Chapter 2  Literature Review

2.1  Introduction
This research arises from a background of technology studies, especially the idea of the social shaping of technology (SST) (Williams and Edge, 1996). SST places the analysis of technology in a social environment, and also asks that we understand all social relationships in the context of the material and technical world, which permeates the cultural and social. A particular area of technologies studies that inspired this research looks at media communication and information technologies in the home, and this was the basis of the research questions and design. However during the course of the five year study a great deal of literature from outside this discipline was brought in: from cultural studies, consumer research, diffusion of innovation research, leisure studies, urban and community sociology and many more. I also took part in other parallel studies that covered similar issues, bringing in new insights to research questions. This chapter introduces some of this literature, its theories and findings in a way that will inform the reading of the empirical work presented in the following chapters. This review was written after the field study and analysis, so the comment and development of the ideas is not only a reflection on the literature, but also on insights from the study.

2.2  Engaging with the Information Society
The new arrival of multimedia technologies including the Internet, mobile and telephony services, and their various applications are part of a revolution similar those that occurred at earlier innovative periods that saw the development of stream power, antibiotics, electricity, radio and television, the internal combustion engine, and the telephone. These established technologies all appear to have provoked considerable changes in society and in our everyday lives. However, they all emerged within a period of considerable social change, and many histories have shown how events and situations pushed forward the development and adoption of technologies that met the demands of the time. Today we are in a similar situation. Technology is associated with many aspects of social and economic change today, but unravelling cause and effect is arguably an impossible task. Instead we have to
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refocus, and see the process as ‘sociotechnical’ change. We are all being asked to accept change in our lives and business. Producers of products and services have to realise that society is changing and they must produce products and services to satisfy citizens and consumers in the 21st century.

Many innovations affect our lives. Sometimes we have a choice about how we engage with them – we can choose to adopt a technology or use it in a particular way. In many other cases we have no choice – we can not afford it, someone else adopts on our behalf, or we are obliged to learn new skills and adapt to the demands of modern life by using new products. However, although we may often be under pressure, the way we appropriate is shaped by our local environment and relationships, and our everyday activities and interests, and personal life goals and themes. The study of consumption of technology is the study of how we engage with innovations, what they come to mean to us, and how we negotiate the way they shape our lives. It looks at how we appropriate the products of industry and try and make them our own. Industry needs to understand what sense products and services make once they ‘get out there’, so they can exploit the consumer experience of our services and products. Consumers or users innovate as well as producers, and the problem of accepting change applies to everyone whether they design or use a product. Consumers, at home, at work, can be more aware of the different ways innovations are consumed and reinvented, and play a more active role in the change process, making innovation work for them.

2.3 The Consumption of Technology

Consumption of technology has become an important part of understanding the place of technology in society. Apart from its intrinsic interest, understanding consumption is important to understanding the entire innovation process, particularly in open markets. Consumers play an important role in the selection and innovation of products that feeds into the innovation cycle, especially in the formative stages of their development (Collinson, 1993), just as industrial users innovations are key to product development and diffusion (Fleck, 1988)²

A basic definition of consumption is the selection, acquisition, use, maintenance, repair and disposal of goods and services. This only a framing definition; I wish to
include the use of media content, and ideas such as repair and disposal cannot really be applied to services or media in any sensible way. Indeed ‘consumption’ may not be the most appropriate phrase to cover all these activities, especially as it implies the ‘devouring’ of goods, and many of the products are not consumables, but capital equipment or consumer ‘durables’. Nonetheless, consumption is useful as a label for many activities and dimensions of the innovation process which are not included in the concept of production.

Consumption has been an issue which until recently has been largely ignored by most academic disciplines. It has been widely defined as an economic activity, in which the consumer is the passive object of the producer. It has never had a positive or sophisticated image. Academics are not only ones who have a particular view of consumers. Industry generally treats consumers as a people to be categorised and exploited. The main business of companies, and the focus of most efforts is on the design and production process – dealing with technology, management, finance. Even marketing is often an extension of production – trying to manipulate the market and consumers to fit the product or service. Only in recent years has a customer-oriented approach started to be developed in all but a handful of industries and companies. This means taking the consumer seriously and learning from and with their innovations, buying into the modern American commercial myth that the ‘consumer is king’.

In recent years consumption has entered sociology, taking a lead from cultural anthropology, which emphasises the symbolic nature of goods and their place in culture, focusing on the ritual nature of material artefacts over their practical use (Douglas and Isherwood, 1979, 1996; Campbell, 1995; Miller, 1995; Sulkunen, Holmwood et al., 1997). This cultural approach to consumption recasts it as an ‘active’ process of appropriation and interpretation. Consumers of goods and services and the audience for media are no longer passive, but appropriate ‘commodities’ and interpret them in their own ways. As cultural studies has it, the consumer is a ‘bricoleur’, a tinkerer, engaged in a ‘multi dimensional process of negotiation involving humans and non-humans.’ (Akrich, 1992). This active interpretation emphasises non-economic aspects of consumption, the cultural context, but in two contrasting ways: *constrained consumption* suggests that cultural,
and particularly class factors limit the what and how we consume, as in the structural model suggested by Bourdieu⁷ (Bourdieu, 1984); and creative consumption (Hebdidge, 1979; De Certeau, 1984; Fiske, 1989) suggests we can understand consumption by subcultures as a series of strategies of resistance and counter-power. Miller develops the idea of 'objectification'⁸ in a theory of consumption that emphasises the transformation of industrially produced and ‘alienated’ commodities into part of our own inalienable culture (Miller, 1987). This approach is ‘optimistic’, we are not the slaves of class or industry – through consumption processes we appropriate from the highly specialised world of industry and make them part of our local and global cultures⁹. However, even ‘creative’ consumption can have limits: the power of the individual consumer in the circuit of production and consumption (Cockburn, 1992). is very limited compared to the producers. De Certeau suggests that we are restricted to using limited ‘tactics’¹⁰ of ‘making do’ in the face of corporate strategies: "The rationalised, expansionist, centralised, spectacular and clamorous production is confronted by an entirely different kind of production called “consumption” – characterised by its ruses, its fragmentation, its poaching, its clandestine nature, its tireless but quiet activity, since it shows itself not by its own products but in an part of using those imposed on it.” (De Certeau, 1984, p.32).

It is clear that a general theory of consumption has to embrace aspects of both approaches: there co-exist constraints and creativity in consumption (Moores, 1995). To understand and examine this we have to look in detail at consumption practice. Constructivist theories of technology (e.g. (Bijker, Hughes et al., 1987) theorise the affordance of technology in use, both practically and symbolically, and empirical work demonstrates that in use and innovation there is interpretative flexibility. Technologies and technical artefacts are given different meanings and uses by different people, and these change over time. Meanings are not fixed, but neither are they developed independently by different groups. Instead there is a constant interchange and mutual influence. The alternate interpretations and power of different groups affect the innovation process and the way the technology manifests itself in different systems and products. Constructivist theories contextualise consumption within cultural and socio-economic setting: family, community,
workplace, nation etc. Meanings are constructed in use and expectation, but these meanings also are constrained by the setting. This approach was originally developed to study technologies in development, but has also been applied to technologies in use (Akrich, 1992), in particular, in the domestic sphere (Silverstone, Hirsch et al., 1992; Aune, 1996; Lie and Sorensen, 1997a). It is important to take into account the influence of the technologies themselves – meanings are not entirely fictions developed by human actors, but emerge in response to the technical systems, knowledge and artefacts themselves, as important ‘actors’ in their own right (Callon, 1991), which through their affordances (Gibson, 1979) and obduracy play a part in shaping social relations and processes.

With this approach we can no longer can draw a clear line between consumption and production in saying where a product is created. Invention and innovation are clearly not restricted to the producer side of the economic equation. Consumers ‘reinvent’ technologies, we 'redefine' technologies with new meanings, and find new uses (Pinch and Bijker, 1987; Fleck, 1988; Rogers, 1995). By tracing this ‘reinvention’ or ‘redefinition’ we gain some insight into the social and cultural setting of a technology11. The general message from these studies is that we have to move away from looking at production and invention, to focus more on appropriation and signification as an essential part of understanding how and why technologies take on such importance in our lives.

2.3.1 Consumption, the Domestic Space and Everyday Life

What sets the study of consumption apart from studies of the use of technology in organisations is the focus on the home, and family and the domestic environment. The home environment is also a very particular space and social unit. In conventional terms it is the 'private' world: the world of the family, close personal relationships, love, sex, entertainment, children - the traditional ‘woman's realm' where every man is his own king! A number of research agendas have lead to the study of domestic technology: Study of consumption of ‘commodities ’and material culture, Gender studies, Teleworking, Audience and media research, Historical studies of media and communications technologies, Consumer studies and marketing and Diffusion of Innovations research12. The convergence point of many of these research
programmes is ICTs, for these are the some of the most common and most problematic technologies. As well as being artefacts they are often telecommunications tools or media technologies: in the home they provide links within the household and between the household members and the outside world (Silverstone, Hirsch et al., 1992), and outside the home, between individuals, and within communities and organisations.

An important feature of new ICTs is that they cross boundaries between areas of life such as the home and the workplace in several different ways: the Internet, the PC and the mobile phone are not exclusively professional or domestic products and indeed they are increasingly being used by consumers to blur the lines between home and work. We have to find a way to situate the use of technology within the broader context of how we technologies become embedded in all areas of life: how ‘technology is adapted to everyday life and the everyday to technology’ (Sørensen and Berg, 1991), how it takes its place in the home, the workplace, the city with and across cultures. Some researchers use the same term as is applied to the taming and breeding of animals from the wild to home or farm life: Domestication. By studying how a technology is ‘domesticated’ we reveal something about the home, workplace or community, the relationships of people within that space, and their relationships with the outside world (Silverstone, Hirsch et al., 1992). With this understanding we can go on to approach the problem of the consequences of new technologies.

2.4 The Adoption of Innovations

While the technology studies and the ‘domestication’ of technology literature based in cultural studies of media provided the initial basis of the research, the questions raised in the study point the way to a range of other literatures that investigate similar issues. In particular, there is a need to understand the processes of adoption of products, and why we adopt, as much as to understand the following domestication process. The main body of literature that addresses this is consumer research.

Consumer research covers six main areas:

1. People as consumers, including the segmentation of the market according to factors including geography, demographics, psychological and cognitive
reasons, such as interests and activities, usage of products and the meanings and benefits of products

2. The environment of technological innovation, and the diffusion of innovations

3. The perspective of the individual, including perception, personality, motivation and learning

4. The social perspective, including attitudes, family influence, small group influence, class influence, and cultural influences

5. Consumer decision making process, including communication and information, persuasion, the decision making process, and the consequences of decisions

6. The development of the consumer and consumerism, including the historical development consumption and its future evolution in the context of technical and social change (based on (Statt, 1997))

Of particular relevance to this study is technical innovation and the *diffusion of innovations*. Research in this area looks at characteristics of individuals and communities, social factors, such as personal influence and the adoption process and decision making but within the context of the introduction of new products and their diffusion through a social system over time, introducing the ideas of contagion, segmentation of market according to the time of adoption, and an analysis of the technology and how it is perceived by potential adopters. By studying the diffusion of innovations within a community, (Rogers, 1995) highlights the social nature of adoption – how an individual adoption is only part of a broader community adopting. Rogers proposes a number of key issues of influence in the diffusion and adoption of innovation: the concept of innovation, its diffusion over time, personal influence and opinion leadership, the adoption process, the roles of the innovator and other adopter categories, and the role of the social system or market segment. Gatignon and Robertson add to this the importance of marketing or change agent actions, and the role of competitive actions (Gatignon and Robertson, 1985). Other work from consumer studies focuses on the lead up to, and moment of purchase of goods, building a model of the consumer, and their ‘innovativeness’ – characteristics such
as opinion leadership and interpersonal information seeking which have been shown to have some correlation with innovation adoption – and building a ‘consumer’ model of new products. Rogers also points out how the innovation itself can be analysed to see how relevant and amenable to adoption and diffusion it may be, suggesting a number of important features to be consider in relating it to the social system it enters: relative advantage, compatibility, complexity, trialability and observability (Rogers, 1995).

