything, but more of a home"		
*		arrived at through my own conditions	*		allowed to specify my own factors		
	*	more detailed		*	includes items I may not have thought of otherwise		
	*	comprehensive		*	"given the naive and minimal needs of a first time buyer, and a case for objective helpful estate agent," this approach "wisest and more comprehensive"		

APPENDIX 13: DETAILED CUSTOMER FINDINGS (PART B)

APPENDIX 14: LIST OF FACTORS ELICITED BY 42 CUSTOMERS

House Type
- Storeys
- Size
- Style/Character
- Age

Location

Distance to Work

Locality/Neighbourhood

Local Amenities

Situation
- Setting
- Sun Factor
- View
- Drive

Structure

Condition

Development Plans

Improvement/Extension ?

Price

Heating
- Heat
- Type
- Fire
- Ventilation

Bedrooms

Rooms
- General
- Master Bedroom
- Study
- Utility
- Attic
- Cellar
- Extra Rooms
- Hall
- Porch
- Dining
- Dining/Kitchen
- Lounge
- Loung/Dining

Bathroom

Shower

W.C.

Cloakroom

Other

Kitchen
- Size
- Style
- Heat
- Worktop
- Cold Store
- Pantry

Breakfast Room

Furniture/Fittings
- Mod cons
- Built-in Cupboards
- Laundry Cupboard
- Double-glazing
- French windows
- Door
- Patio
- Railing
- Stairway/Steps
- Phone
- Wardrobe
- Carpets

Garden
- Size
- Condition
- Fence
- Overlooked ?
- Land
- Outhouse
- Shed
- Stables
- Greenhouse

Garage
- Situation
- Size
- Style

Lease

Possession

School Catchment