These factors provide inputs to the adoption process which takes into account attitudes and awareness about products (Cognitive processing), the uncertainty and risk of adoption (including financial risk, social risk, credibility risk etc), pre-existing activities that will influence and be affected by adoption, and finally competitive innovative solutions. For different products, consumer adoption studies try and discover what factors are salient in adoption (product attributes, personal innovativeness in relation to particular product categories), and crucially for market research, how attitudes towards a new product are related to actual intent to adopt. One of these models of influences in the adoption of innovation is proposed by (Gatignon and Robertson, 1985):
In this review of the literature I concentrate on the adoption process, personal influence, perceived innovation characteristics and to a lesser extent, personal characteristics.

### 2.4.1 The Adoption Process

The adoption process encompasses how an individual encounters an innovation, how he or she engages with it, how decisions are made about it, the process of actually obtaining the product and then its implementation and use. One model that is widely used is that developed by Rogers (Rogers, 1995). Rogers identifies a number of stages in adoption, taking the concept of adoption away from a simple decision to purchase towards a more complete model that accounts for the long awareness building and evaluation period that may occur before any actual purchase, including the possibility of trial and rejection, the importance of demonstration and recommendation, post-purchase re-evaluation and re-invention, and more creative
consumer behaviour. Rogers’ model contains five main dimensions to an innovation decision process (Rogers, 1995):

Knowledge – exposure to existence and understanding of function (questioning whether awareness comes through a search initiated by need, or through random exposure in the environment);

Persuasion – formation of attitude, often based on affective judgements, including thought experiments and getting innovation-evaluation information from the close social network;

Decision – to adopt or reject – often based on personal or vicarious trials;

Implementation – putting to use – including the appropriation work needed to be done until an innovation is institutionalised. This stage can often include some reinvention of the product (Von Hippel and Finkelstein, 1978), innovation in its use or adaptation to new circumstances and conditions (Foxall, 1994);

Confirmation – reinforcement or disappointment – sometimes leading to discontinuance.

Studies suggest that the adoption of ‘high involvement’ innovations – risky, costly, or involving structural changes - can follow a these stages in a rather linear manner, but in general there is little longitudinal research that demonstrate how these processes work.

Different sources of information and confirmation are used during different stages of this process, specifically mass media, and local and ‘cosmopolite’ interpersonal sources. The media and cosmopolite sources are used more by early adopters and in the knowledge stage, by those who have to go outside their group to find information, and maybe have outside groups as the reference and model for their own adoption. Rogers suggest that local sources, those of the close social group are referred to more in the persuasion stage as people form attitudes and make decisions.

There have been a number of criticisms of diffusion research. Rogers, who has done the most to consolidate and expand it has several criticisms of the type of research that is conducted in practice:

1. There is a lack of process orientation. Research tends to look at the moment of adoption, and not actually track the individual’s decision process over time.
2. There is pro-innovation bias which assumes that all innovation is desirable (Dunphy and Herbig, 1995).

3. There is a lack of socio-metric analysis.

My study is designed to address the first two concerns. (Dunphy and Herbig, 1995) make some further criticisms which will be addressed in more detail in the course of this chapter:

1. It is assumed that opinion leaders are innovators and they will lead the rest of consumers, when it seems that “most true innovators are likely to be social deviants, abnormal and adopt innovations indiscriminately” (Dunphy and Herbig, 1995, p.196) quoting (Sheth, 1981))

2. If the product is not used, the blame for failure is set on the individual, and their lack of intelligence, inability to change, rather than the product.

They also point out that the pro-innovation bias, while very common among innovation promoter is in fact completely absurd, since in fact most products fail because most innovations are not desirable, not to a small group of ‘laggards’ but to the majority of the “pragmatist” population.

Gatignon and Robertson also point out that most research has focused on single decision (Gatignon and Robertson, 1985). However for many ICTs, multiple units are adopted, and then subsequently upgraded or added to with extra services, software etc. The arrival of the Internet means that the user is able to adopt new and innovative services everyday based on the same technology. Research has also often focused on a specific innovation. We need to look at how and innovation fits into existing consumption system and inventory patterns, including competition for resources, and discontinuous patterns of adoption. To do this involves an integration of adoption theories with insights from studies of consumption.

### 2.5 Technology and Everyday Life

As discussion of adoption makes clear, consumption does not happen at the checkout. The purchase or acquisition is just one moment in a process of developing knowledge and attitudes and of practical use that we must contextualise within the world of everyday life. The environment for consumption of goods and artefacts is difficult to delineate. One category is ‘everyday life’, introduced as a concept by
sociologists such as Lefebvre (Lefebvre, 1971) and Bourdieu (Bourdieu, 1979). Sørensen defines the everyday as the routine, non-specialised, non-bureaucratic: it is found everywhere (Sørensen and Berg, 1991). This is not ideal since much of the 'everyday' is still found in bureaucratic settings, but like much in this field there are shifting boundaries of definitions, not only from an analytical perspective, but because reality is changing as well. Gender studies has been particularly keen to study the ‘everyday’, where everyday was the non-work area, the traditional women's realm. Of course this emphasises that the home is the site of work (Cockburn and Fürst-Dilic, 1994). This has been part of a process of focusing attention on realms of life that have been previously rather ignored.

In studying technology, especially with the social or cultural perspective, the everyday routine is very important. Technology is often seen as globalising, bureaucratising, standardising, but it is always appropriated and re-embedded in local context (Lie and Sørensen, 1997a). Technologies acquire meanings in everyday life. Here, old technologies may acquire new meanings, and new ones existing meanings. This is summed up as “Technology in everyday life is looking at it as a personal and familiar” (Sørensen and Berg, 1991). Of course every individual has their own everyday experiences. What is out of the ordinary for one person is completely everyday for another: one person’s special life-changing event can be perfectly banal in another context, so the analysis of everyday life has to stem not from pre-conceptions about what it should be, but from the experiences of individuals as they live their lives. We actually have to question whether ‘everyday life’ is in fact a good concept when we come to study the life of an individual which crosses all sorts of organisational boundaries and encompasses different regimes all in the course of the ‘everyday’. Later in this review the idea of the ‘life-space’ is introduced as a way of extending the concept of the everyday.

The discussion of the consumption of material goods (as opposed to media goods) and their place in our lives can be put in the context of the broader place of material goods in everyday life. A number of writers emphasise the important role that artefacts or technologies have in our everyday life experience, and how they serve important purposes in grounding that experience, and as the object of our everyday definition of self and our relationship to others and the rest of the world. Hannah
Arendt (Arendt, 1958) suggested that quotidian artefacts serve to stabilise human life: they provide practical and symbolic supports and continuity to our lives. Objects are used in the formation of our own identity, and in the way we interpret the world around us. Hickman investigates what he calls the “Phenomenology of quotidian artefact”, to show how people use technologies for self-stabilisation and to remove themselves from the real world, to the world of enchantment and imagination (Hickman, 1988). A particular example of a technology used in this way is the motorcar (Lamvik, 1996) (Barthes, 1957).

This approach is very useful – it emphasises the meaning and uses of technologies that are not directly associated with their specific technical function and the practical activities for which they is used. It highlights many of the ‘good’ things about technologies, that some people find more than others do, an ‘expressive’ or ‘play’ relationship that is often overlooked. (McCracken, 1988) shows how consumer goods are given symbolic meanings by those who consume them, and how those meanings are developed, linked, maintained, developed and interpreted. He highlights a number of symbolic actions or rituals that we use to maintain, enforce or transform the meanings we give to artefacts (McCracken, 1988). These include exchange rituals, especially gift giving, possession rituals, the activities of making goods our own, grooming rituals and disvestment rituals when we get rid of products or obtain second hand ones.

2.6 How we Consume

The types of analysis presented so far show something of the way we consume products that goes beyond their practical application. However, what are the sources of meaning and cultural difference attached to technology. Consumer research generally recognises three main dimensions to consumption: Functional, they do something practical; Experiential, they provide sensual pleasure, entertainment etc; and a third factor, Identity, which recognises that products provide expression of self identity of individuals and groups, and help provide links to an individual’s past or a group’s social history (Csikszentmihayli and Rochberg-Halton 1981; Belk 1988; Wallendorf and Arnould 1988; Fournier 1991). Holt (1995) has extended this in an interesting interpretation, bringing together the various personal, social and cultural
dimensions of consumption. Drawing on a study of supporters of a baseball team he suggests that there are four dimensions to consumption, based on the structure of the action and its purpose. Autotelic activities are those that ‘justify the end in themselves’, or are purely undertaken for their own sake. Instrumental activities are to produce other outcomes. Some consumption activities are focused on an object, in this case baseball, or in our case some aspect of an ICT, others focus on activities that are primarily social or interpersonal.

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<thead>
<tr>
<th>Object Action</th>
<th>Autotelic</th>
<th>Instrumental</th>
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<tbody>
<tr>
<td>Interpersonal</td>
<td>EXPERIENCE</td>
<td>INTEGRATION</td>
</tr>
<tr>
<td></td>
<td>PLAY</td>
<td>CLASSIFICATION</td>
</tr>
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**Table 1 Four dimensions of consumption (Holt 1995)**

Here I apply these categories to the consumption of ICTs.

**Subjective reaction/experience:** The direct, (phenomenological) experience of the object: exciting, fascinating, brilliant, wonderful, troublesome, frustrating, feelings of helplessness, bafflement.

**Integration:** Actions directed at the object. These include: Assimilating: becoming a computer person, owning, learning about device and uses; Producing: the technology is useful, indispensable, it gets the job done, it makes a particular lifestyle possible, or makes work possible; Personalising (appropriation): both physical and meaningful including owning, (e.g. a collection of software, games, e-mail addresses photos, IT hardware), developing one’s own knowledge, production outputs, and demonstrations of successful personal use.

**Classification:** social classification of individual. Based on Object: ownership, knowledge, expertise, (Mac person, technology person, graphics person, nerd, or alternatively, a non-technology person, resistor, left behind, excluded); or Based on Action with Knowledge/object: professional user or amateur enthusiast, innovator, entrepreneur, games expert, programming expert; activities such as reading about,
spending time using; or classification through actions towards others: active proselytism, teaching, talking about, boring…

**Playing:** autotelic (having no other reason but itself) interpersonal relationships. As a common experience: playing together, working together, designing together, communicating; Socialising: as a conversation point, a focus for relationship building: shared interests, talking about, swapping, helping and teaching

This type of analysis can also be applied to non-adoption of artefacts (as we shall see later), and seen in the context of processual analysis of adoption or domestication. For example these consumption processes can be seen in all stages of the adoption process, and in the appropriation and on-going use of the product or service (see Appendix). We can see what a technology means in someone’s life, it lets us understand how and why it is used, particularly for consumption as social identity.

We can see this type of analysis applied in the case of the home computer (Aune, 1996). Computer users can be classified as ideal types: the Overtimer, who uses the computer in an instrumental way to bring work home, but is not interested in it otherwise; the Explorer, for whom the computer crosses over home and work, and which use of the computer is just another extension of passionate interests in work or hobbies that dominate other activities. Engagement with the machine is an important reflection of self identity; The game player who used the machine as a time killer, just as a way of spending some leisure time, but would be just as happy (or happier) doing something else; and the game freak, for whom gaming is a way of life, with the social consumption of games as important as playing them, with self identity as a game player.

<table>
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<tr>
<th>Work Leisure (Hobby)</th>
<th>INSTRUMENTAL</th>
<th>EXPRESSIVE</th>
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<tbody>
<tr>
<td>overtimer</td>
<td>explorer</td>
<td></td>
</tr>
<tr>
<td>time killer</td>
<td>game freak</td>
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**Table 1 Ideal types of home computer users from (Aune, 1996)**

This brings out two dimensions in the use of ICTs: the expressive and the instrumental. Research on use of ICTs has often noted this type of division of interpretation of a technology: with some people focusing on the technology as a tool for achieving ends, and others integrating the technology much more with their self
identity, and using it as a way of expressing that identity, in the same way other might do with, say, a sports team. We are essentially contrasting the utility of a product and the engagement it produces. *Utility* is what we find useful in a product, in use; *engagement* is the way our imagination and interest are captured by a product, whether it is a new computer or a novel. These two factors are key to the way we appropriate and use all products: utility is linked to the practical benefits and problems we identify in a product, and the engagement is our subjective response to it, how much is excites us, provides us with comfort or opportunity to play (Hickman, 1988). To investigate personal and social meaning of technologies further, we need to look more closely and the qualities of technologies, in particular ICTs and at examples of how people consume them at a symbolic as well as a practical level.

### 2.7 The Qualities of Technologies

In studying the adoption and use of new ICTs we must address the issues of whether they have any particular characteristics that distinguish them from other types of innovations or established products that could make a difference to the say they are adopted and domesticated. There are several ways to look at products, and particularly new technologies. While a pure deterministic viewpoint still exists, with the technical functions and facilities of a product being the basis for all analysis, most researchers have tried to develop more sophisticated approaches. These are generally based on an analysis of the particular technology in relation to the potential user existing technologies and other new technologies, and the development of complementary socio-technical systems. New ICTs are often suggested to have a number of characteristics – they are radically new products, and often involve a great deal of investment in products and learning.

The notion of radical or discontinuous innovation (Freeman, 1988) suggests that an innovation is very different from what came before, and generally, considerable innovation is necessary in the system in which it will be adopted, and in the creation of new meanings. This type of argument covers technical, economic and symbolic dimension of technology. Many ICTs appear to be radical in some sense, either because they are used as part of radical organisational change, they demand people to
make significant changes in their lives, or give people significant new opportunities. Sometimes however the change is not so radical in practice as it is in theory. Often technologies offer the possibilities of change that are in fact very slow to develop as they are implemented. Sometimes change can be very subtle, as in the case of the Diderot effect (McCracken, 1988) discussed in section 2.8.1.

Within the field of diffusion of innovation research, Rogers (Rogers, 1995) tries to examine in detail the different aspects of a new technology and how they are perceived by potential adopters. He suggests five perceived attributes of an innovation that will be crucial to its potential for diffusion: Relative advantage; Compatability, Complexity, Observability; Trialability. These factors he rather unconvincingly suggests can explain 49-87 % of variation in rate of adoption of different products. The rest is explained by other factors such as the social network and the role of change agents. Rogers give examples of the mobile phone and video games machine as being products that satisfied all criteria for adoption, although it is obvious that this only applies to a part of the market to which the product appeals. This approach is one that is meant to be a tool for analysts and promoters to use to understand how and why a technology has been successful or not in the market. It does not tell us how a particular technology will actually be judged, and the meanings that will be attached to it and how that meaning will evolve. However others have analysed how technologies are given meanings, and how the technologies not only fit into technical systems and activities, but also how they fit into existing networks of symbolic codes, for example the classification of domestic technologies suggested by (Livingstone, 1992), of the system of meaning-based relationship between consumers and products suggested by (Fournier, 1991) such as Objects of Utility, Ritual Enhancers and Objects of Personal identity.

Some products have a high symbolic content, and therefore will provoke more contention that those with low symbolic content (Hirschman, 1980). Many ICTs are supposed to be high in symbolism, reflecting their demands on the user, their cost and skills needed, the problems they cause and their association with particular user groups and activities. They require the consumer to be engaged to quite a high to degree with the adoption process, sometimes called 'high cognitive processing'. These types of products require high consumer learning, especially for discontinuous
innovations. They also often require high innovation and switching costs (Gatignon and Robertson, 1985). In some cases they are dependent on social acceptance, and can be symbolically defined by social referents (Hirschman 1981).

Products with high symbolic content are also much more likely carry a range of different interpretations. Since many ICTs are often adopted by a multi-person adoption unit, such as a household, this creates much more room for dissent or conflict, and a more complex domestication process. At the time of this study (1987-88) little research focused on the whole household, or recognised the multiple types of households today. This makes the analysis of the adoption process much more than simply following an individual making a rational decision about their needs and the technical or other merits of an innovation. Instead an approach sensitive to the issues raise by the ‘domestication’ research is necessary.

2.8 The Domestic and Domestic Technology
One of the central locations of everyday life, especially in the definition opposed to the workplace, is the domestic setting, the home or household. This is the focus of much consumer and consumption research. The home has become a key location for the use and ownership of artefacts during the 20th Century, and new ICTs are expected by many to make our lives even more ‘home-centred’ (Castells, 1996, p.398). Much of industry has developed to create products that create or satisfy the demand of labour saving, leisure and now professional work tools for the domestic environment (Forty, 1986). Through this process the home has been transformed, physically and culturally within itself, but has also become an important ‘consumption junction’ (Cowan, 1987), the focus of an entire network of external social actors. It is clear we need to describe and analyse the household before we can understand the place of technology in the home, and its interactions with the broader socio-technical network.

The family, which has come to be regarded as the typical social unit within the physical home has “dynamics that are expressed and managed though shared goal, family myths, rule and routines, conflicts and tensions and its frameworks for explanation and understanding.” (Livingstone, 1992, p.113). However, while the household is often a family home, there are an increasing number of other
possibilities, and the family itself can vary greatly in integration and extension (Livingstone and Bovill, 1999), particularly over the lifecycle\textsuperscript{35}. Many people live in some other sort of household. Whatever its composition, home is certainly ‘gendered’, and constructed spatially and temporally (e.g. (Giddens, 1991)). Our study is then one of the socio-technical dynamic of domestic setting: the social dynamics of gender, power relations, distributive patterns, institutionalisation, symbolic relationships, and relationship between political, social, economic issues of everyday life. (Sørensen and Berg, 1991; Morley, 1992; Silverstone, 1994).

Silverstone, Hirsch and Morley attempt to capture way the household works with the concept of the moral economy: "it is an economic unit, consuming, producing, exchanging. It is also a moral economy, because these activities are defined and informed by cognition, evaluations, aesthetics, themselves defined by histories, biographies and politics of the household and its members" (Silverstone, Hirsch et al., 1992)\textsuperscript{36}. Households will share some of these features with the public world, but will also have their own distinct and evolving character within a boundary that is physical and cultural but is constantly called into question by technologies and household members (Morley, 1992). Work in family sociology looks at how the family deals with major life events, and the use of goods and space in the home (Anderson, Tunalay et al., 2000). Consumer research has also attempted to examine these family dynamics in the consumption of goods and services. The family and the household socialise us into consumption, and the family unit, of whatever form, is an important consumption unit as a whole. Consumer research highlights the social processes and the appropriation work that occurs even before the product is introduced in the home (Statt, 1997) such strategies using in the negotiations over adoption, and roles that different household members play in the consumer life of the home\textsuperscript{37}.

To illustrate this, recent work on the place and use of ICTs within the home by (Livingstone and Bovill, 1999) looks at the role media technologies play in family life, the gender differences in use and interest, and the development of a youth bedroom culture of media use\textsuperscript{38}. As an example of the range of ways that ICTs are integrated into family life, the researchers tentatively identify a range of styles of family interaction, based on how families divide their time between shared and
individual activities. They highlight life-cycle changes in the way that families use media, and note a key dimension is whether families live ‘together separately’ and use media according to their own lifestyles, or families that live a convergent lifestyle, and consume media within shared activities.\(^{39}\)

The important point to draw out is that we are trying to open the black box of the household. To analyse patterns of consumption, adoption and resistance to new technologies we must not stop at the boundary of the household, representing it as a unity. We have to look inside, to the individuals living together, who have different expectations, reactions, power and knowledge, constantly changing and re-enforced. Equally, it is important not to treat the ‘domestic’ as sealed from the outside either. This is starting to become the concern of some researchers, as more and more examples of the home and workplace overlapping are recognised, especially with the adoption of new ICTs. Evidence and arguments for this crossover and types of boundaries between spheres or arenas of everyday life is examined shortly.\(^{40}\) As we study the boundaries of the home, we start to see how they too are constructs, and have to be constantly maintained: “Acts of boundary marking are of crucial importance for the on-going creation and experience of the home” (Moores, 1996, p.48). Some people have a home that is very open to other people, to bringing in work, to the public view; it is one physical space that is linked to other people’s houses, the street and the workplace. Others defend their home as a very private space, not wishing to let anyone know what is going on outside. The home is one place that one can really be ‘oneself’, where one makes the rules and does not have to bend to the wishes of other. Therefore we have to look at the home in the context of control and confidence of its residents not only in their house, but also in other areas of their lives.

### 2.8.1 The Domestication Model

Using in-depth studies of ICT use in different sorts of households\(^{41}\) (Silverstone, Hirsch et al., 1992) developed a well-known framework, Domestication, to help understand the nature of private household and public worlds and the role of communications and information technology in that relationship. They see technology as a way to study household relationships, and use a model of
relationships to study how technology is used, the *moral economy* discussed previously. Domestication is a tool to allow the researcher to follow the process of cultural integration of artefacts from the outside world into the home without losing sight of the physical artefacts (Berg, 1996). (Silverstone, Hirsch et al., 1992) suggest domestication comprises four elements of symbolic and cultural work: *appropriation* (the technology is brought into the home), *objectification* (the way the object is fitted into the space and time structure of the home), *incorporation* (the everyday usage) and *conversion* (fitting the object to the wider social and cultural surroundings)\(^4\). These are not discrete, but inter-linked facets of the biography of a domestic technology and the home. Although these processes would appear to relate primarily to the initial adoption of a product, they continue as use, the household and technology change. Looking back to the McCracken’s rituals, we can see exchange and gift giving as one of the stages of appropriation. Rituals of possession and grooming can be seen in the on-going process of domestication, as products are constantly reassessed\(^4\). McCracken also points out that as new products are introduced into the home they are not only integrated into it, but change it. He describes the concept of Diderot Unities and the Diderot Effect\(^4\), whereby every new introduction into the home sets off a re-evaluation of the existing material environment in a never-ending spiral.

Another approach to this two-way process suggested by Fournier and Deighton (1999), focuses on *assimilation*, where on the one hand we accommodate ourselves to the artefact, making up for inconveniences or shortcomings, and *incorporation* of new product and person meanings. They point out that any new assimilation also involves the successful *dis-adoptions* of existing way of doing things, routines, relationship patterns etc. This is often the end story for many products, a process of disinvestment (McCracken, 1988) as artefacts can become worn out, are disposed of, or owners lose interest, but often involves active rituals of dispossession, such as mourning or pleasure at seeing the back of the old.

Other researchers have taken up the ideas of domestication as a general approach to analysing the appropriation of a generic technology to a specific setting, whether it be the home, an organisation or even a country. Lie and Sørensen edit a book of research that uses the concept as a tool and inspiration for more research on
contemporary ICTs, notably the home computer (Lie and Sorensen, 1997a). They use domestication to emphasise the practical and symbolic work that is done in appropriating technologies in many situations. As appropriation occurs, local routines are constructed, and general scripts (Akrich, 1992) or ways of doing things are transformed as the technology creates new opportunities, but also imposes itself on the existing organisation. There is a two-way process of enabling and disabling, done on the one hand by the strategies of designers and marketers trying to shape and promote certain uses and meanings (Woolgar, 1991), and the counter strategies of users appropriating and redefining the technology both in relationship to the technology, and between each other. Domestication does not imply taming, but rather “stable truces that can be broken” (Lie and Sorensen, 1997b): re-domestication can and often does occur (e.g. telephone, screen activities).

2.8.2 Domestication: the Home and the Country

Historical research on technology and design illustrates how technology comes into everyday life of individuals and a nation. This approach integrates the model of domestication at the household level with domestication at the level of broader cultural groups – particularly a country. The domestication process contributes to a social shaping (Williams and Edge, 1996) or social constructivist (Bijker, Hughes et al., 1987) analysis of the history of a technology. My study looks at the evolution of a modern generation of ICTs, in particular, technologies of the mass market, the Internet, the mobile telephone and personal computers of various sorts. In the past other ICTs have had huge influences on society, and it is very informative to look at the telephone (Fischer, 1988; Moyal, 1992; Umble, 1992; Frissen, 1994; Flichy, 1995; De Sola Pool, 1997) or the radio (Forty, 1986; Moores, 1995; Crisell, 1997)\textsuperscript{45}, and other less successful media technologies such as videotex (Schneider, 1991; Bouwman and Christoffersen, 1992; Bouwman, Christoffersen et al., 1992; Feenberg, 1992; Thomas, Vedel et al., 1992). These histories tell a story of initial technical innovation, and a ‘DIY’ culture of enthusiasts competing with an alternative commercial interpretation of the technology and its use. Eventually there is a degree of stabilisation as commercial or monopoly providers are able to implement more advanced and diverse technologies to satisfy a mass market that
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includes a huge variety of individual and corporate users with very different uses for the technology.

The examples of the telephone and the radio illustrate technologies that were deployed in commercial and domestic markets, simultaneously, at a formative stage in their development. However, while broadcast radio tend to be used by only a minority in both the office and at home, the telephone is used by many in both places. In particular, the telephone system was used in commerce and then appropriated by consumers for their rather different uses. The same is now being seen with the personal computer, the mobile phone and the Internet, where almost exactly the same systems are in use in the two domains, and remote systems are accessible from both domains, and are often designed to link them (e.g. consumer e-commerce). Other technologies, such as interactive television, although they use rather similar underlying techniques, have been developed in a rather different way for the consumer and business markets. In the case of the Internet the cross-over is not so straightforward as with the telephone, as many would say that there is a two-fold appropriation of the original system away from the academic and military users to both commercial users and the general public. From the point of view of constructivist analysis, its development can be seen as the conflict over interpretations of what the Internet is and should be (although this is a debate for another day!).

2.9 Interpreting Domestic Technologies

What are the symbolic values that people ascribe to technologies, and how does this affect the way they engage with them. Sonia Livingstone examines the meaning of domestic technologies using a personal construct approach which focuses on the way people actively construct their world (Livingstone, 1992). This highlights some of the ways that technologies are incorporated into the household and become points of conflict, especially as men and women give very different meanings to everyday technologies. She identifies four main ways that people will feel about a technology:

Technologies are *Necessary*, and cannot be done without: they allow *Control* over things, time, one’s own life and other people; they are *Functional* – they do things, both practical and impractical; and they facilitate *Sociality* and *Privacy*. The
different meanings associated with technologies reveal some of the tensions in the family, and their different values, such as decisions on what money should be spent on or how much time tasks should take. We can imagine, and there is evidence for, conflict over newer technologies - such as the CD, VCR, Satellite TV, a multimedia computer - often men's and children’s toys. For example, in a study of women and domestic technology (Gray, 1992), Gray found that women had very ambivalent attitudes towards the video recorder and other entertainment technologies in their family households. Women had little role in buying the machines or in renting tapes. Some women felt they were inadequate to operate the machines. Others were very happy to let their men-folk operate them, as they knew that would keep them happy. Some deliberately refused to learn to use the video, a strategy of ‘calculated ignorance’ to make sure that recording programmes did not become yet another domestic task they would be expected to do\textsuperscript{69}. The idea of differential control over technology in the home was also picked up by Susan Fournier and David Glen Mick in a study of the appropriation of answering machines (Mick and Fournier, 1995)\textsuperscript{50}, where the machine is used to emphasise the power of particular household members.

While all artefacts and technologies introduced into the home are important, ICTs are among the most interesting because they are “not just objects, but media”, “as media, they provide actively interactively, or passively, links between households, and individual members of households, with the world beyond their front door... in complex and often contradictory ways... they are doubly articulated into public and private cultures.” (Silverstone, Hirsch et al., 1992). One consumes the technical artefact, and also the services, information and entertainment mediated through it. These ICTs include television, as contemporarily the leading ICT (Silverstone, 1994)\textsuperscript{51}, radio, the telephone and mobile phone, the personal networked computer (certainly in contention as the new ‘leading ICT’), video games, Videotex system, such as Minitel and teletext, Internet, video recorders, interactive television etc. As media, especially television, they have attracted the attention of a range of scholars and commercial interests, interested in the ‘content’ or the messages delivered by the media, and they are the focus of a range of theoretical and empirical work that is complementary to studies of technology: media studies, cultural studies, gender studies (Wand, 1968; Hall, Hobson et al., 1980; Greenfield, 1984; Morley, 1986;
Lull, 1990; Williams, 1990 (first pub. 1975); D'Agostino and Tafler, 1995; Moores, 1996; Winston, 1996; Östlund, 1998; Livingstone and Bovill, 1999). Much of this work has been focused on power and semiotic readings, used in both a deterministic and constructivist way (McLuhan, 1964; Hall, Hobson et al., 1980; Morley, 1992).

Studies of television also highlight cultural differences over the acceptance and use of technology. Just as there are foods that are good for you and ones that are pleasant (Charles and Kerr, 1988), so there would appear to be technologies that are good for you and ones that are not? Research on technologies at home shows that domestic media technologies are often disputed as to their value (Silverstone, 1989; Silverstone, Hirsch et al., 1992; Moores, 1995). In particular, the ‘middle-class’ opinion that television is somehow bad or to be limited in it use, especially by children. Silverstone and Baudrillard both consider the different class relationships to television (Baudrillard, 1981; Silverstone, 1994, p. 123). Baudrillard based his analysis on consumption of the TV in the late 1960s, when lower-middle class households attached status value to the technology, and upper-middle class owned for the use value. Later work by Moores saw that satellite TV (Moores, 1996) had a very different image in the 1980s – indicating low status, or at least unacceptable status in the upper-middle class. However these have to be seen in historical context. We can also look at early meanings for the video in Norway (as a device for playing pornography), and in post-soviet Russia, (a device for educating children in western culture).

However the introduction of new technologies into the home has meant they have had to be re-evaluated, some as being ‘bad’, some as ‘good for you’. For example among a certain percentage of the population there is the assumption is that ‘Media’ is only good for you when it is informative and educative, or engages with ‘elite’ culture, (which of course it can only do badly). Entertainment and popular culture are merely a waste of time, and actually dangerous because they distract from more worthy activities – learning, face-to-face relationships, being outdoors, reading etc. Multichannel Satellite and cable TV has suffered criticism by many as being ‘bad’ – as if 4 or 5 channels is not bad enough, why would anyone want to waste time on 30 channels? The computer has often been seen as a ‘good’ thing (Livingstone and Bovill, 1999), the Internet too, and both have been sold, and are bought, as important
educational devices for the home. However, like the home computer in the 1980s, both can diverted to less acceptable activities, principally games. Within the discourse around the Internet there is a re-evaluation of the media in general, and the Internet is sold as a ‘better’ technology or medium than the television. Active use and interactivity of the Internet and the computer are contrasted favourably with the ‘passive’ nature of broadcast media. Computer games occupy a strange niche – they are 'better’ than much TV – they demand active engagement, and some can be edutainment. However they are certainly seen by many as a waste of time, and addictive, both negative features if other activities are to be encouraged. Within video games there are of course differences as well e.g. killing games v. construction games (Greenfield, 1984; Mediascope, 1999b). In these arguments and meanings there appears to be a focus on ‘knowledge’ as an important value, set against entertainment. Products that build knowledge in some way, and encourage active engagement with the world and with information are better. However many people recognise the qualities of the TV as an aid to relaxation. Its ability to engage one with the minimum personal effort is a quality that is useful, but should be controlled.

Summarising the lessons from cultural studies of consumption and domestication, the user is taken as active in appropriating the technology, there is conflict over practical and symbolic aspects of, and media and communications technologies have meanings both as physical objects and through the content and messages conveyed through them. Domestication puts into question the boundary and relationship between where technology comes from, and where it is used, and the various domains where it is given meaning.

2.10 Spaces of Everyday Life: Home, Work and Boundaries
Although most of the research on consumption has focused on the home and domestic setting, certain technologies are in the home and in the workplace, and their adoption and use are closely linked in both domains. The workplace itself, and other locations, particularly public locations such as community centres, cafes, museums (Stewart, 2000a) are locations where we encounter and use new ICTs. While the workplace has long been the focus for studies of ICT adoption and use there is little that links these domains. U.S. researchers in the consumption of ICTs questioned
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this (Dholakia, Mundorf et al., 1996a) criticises the majority of ICT research for concentrating on the business applications, and for its technological determinist position, and call for an analysis based on understanding the everyday life of the consumer or user. In the industrial era they claim the life-space was demarcated into categories of work and personal life, but this is now changing. Also changing are the activities we can do inside and outside of the home or workplace. Traditionally, technologies were divided clearly along the divisions of everyday life – radio and TV for private use in the home, industrial equipment at work, and a third set of activities and services in the ‘transactional’ sphere between work and the home – shopping, banking, insurance taxes, voting etc. They suggest we must now look for the ways that new generations of ICTs are integrating these spheres of the life-space (Figure 2). In particular, we see computers in the home for personal activities. Work is also entering the home with the computer, and many new ‘tele’ transaction applications can now be based in the home and at work. They point out that “once a technological system gets established in one life sphere, it has the potential to migrate to the other connected spheres” (Dholakia, Mundorf et al., 1996a, p.8).

![Figure 2 Integration of life space and convergent technologies (Dholakia, Mundorf et al., 1996a, p.8)](image)

This discussion of ‘spheres’ of everyday life demarcated by boundaries needs some investigation, especially if we wish to see whether new ICTs actually migrate from
one sphere to the other, as they seem to be doing, and whether there will be more integration of life-spheres as a result. The whole area of telework, and the rise of ‘flexible’ working based on new ICTs puts these boundaries into question (Qvortrup, 1999). Research in this area shows that the division between home and work is very variable, mostly dependent on the employment situation of an individual, but also based on their ability and desire to do ‘boundary work’. Nippert Eng suggests that people are given different amounts of discretion by their workplace and family to integrate or segregate their life spheres as they wish, i.e. to define their own boundaries (Nippert-Eng, 1995). Individuals also have different ideas about how they want to segregate or integrate their lives. However this is not fixed: the home/work boundary is also subject to conflict compromise and change.

Boundaries are maintained and signalled by various markers and strategies, including time boundaries, space, objects, relationships, communications and activities of one sphere being conducted in the other sphere (Nippert-Eng, 1995)\(^8\). ICTs are used in boundary work in many ways: The workplace can use the personal computer to enter the home sphere, by giving a computer to do work at home, which many surveys show is one of the main reasons people have a computer at home. Nippert-Eng found that privacy in the workplace was necessary for managing boundaries, with technologies such as the telephone, voice mail and e-mail enabling people to maintain their boundaries as they wished.

Other important evidence about the use of ICTs in boundary work is provided by Gournay and Mercier, (1998). They examined the use of telecommunications in a study of the various forms of destabilisation of everyday life, and the practices and strategies used to cope with them (Gournay and Mercier, 1998), in particular, how people use the instruments of communication in order to control their space and time. Expertise and experience with technologies such as the phone at work increases the likelihood of adopting at home. The same is true of the computer. However with continuing maturity of the medium, the expansion of phone use at work no longer has the same effect, it has the opposite effect – they found people using communication technologies in order not to communicate at home. Just as Nippert Eng suggests, the private or home space is divided from work space in a number of dimensions: spatial, temporal and relational. There is also an ‘instrumental’ or
technical division with distinct domestic and company markets for new technologies. There are important differences in how people use the phone - over the life course, and depending on the type of profession they conduct, and how much they integrate their work into the rest of their lives. For example some people try to avoid the telephone at home as it represents the workplace, others were more integrative, bringing work home and using the phone to communicate and using the phone at work to manage their home life.\textsuperscript{59}

We have reviewed ideas about the adoption and domestication of technologies within the home, where the home is seen as a social space as much as a physical space, and discussed the importance of taking a broader view of everyday life introducing the idea of the life space. The home and the workplace are embedded in broader communities, and social networks link these, as many people divide their lives between different spaces. We can therefore change focus here to look more closely at the concepts of community and social network, and see how they can be related to the adoption and domestication of new ICTS.

\section*{2.11 Social Network and the Personal Community}

Social research on technology emphasises the place that technologies have in a community: the idea of ‘sociotechnical’ is developed, where technical change is intimately linked to social change, and the use of technologies ‘non-human actors’ can only be understood in the context of social relationships of ‘human’ actors’, their goals, knowledge, and power etc (Latour, 1987). Within organisations, the adoption and use of new technologies is examined in the context of the organisational structure, power relations, explicit and tacit rules, departmental interests and agendas and knowledge flows. New technology implementation often creates conflict as it demands changes in organisation, established activities, and reinforces or undermines autonomy and power relationships. This can extended to socio-technical change across industry and government too. Recent innovations in ICTs have brought the phrase ‘paradigm shift’ out of the obscurity of science and technology studies (Kuhn, 1970; Dosi, 1982) into the jargon of management consultants and
advertisers predicting the demise of ‘old economy’ businesses that do not reinvent themselves around the Internet.

Within the domestic sphere, the same type of analysis has been conducted on media and technology as we have seen earlier. The home is just as much as a socio-technical organisation as a multinational business. There are explicit and tacit rules, division of labour, power relationships, processes of exchange of money, favours and knowledge in the ‘moral economy’ (Silverstone, Hirsch et al., 1992). Conflict between generations, gender inequalities and vested interests, give rise to disputes over adoption and use of new technology. Wherever new technology is adopted, the appropriation process can be followed through the interactions of the household members.

As well as internal change in appropriation, the relationship with external change agents and other organisations is important for industry and the household. Change agents - those promoting the adoption of new technologies, whether they are advertisers or management consultants - have a powerful effect on the organisation, often having influence on particular parts of the organisation. Firms and families alike are also influenced by similar organisations, and are soucieux of how they are seen by others. The analysis of the network of human and technical ‘actors’ has been developed in different ways within technology studies to investigate the development, diffusion and use of technology (Bijker, Hughes et al., 1987; Callon, 1991; Bijker and Law, 1992; Law and Hassard, 1999).

While much of social science concentrated on a macro sociology of ‘institutions’, a branch of sociology has studied the ‘micro’ level of social interactions, and particularly personal influence in the social network. Social Network Theory developed as a way of linking this micro-sociology to macro-sociology (Granovetter, 1973), and has become extremely popular as a way of analysing social phenomena. Much of the stimulus for this approach has come from studies of social influence and the diffusion of ideas and innovations in a social network. Most studies of why people adopted innovations have revealed that word-of-mouth influence and demonstration effects by others in a community are among the most important influences in adoption.
A number of concepts have been developed in social network research: the number and type of relationships an individual has in a community, the density of ties in a network, the type of influence that a relationship carries for the individual, the emergence of cliques, and ideas of centrality and periphery, such as those individuals who have a special role as sources of knowledge, and personal influence (opinion leaders), or those who are marginal in a network (on the ‘edge’). Network analysis has been developed to analyse relational data about a community (Scott, 1991), and it is used to inform all aspects of social research as this is the basis of social interaction within a community.

2.11.1 The Use of Community and the Social Network

Some recent research on social networks reveals the different sorts of network that people have, and the way they use them (Litwin, 1996; Gottlieb, 1981; Wellman, 1982). Different classifications of network are suggested, based on variables of size and complexity, and factors such as availability of close kin, level of family, friends and neighbours involvement and the degree of interaction with community and voluntary groups. The social network provides emotional support and practical resources, but is neither symmetrical in its function nor made up entirely of people who get on with each other (Wellman, 1982). Wellman suggests a number of roles for the network, as: “Havens: a sense of being wanted and belonging, and readily available companionship… Band-Aids: emotional aid and small services… ladders to change their situations… and levers … to change the world” (Wellman, Carrington et al., 1988). This emphasises how different people provide these services, and relationships are by no means equal or interchangeable. Most people have a small number of the informal bonds which they draw on to deal with life’s contingencies. The type of network and relationships we have, as with the more narrow interpretation of friendship, is shaped by gender, class, occupation, life stage, obligations, etc. Seen from the outside of course these network communities are experienced in very different ways by their members.

There have been many studies of the diffusion of innovations that have investigated the role of the social network in adoption, including ICTs. The social network is of course the basis of the ‘network effect’ found crucial to the uptake of
communications technologies. Research on adoption home computers highlights the importance of social networks for providing practical and moral support in the adoption and use of new ICTs. In the 1980s Murdoch et al did a study of the adoption and use of home computers (Sinclair ZX 81s) in a town in the UK. The computer was not straightforward to use – it meant spending hours typing in programs by hand and trying to debug them. It was very tempting to give up with the thing. The researchers found that those who lived in more affluent areas where more people had bought machines were able to share problems, and support each other in discovering new uses, sharing experiences etc., than those in poorer areas where owners were isolated. (Murdoch, Hartman et al., 1992). This role for the support network is an important research focus of this investigation. Another study in the US at a slightly earlier time also highlighted the role of the local social network. In a study of adoption of home PCs in the early eighties among professionals in Silicon Valley (Rogers, 1985), Rogers found that the principal factor in the adoption and diffusion of these early home PCs was the evangelistic work of experienced users within their social network. The PC at that time was very difficult to use, and personal persuasion and help from friends was necessary to get people through the early stages of use.

2.11.2 Personal Influence and Word-of-Mouth

This thesis examines where and how people find out about new ICTs, what influences them to adopt or resist, and the social aspects of domestication of ICTs. How does the personal network or community influence our knowledge about and adoption of innovations? There are two main strands to the study of social and cultural influence on the individual consumer – one is from social psychology and the other is from social network research in sociology and innovation studies already introduced. The influence of social psychology includes using the model of Primary groups and Reference Groups (Chisnall, 1985; Statt, 1997). The attitudes, opinion and behaviours of an individual can be analysed by understanding the influence of their Primary or membership groups, or how they follow the lead of others. This compares the influence of a person’s close community, that of others visible in the broader social network, and finally groups or individuals visible in the media. The other relevant research looks at the mechanisms and importance of influence and
information seeking or personal influence (PI). Personal influence has two dimensions: that of personal contacts - word-of-mouth (WOM) – and comparisons with others in a structured society.

Word-of-mouth influence has been highlighted by many studying the diffusion of innovations from the 1950s onwards, who have found a ‘vast and powerful network’ of neighbours exchanging product information ((Whyte, 1954)). Pre- and post-purchase communication by consumers about products is now recognised as a key aspect of successful marketing of innovations (Swan and Oliver, 1989). However, what sort of relationships are most important in personal influence and WOM, and how do they work?

There are two issues, one related to access to or obtaining particular information, the other to influence in resolving uncertainties, and shaping attitudes and behaviour. Sociology has shown the importance of ‘weak ties’ in providing access to new information (Granovetter, 1973). However social psychology suggests that informal groups are essential for resolving issues of uncertainty (Festinger, Schachter et al., 1959), such as those involved in adopting novel products, so close relationships would appear to be important. Granovetter also recognises the value of strong ties – and suggests ways they are used for particular network-based activities, such as information seeking, referral, and influence. For example, he suggests that strong ties are more likely to be activated in referral than weak ties. They are also more likely to be used for information seeking because in these relationships we are more likely to know that the other person knows. It would also seem likely that similar strong ties are activated for advice on similar products, as we know that those people can help, and have advised before. Rogers suggests that in certain circumstances strong ties may be more credible than weak ties, so that their influence will be stronger (Rogers, 1995).

Along with the concept of tie strength, some researchers use homophily and heterophily to describe the type of structural relationship between people. Homophily is when pairs of individuals are similar in terms of certain attributes such as age, education, sex, social status (Rogers, 1995). People interact with those similar to them ((Laumann, 1966) quoted in (Johnson Brown and Reingen, 1987)). By this
argument heterophilous relationships should be less common and weaker\textsuperscript{71}. It would seem apparent that while people in a network may share common attributes, they can also been very different, such as between generations in a family, or in a workplace. It seems very likely that we associate closely, if not voluntarily, with many who are not similar to us, just as we do not know many who are like ourselves.

In 1983 Rogers lamented the lack of socio-metric analyses\textsuperscript{72} could understand exactly how personal influence and word of month influence in the social network actually worked, as no-one had attempted to track the flow of information in interpersonal ties, weak or strong. (Johnson Brown and Reingen, 1987) are among those (including this study) who have tried to address this issue, using the insights and tools from social network research, looking at negative word-of-mouth and feedback loops in a community by following who-told-who information flow networks\textsuperscript{73}. Weak ties do seem to be important bridges between subgroups, linking micro to macro level in the community. However, strong ties were more important at the level of individual contacts\textsuperscript{74}. It would appear obvious that where information is already known by someone in close proximity then these strong ties are used in preference to the greater effort, and in required to look outside, They suggest that strong ties are induced by situational and environmental factors— as topics arise in everyday conversation (spatial and structural proximity gives rise to relational proximity).

This study also raises a number of methodological points for studying WOM and social networks. Rather than looking at closed networks, it is important to study the role of WOM in an open community, representative of real consumer situations, unlike many of the other closed studies. Given the importance of weak ties and bringing information between close social networks, (e.g., between groups of work colleagues and neighbourhood groups), it is important to look for boundary spanning relationships and ties that were not used every day, One should also include non-users as well as users, who could equally well take part in WOM networks. It is also important to find out not only what people do (such as the moment of adoption), but also look for what people talk about, crucial to understanding the movement of information, and the way that people find out things.
2.11.3 Personal and Relational Influence

Discussion of the role of the social network, and specific relationships and links such as weak ties, and reference groups raises the question of the general mechanisms social and personal influence. (Rice, 1993) proposes a social information processing model coming out of social influence processes where there is exposure to the attitudes, information and behaviour of valued and specific others\(^7\), or classes other others through three specific proximity mechanisms: Relational: the ‘cohesion’ relationship of close contact and communication, where influence and information comes from the groups or cliques we are most strongly tied to, such as family; Positional: the relationship of people with similar status, roles, obligations and activities; which includes organisational proximity and the commonly used idea of Structural Equivalence, where influence is not from personal sharing, but from being subject to similar conditions, pressure and attitudes as equivalent others; and finally Spatial Proximity: physical co-location, or a neighbourhood effect, where just working or living close to someone increases the likelihood of interaction and influence, and involves sharing the same spaces and stimuli\(^6\). Research on specific issues and in specific networks should examine the relative importance of each of these mechanisms, and how they work in practice. There is also the issue of influence being a group effect or an individual effect – the result of shared norms or of personal influence.

Using this type of model, Burt (1987) attempts to identify what sources of influence are more important in terms of the relational proximity (cohesion) and structural equivalence model. His analysis suggests that ‘cohesion’ influence (positional) is only really important for eager innovators, who share their enthusiasm with others of a similar bent, and were also more open to other sources of influence. For most people who adopt later, their reference point is others in structurally equivalent situations. While cohesion can be seen as cooperation, Burt saw structural equivalence as bringing competition into the equation. However it is possible to see that adoption in equivalence occurs when we see that an innovation is relevant to others in similar situations to ourselves.\(^7\).
2.11.4 The Opinion Leader

The role of individual personal influence is highlighted in the concept of ‘opinion leaders’, individuals who have a particular strong relational influence in a network. Diffusion and consumer research literature and practice has long used a model mainly based on a rather inexact reading of Katz and Lazerfeld’s two step model: the “notion of a dominant opinion leader in touch with mass media who exerts a homophilious influence on a set of passive followers” (Gatignon and Robertson, 1985). The early work of Katz and Lazerfeld showed the certain individuals were respected for their opinions by consumers looking for guidance (Katz and Lazarsfeld, 1955). The opinion leader is supposed to be someone whom others will look to for guidance, as an authority in shaping their attitudes and beliefs. They emphasised the informal and familiar relationships that lead people to seek the opinions of those close to them who had knowledge and special interest in the particular topic: “The power of opinion leadership in the kind of face-to-face influence situations which we are concern [with] ... finds expression in informal persuasion and friendly influence, which probably does not derive from wealth or high position but from casual everyday contact with peers” (Katz and Lazarsfeld, 1955, p.325). Later research has opened this concept up considerably. Social network studies show that certain individuals are referred to for advice by many others in the community. However, what sort of advice is being asked, and how do those people get their status? In closed communities this is easier to answer, but what about in open social networks? Other questions include why do people become opinion leaders, and how does opinion leadership relate to innovative behaviour in adoption.

The role of the opinion leader has to be based in an understanding of personal influence. Weimann (1982) points out a number of issues wrong with a simple Personal Influence model, such as comparing negative and positive influence, word-of-mouth and visible influence and opinion and information sharing as well as seeking and giving. Gatignon and Robertson (1985) reviewed the literature in this area and found that the networks people use for information, and those that they are influenced by (conformity) are often different. Negative influence can often be more persuasive that positive influence depending on the credibility of the source, and some people prefer impersonal sources such as the media, while others, maybe those
who are more gregarious, are more likely to respond to influence of others. In
particular, the evidence appears to show that while there is considerable influence
between similar people (homophilious), as the early opinion leader work suggests,
there is also a certain amount of heterophilious influence. Innovators may have no
one in their network to refer to so they have to look outside. This can be related to
the concept of weak ties, and to anthropological concept of the ‘marginal’ – one who
transcends cultures and is critical for dissemination of innovations (Barnett, 1953).

During the period of this research Burt published more work on opinion leaders,
trying to understand what makes someone an opinion leader, and if their influence
really is to ‘lead opinion’ (Burt, 1999). He tries to reconcile the idea of the opinion
leader at the centre of a social group with the idea of the innovator as someone of the
margins of a social network, or with many weak links to other networks. This
suggests that there is a very important role for information and opinion brokers,
individuals with strong links to other social networks or other external information
sources that brings ideas in, but not necessary someone who has a particular
influence within a social group.

2.11.5 Community and Social Network

From the theoretical, we can pass to more empirical work on what sort of
communities exist that facilitate PI and WOM, and the different types of social
network that people have access to. Away from studies focused on diffusion, social
network research has investigated the types of relationships that exist in
communities. In particular, looking at the social network as a resource for social and
economic support, and a source and confirmation of ideas and values. A raft of ideas
and research on communities become relevant here covering the family,
geographical communities, and communities of interest where ideas and interests can
bring people together and form a basis of their relationships, i.e. the content of social
exchange and personal relationship. Central to this has been concern about the
breakdown of traditional geographic ‘public’ communities and the extended family,
and the growth of the personal, or privatised communities (Bott, 1955, Davies, 1993
#173; Bell and Newby, 1974; Fischer, 1977; Wellman, 1982; Crow and Allan, 1994;
The personal community of colleagues, friends and family (kin) is highly dependent on the individual, their life stage and a number of structural factors. Different sorts of relationships also bring with them obligations, and are used for particular functions. Kinship and friendships have different and complementary role, roles which are certainly changing\(^8\). An example of structural differences in social network is between men and women. Gender is still an important factor in the sort of friendships people have, and what they are based on: men tend to have more freedom for sociability, and often base friendship around activities and clubs; women tend to use friendships in a more relational way, with intimacy and relational talk (gossip\(^8\)) more important (Allen, 1996). Relationships reflect shared interests and everyday concerns, so we should expect ICTs to become a part of the talk of friendships as they enter people’s lives. Friendship identity also involves ‘them and us’ distinction, so we should also expect to see talk about ICTs avoided when it is not an issue of common interest.

There are also other important types of communities: those based on organisations such as the workplace or civic life\(^3\), and those around common interests, such as sport or fashion\(^8\). These interests may bring people together, but they also highlight the exclusionary nature of communities of interest. The ‘community of interest’ is a concept that has also come of age with the development of new communication technologies and the rise of the concept of the ‘virtual’(Reingold, 1994). Local community networks may have broken down, but people are able to maintain their own communities extended over a much larger area using the car, public transport, the telephone (Wellman and Tindall, 1993) and now e-mail, SMS and the mobile phone. This not only enables people to hold together traditional social groups, such as the family or the old-boy network, but to belong to new scattered communities of people who share similar interests\(^8\). It also means that we can belong to groups that we choose voluntarily to belong to, and no longer have to rely on the physically local community and institutions\(^8\). There are many example of special interest groups, often with considerable political and social influence now flourishing though new telecommunications technologies\(^8\).
2.11.6 Conclusions

It is clear that most people are members of a number of communities based around a range of ideas and relationships of various strengths and meanings. We use technology to manage more varied and diffuse communities. Research needs to focus on the type of communities that people belong to, the type of relationships they have with others in those groups, and the role that technology can and does play in maintaining them. We have to understand why people belong to communities, what they get out of them, and what they invest in them. We can link this idea of community to exchanges and commitments in specific types of interpersonal relationship. In addition, this theoretical and empirical work on community obviously has important implications for the study of the diffusion of innovations, and the sources of knowledge, sharing, demonstration and support that people can draw upon in their engagement with technology. We have to investigate and understand the actual communities that people live into today, and how they are evolving if we which to understand the diffusion and development of ICTs.

Linking this work on social networks and communities, one is brought to the conclusion that one must look across boundaries of home and workplace to understand the adoption, appropriation and consumption of ICT. From the point of view of domestication the home is just one part of our personal community participation: our everyday life stretches across physical spaces and virtual communities. These real and virtual spaces where we feel at home too, as is recognised in English with expressions such as home town and home country. We can also see the that social network or community provides us with many things. It is a source of information, practical and moral support, practical resources and it influences our identity in many ways. More importantly it is the structure in which we share our lives, and everything in them.

2.12 Particular People: Lifestyle and Identity

This evidence suggests that different individuals in different circumstances will behave in different ways. There have been many ways of trying to classify consumers according to characteristics that can then be used to predict future behaviour. In the broadest sociological approach, class has long been a controversial,
practical and theoretical framework. Geography and demographics, particularly gender, age, education, and economic situation are also very well researched. However, these broad macro-sociological categories have been found wanting, especially as the importance and meaning of gender, social class and age have radically changed in the past century (Livingstone and Bovill, 1999). Nonetheless sophisticated geo-demographic segmentation based on these factors has been developed for marketing.

Consumer research has looked to psychological and cognitive factors have also been introduced as ‘testing’ of aptitudes, values and attitudes etc has been developed, particularly trying to link attitude to opinions and behaviour. Attitudes tend not to link to actual behaviour, they seem to shape the acquisition of information. Information can be obtained accidentally, by systematic acquisition and by invention of facts to fill gaps (Chisnall, 1985). Attitude towards something shapes the systematic acquisition of information, and also the information that is invented.

More recently the concept of individual ‘lifestyle’ has attracted considerable attention among market researchers trying to find new categories that are focused on the consumption behaviour of people, rather than on, say, their political attitudes or health. The concept of Lifestyle groups people according to supposedly common characteristics including attitudes, values, family status, occupation, education etc, cutting across traditional demographic segmentation. Those with different lifestyles can be seen as having particular needs and attitudes to different product classes, and different resources available to adopt and use them. What these approaches do not show is how people see themselves and how these categories are constructed in real life, and why they should be relevant to the consumption of ICTs.

Others have tried to understand why people classified in certain categories, such as class, gender, tend to have certain attitudes, behave in particular ways or hold certain values: what is it about particular economic conditions, education, upbringing etc that creates a recognisable category, and appears to make people behaviour in certain ways. The idea of capital, whether it be economic, educational, cultural (Bourdieu, 1979), social or other has been suggested as an important feature of social categories.
There are not only features internal to each group relevant to creating categories: the relationships and contrasts between groups is what makes the differences important. Those in different groups are not only the object of the conditions, but identify with a social category, its conditions, values, etc. Defining oneself in opposition to others is also important: it is not only internal factors that are important, but also the contrast with or ‘opposition’ to the values and tastes of others (Douglas and Isherwood, 1979, 1996; Douglas, 1996)\(^4\).

Another issues that challenges the idea of fixed social categories is a recognition of the way they change internally, their response to external change, and the movement of people from one category to the other. Classifications are rooted in cultural and material differences, and these are constantly in flux. The individual is also not the same as their classified group – each person moves between classifications, aspiring to other sets of values or material circumstances. Groups can also change as others aspire to join or change it. Technical innovation can provide the opportunities for people to challenge their culture and move out of it, consciously or not, or the opportunity to appropriate its products to maintain their culture. It can also provide considerable challenges to values and lifestyle, as they coerced into living in news ways, and have to defend existing values. A new technology can also be strongly associated with another culture, and rejected, or used as a symbol of the vulgarity, indecency, corruption etc of the other culture (e.g. dangerous hackers and computers, mobile phones and yuppies, Internet and paedophiles, satellite TV and ‘working class’ culture).

If a technology is forced upon someone, then they may have some conflict of identify about what it means to use or own the technology. The process by which they make it their own or find a mechanism to cope with and control this ‘alien’ creature we have called domestication. This implies tension and the need for control, and the possibility of avoidance and divestment, as much as the idea of peaceful cohabitation. Some people find they have to have a technology, but put strict boundaries around its use, and would b very happy not to have to deal with it. Other people embrace the technology, and experiment with introducing it into other parts of their lives. Both approaches involve innovation and the development of new rules and routines.
Some people will embrace the technology but remain within the mainstream uses. Other people will use it to subvert, to get round restriction, or to undermine established norms of ‘other’ cultures. The mobile phone can be used to remain tied to other people, but can also be used to remain isolated. The Internet can be used to do home shopping, or it can be used to distribute illegal software, documents and music copies.

The idea of opposing lifestyles is fundamental to the idea of boundary, that on either side of the boundary there are opposing activities, values, communities that are somehow incompatible. In the study of attitudes to technology, oppositions of gender, age, personality are strong. ‘That’s for young people, I’m too old’. ‘Only kids can understand this new stuff’; ‘It’s something the men talk about’, ‘that’s women’s business, I don’t get involved in it’.

In the field of adoption, appropriation, domestication and consumption of ICTs, there are a huge range of factors, psychological and social categories that have been investigated, including not only established groups from social science, but also new categories specific to consumer behaviour and to current ICT. A review of some of the research in this area including the idea of life form applied to teleworking, telecommuting, and flexible working (Qvortrup, 1999), and the types of users of web based media service is include in the Appendix. There are also issues of change over the life cycle that are very important for the adoption of new technologies: at different ages people have different motivations, experiences and commitments that shape their needs, attitudes and resources to adoption and use technology. Again, an exploration of these issues is available in the Appendix.

### 2.12.1 Adopters in Diffusion: Innovativeness

Diffusion researchers have tried to classify people in an adopting community according to the time in the diffusion of an innovation that they adopt a particular innovation. According to this one can measure the innovativeness of a consumer. Innovativeness was originally defined by (Rogers and Shoemaker, 1971) as “the degree to which an individual is relatively earlier in adopting an innovation than other members of his social system”, where an innovation is “an idea or practice or
object *perceived as new* by the individual. They developed a “mutually exclusive and simple system” where adopters are divided in time on an ideal S-curve of diffusion\(^5\).

<table>
<thead>
<tr>
<th>Innovators</th>
<th>2.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early adopters</td>
<td>13.5%</td>
</tr>
<tr>
<td>Early majority</td>
<td>34%</td>
</tr>
<tr>
<td>Late Majority</td>
<td>34%</td>
</tr>
<tr>
<td>Laggards</td>
<td>16%</td>
</tr>
</tbody>
</table>

**Table 2 Ideal normal spread of adopters (Rogers and Shoemaker, 1971)**\(^6\)

Numerous studies of innovativeness have come up with some broad general socio-economic predictors of innovativeness, for example, age not a factor, and formal education and literacy are important. Earlier adopters have higher social status, they have a higher degree of upward mobility, and innovations may be a way of getting there. They also have larger economic units (e.g. as owners or managers of farms, factories etc). However, while this give some general indications of innovativeness, the scale based solely on time taken to adopt. There are other problems to with this classification according to time to adopt:

1. The actual empirical evidence for these consumer traits in the literature is weak (Gatignon and Robertson, 1985).
2. Do innovators innovate because they are richer, or richer because they innovate? Many rich people do not innovate, but rich innovators can take the risk better (Rogers, 1995).
3. This post-diffusion scale does not work when there is only limited adoption in a community, and it does not account for those who do not adopt at all. (Rogers, 1995).

Products evolve during periods of diffusion. Technology development and developing uses modify the product, the meaning changes over time, and there is product diversification e.g. in the case of the ‘computer’ the earliest users had a very large expensive machines for industrial use – anyone following the ‘diffusion’ of the computer would have to follow a vast range of product that this has turned into. What the product actually is comes into question, as does the differentiation between products.
• Earlier and later adopters are very different in the way that they judge products, and the feature that are important, but they are complex rather than simple differences (Cestre and Darmon, 1998).

• When there are succeeding generations of products in the marketplace those who adopted one product early may appear to be late adopters of a subsequent generation of products.

• An individual may be innovative in one area does not mean they are innovative in another product field: “there is not a generalised innovator across product category or interest domains” (Gatignon and Robertson, 1985).

• Innovativeness in this case applies to the purchase of the product – not to the invention of new uses, adaptation, development of new meanings etc, which can occur in subcultures well down stream.

• What one individual perceives as innovative may not appear so to another – a product may be seen as uninteresting if it does not possess certain qualities that are perceive a new or important – e.g. GUI (Graphical user interface) over command line interface.

Many people have tried to understand what it is that makes someone innovative in their adoption of new products, as there are clearly many social and contextual issues involved (e.g.(Hirschman, 1980; Gatignon and Robertson, 1985; Midgley and Dowling, 1993)). Hirschman (1980) in particular, looked at a number of features of consumers to see how they related to innovativeness, and proposes three dimensions of innovativeness: *novelty seeking; role accumulation (life changes that trigger adoption)* and *creativity* in problem solving based on experience with technology; and accumulated *scripts* or strategies for dealing with innovation are the basis of innovativeness. This could also be referred to as *expertise* (Alba, 1987).

Hirschman also suggests that three types of innovativeness be distinguished, and investigators should pursue all three in their research: *Adoptive Innovativeness*: the actual adoption of new products, *Vicarious innovativeness*: the acquisition of information on new products, and *Use innovativeness*: which may not involve the adoption of a new product, but rather the novel application of an already adopted product. While the construct of innovativeness is interesting as a personal
characteristic, Hirschman focuses on the more interesting questions of how and why people are innovative: what are the circumstances that lead people to innovate, or allow innovation and what are the resources we are able draw on.

One result of this type of approach is to reconsider the widely used categories of consumers, such as innovator and laggard. Midgley preferred to develop the concept of innovativeness based on characteristics of the individuals with a definition of innovativeness as “the degree to which an individual is receptive to new ideas and makes innovation decisions independently of the communicated experiences of others” (Midgley and Dowling, 1978, p.236). The innovator is now seen as someone who is not influenced by their social network or community rather than the first to adopt ((Bass, 1969) in (Gatignon and Robertson, 1985)). The innovator may adopt at any point through out the diffusion process, the fact that others have already adopted does not make their adoption or use any less innovative – indeed later adopters may be those who are more creative in their use of an innovation than early adopters. A heavy user of computers adopting the latest machine is hardly being an innovator, while the first person to use the machine for an entirely new purpose, or in a situation where computers have never been seen before is an innovator.

Rogers himself points out the problems with the concept of laggard, which as generally been taken to be someone with low innovativeness, resistant to change etc (Rogers, 1995). In fact the laggard is someone who may be innovative, or would otherwise be willing to adopt, and have the need, but is excluded for systematic reasons, such as lack of money, or is never exposed to the existence of an innovation due to their structural and institutional situation. Many new technologies could be relevant to a huge range of people, but they do not have the resources, and those promoting the innovation take the easiest route to promotion by going to existing user groups, and not attempting to promote the technology to others who may eagerly adopt once they are aware of the possibilities.

Other researchers have developed ways to classify consumers and users of ICTs according to their lifestyle and to their attitudes and use of new ICTs (Haddon and Hartman, 1997). However instead of basing their classification on the time of adoption they try to derive it from an analysis of individuals and their environment.
For example (Clerc and Mallein, 1998)⁹⁹, consider products based on individuals and four structural variables, time, space, self and relations with others. They look for the meanings that an individual may give to a technology as they assess with respect to technologies they are familiar with, their everyday activities, the professional and personal identities and their professional and personal environment¹⁰⁰. They pick up on the point that the main aim for technology developers is to satisfy the ‘pragmatics’, those who are curious and keen to know how they can benefit from the technology (Dunphy and Herbig, 1995). The ‘passionée’ or innovator does not matter, since they are in a world of their own, adopting indiscriminately, rather than rationally (Sheth, 1981). The only possible benefit is that they can play an important role in innovating uses, and acting as ‘experts’ for other groups. They suggest two other main groups as well: people who are not so enthusiastic, and even resent the technology coming into their lives, but recognise that it is a useful tool for their work and have to get on with it; and a group that really resent the technology or do not feel able to cope with it in any way.

2.13 Resources, Barriers and Triggers

This approach of looking at structural features and at the resources and opportunities for innovation leads to two final issues. First, we need to understand how particular practical resources and barriers are currently shaping the way people see new ICTs and the way the adopt them. Second, the adoption of innovations is often dependent on a trigger factor, such as Hirschman’s role accumulation that makes people engage with that innovation.

Dholakia, Mundorf et al. (1996b) identify four practical constraints that influence ICT adoption and use: money, space, time and skills¹⁰¹. In a similar way to Williams and Edge (1996), they stress that limitations in resources do not limit adoption and use, but shape it. For example, time constraints may encourage people to adopt certain new ICTs to save time, while leisure time encourages people to spend on time-filling products. They suggest that for ICTs this shaping is often in the direction of simpler, smaller and cheaper products: limits on the resources of potential users drive innovation by producers to solve the problems of resource limitations. When adoption of technologies is widespread, these limits on resources start to be seen as
barriers to adoption, preventing certain consumers from benefiting from advances that have found acceptance and use by others. Producers identify particular barriers to adoption in different market segments or among groups of consumers, and focus innovation in technology and marketing on reducing their saliency (Hughes, 1983, p.80).

The concept of trigger to adoption is suggested by (Stewart, 2000a). Adoption purely for the sake of interest in the technology itself is generally the preserve of the richest technology enthusiasts. For the rest of us there has to be some internal or external motivation for adoption. In the case of cybercafes I suggest four main categories of trigger: 1) Life Events: major changes in circumstances or occupation; 2) Social Push: the influence of the social network; 3) Multimedia Pull or Instrumental need: the failure of existing technology or techniques to work satisfactorily; and 4) Curiosity and Interest in technology or content the desire to develop knowledge in a new area, not restricted to the technology, but also how and why others are engaging with it. This approach emphasises the emergence of particular, contingent factors that motivate people to investigate and adopt, rather than relying on rather general, or deterministic ideas of need and absolute resources.

Many of these issues identified in this section raise the question of why people do not adopt innovations: what attitudes, resources limitations, of lack of triggering motivation lead us to ignore, delay and resist new technologies that seem to hold so much promise.

2.14 Resistance, Non-adoption and Technophobia

It is tempting to only look at why people adopt and use new ICTs: in adoption there is a process to follow, a ‘before’, and an ‘after’, a conclusion to the process. Current users are expert on their usage, and can easily talk about what it means to be a user, as well as recalling how and why they became a user. However, as those in marketing and sales know too well, one also has to understand why people do not adopt an innovation, or indeed any existing product or activity. Social studies of science and technology have also stressed the importance of a symmetrical approach to investigation: we must look at failures as well as successes. In this case, from the perspective of technology developers, or those with a positive view on the
development of the ‘Internet’ or ‘information’ society, non-adoption is a failure of the product, but is this really the case?

Asking the question ‘how do people not use?’ is also rather strange, but none the less legitimate. In the chapter on how people use new ICTs (Chapter 6), the ideas of proxy use and reliance on others will be raised and illustrated. This section looks at the evidence for why people do not adopt an use particular technologies, and new ICTs in general, the strategies and process of non-use and non-adoption. It also looks at accounts of the experience of being a non-user or rejecter in a world where many are taking up these innovations.

Much consumer research on non-adoption looked at the individual, and saw their non-adoption as some sort of a personal problem – non-adoption could be blamed on them ((Rogers, 1995)). Rogers points out that non-adoption, and discontinuing use is often a good, rational decision, it is the fault of the product and the promoter. There are also structural or institutional reasons for not adopting, often highlighted by anthropologists, and social scientists looking for reasons why the system excludes certain groups, such as women, ethnic groups, the elderly etc. (PAT 15, 1999; Shaddock, 1999; PAT 15, 2000). In many cases non-adoption is the ‘normal’ behaviour, given the costs and lack of relevance of most innovations (Dunphy and Herbig, 1995).

Rogers (1995) highlights the need to do studies of adoption and rejection asking the question ‘why’, and investigating the process in action rather than after the fact. However Rogers is also a promoter of taxonomy of adoption that groups adopters according to the time that they adopt in the diffusion of an innovation. ‘Innovators’ are the first to adopt, and the last to adopt are ‘laggards’ which is widely taken to mean that they are somehow backwards, traditional, uneducated etc. However much other research ((Stoorgaard and Jensen, 1991; Berg and Aune, 1993; Bauer, 1995a; Wilkes, 1995; Miles and Thomas, 1996; Glassier, 1998; Mick and Fournier, 1998) show that there are many reasons why people do not adopt particular technologies, because they are unable, because the products are irrelevant, because of community rules”, there are ‘better’ alternatives, and because even minor innovations may
involve considerable restructuring of social relationships, the obsolescence of skills (Dunphy and Herbig, 1995), and so on.

Non-adoption and non-use are not the ‘mirror image’ of adoption and use (Gatignon and Robertson, 1991), but a part of a range of different strategies for dealing with the appearance of a new innovation. Non-adoption and non-use can be sophisticated strategies of the informed and empowered as much as the result of ignorance or fear. Non-adoption and non-use are not one type of behaviour that can be contrasted with adoption and use, just as non-adopters are not the ‘opposite’ of adopters.

In the case of my ‘experiment’ in the Internet or information revolution, I am looking at what innovations come into the view of ‘ordinary people’ and whether or not are adopted, or rejected, or just ignored. The way that people cope with new innovations around them involves a range of strategies that include both appropriation and rejection. I look at this process in detail, knowing what products and ideas are being generated by industry on the one hand and on the other noting tracking their relevance, availability and appropriation by individuals and groups in society. There are broad classes of products being developed, such as mobile telephony, the Internet, commercial tele-services, interactive television, and many particular instances, from the latest PC or mobile phone, computer game, on-line banking service, to every new Internet auction site and on-line discussion groups. When someone does not use a particular product or service it may mean the rejection of that innovation a class of products, or of a particular configuration. In a period of social and technical change, this rejection may not last long: circumstances, knowledge and services and technology all change very quickly, and an non-adopter, or rejecter, may become an expert user within a few years.

This change creates unusual circumstances for adoption. The normal diffusion process for an innovation means that the knowledge and example of use of innovations takes time reach people. When these innovations are changing rapidly, and occurring in many different areas of life, many alternative messages and examples are being passed around, often conflicting and confusing as well as stimulating. Innovations often challenge the existing order and activities, and until
there is some stability, many people will see them as either unnecessary, or destructive. Only a minority will be forced to adopt, or have the resources or inclination to experiment and innovate themselves.

A feature particular salient to ICTs is that early technology has been complex and demanding of expert knowledge, creating an image that it is out of reach and irrelevant. Early uses and users have been highly specialised or remarkable, and the innovation comes to be linked to those users and uses, even though it may have become much more accessible. The same is true today: innovations in new product categories are often fraught with problems and hard to use, making it a rational to wait and see before adopting, even if one is interested and has the resources (Chapter 7).

2.14.1 Resistance to Innovation

There are a number of different research literatures that investigate issues of resistance and non-adoption.

1) Diffusion of innovations literature looks at non-adopters of particular products according to the time in the diffusion of an innovation that they adopt, and tries to find ways of predicting why some people adopt later than others. This involves looking at the importance of psycho-demographic variables, age, gender, income etc, and developing constructs such as innovativeness and cosmopoliteness to explain adoption tendencies. Resistance can be measured through rate of adoption and non-adoption in different markets (Bauer, 1995b). It also looks at the characteristics of the technologies and the supply network and the way they fail to satisfy and delivery appropriate products to all potential users. This study of adoption develops models of processes of adoption, suggesting different stages in a process where non-adoption decision can be made. However limitations in focusing adoption have lead to the conclusion that rejection needs to be studied as well (Midgley and Dowling, 1993).

2) Domestication and Appropriation literature looks at how a community adopts technologies, the different interpretations and levels of engagement that different members of the community have with a technology, and how it becomes integrated into the relationships and activities of that community. The members of a community generally have different degrees of use and control of a technology, including those
who have very little use and highly resistant to the product or service. Nonetheless they are obliged to deal with it in their community from the perspective of an outsider. The approach looks at the strategies that are used resist and control the adoption and innovation of technologies and activities associated with them.

3) The technophobia approach looks for reasons why people do not adopt or use a technology, even to the degree that they suffer from being in contact with it, or from not being able to use it. It tries to understand the social and psychological issues behind their non-adoption and non-use (Brosnan, 1998). This approach helps understand seemingly irrational resistance to technology. It is often measured by psychometric tests.

4) The exclusion approach looks at why some people in a community do not and cannot engage with new technologies, and the ways they might suffer extreme anxiety or be excluded from economic and social life, and personal development as a result of not adopting a technology (PAT 15, 2000).

5) The resistance to technology approach looks at the reasons why people oppose and resist technical change, and the strategies they use to articulate this resistance. It looks at degrees of resistance and non-adoption, and differentiates different types of resistance to technology (Bauer, 1995a; Szmigin and Foxall, 1998).

In addition, adoption models of the consumption and appropriation of technologies can also be used to look at why people do not adoption and do not use particular products from a cultural perspective. Models of how we consume products can be reversed to look at how we do not consume, highlighting issues of personal and community identity, the role of personal networks, negative subjective reactions to technologies and difficulties of integrating technologies into activities and communities.

2.14.2 Rejection and Resistance

I have used the words rejection and resistance here, as synonymous with non-adoption and non-use, but this is not the case. Nor do these words completely capture what non-adoption is about. There are many reasons why people do not adopt. Rejection implies making a choice not to adopt and use. However there are other
reasons that are very common, such as lack of resources and money, lack of skill, or total ignorance that there is an innovation to adopt at all. Why people reject is still a problem for industry and research, as many people who it would appear could benefit from an innovation and would appear to be interested do not adopt (Midgley and Dowling, 1993).

The concept of rejection does not only apply to a decision not to adopt a particular innovation, but covers a range of actions that include rejecting an entire class of technology or innovation, as in the case of someone who decides not to use computers. There are other dimensions to the way we decide to reject a technology. The rejection may only apply to a part of life, such as deciding to keep computers out of the home, or private life, despite adopting or embracing them in professional activities.

Other researchers prefer to use the general term ‘resistance’, which implies the blocking of the oncoming train of innovation. Resistance can have various motivations that are based on specific fears and grievances, such as fear of job loses, or specific environmental damage, to more general moral or intellectual objections to innovations, especially backed by industry. As well as the type of resistance, we must also take care to see what the target or object of resistance is suggested noted earlier. Bauer suggests a four possibilities: the machine’, (Luddites), the industrial or government power behind an innovation; the implementation of an innovation; or a particular aspect of an innovation. In information technology Bauer suggests the objects of resistance are often the consequences of innovation e.g. privacy invasion, data misuse and control, VDU radiation and RSI, use of artificial intelligence, loss in quality of working life, de-skilling, changing job structures, bad user interfaces, redundancies, and concern over issues such as pornography, hacking, and databases (Bauer, 1995b).

This resistance can often be part of a social movement. On the other hand it can be based on personal anxieties and attitudes commonly considered to be ‘irrational’, sometimes called ‘technophobia’.

Whether using the term rejection or resistance, it is helpful to differentiate three groups of objects of resistance:
• Resistance to, or rejection of technical innovation in general.
• Resistance to a class of innovations, such as ICTs.
• Specific resistance or rejection of a particular innovation.

While inter-linked, for the individual and their community the motivation and performance of the resistance can be very different depending on the level. By deciding not to use new ICTs, a non-adopter does not have to decide to reject any particular product, but someone choosing a new computer has to make the choice of one, rejecting all the others.

Bauer (Bauer, 1995a) investigates the idea of resistance to technology, or the ‘refusal to comply’ with expected or ‘normal’ change\textsuperscript{107}. Developing a taxonomy of resistance based on active or passive resistance, classes of resistive action, and the level of resistance He proposes three distinctions: \textit{rational/irrational} resistance which highlights that much apparently irrational resistance is perfectly rational; \textit{resistance/opposition}, where resistance is based on holding values opposing those of the system that is promoting a technology; and the problem of self reference, or \textit{avoidance behaviour}, often because it takes no effort not to adopt\textsuperscript{108}. These distinctions are also found by other researchers (Mick and Fournier, 1998; Szmigin and Foxall, 1998)\textsuperscript{109}. There is a continuum of behaviours (Fournier, 1998), from passive avoidance to an active opposition, passing though various strategies of minimisation of contact that do not involve confrontation with the system or source of the technology, but involve coping with it in a more personal or private manner.

\textbf{A Resistance Continuum}

- Avoidance Behaviours
- Minimisation Behaviours
- Active Rebellion
  - Coping Strategies
  - Downsizing
  - Complaining
  - Dropping out
  - Boycotting
As well as these main types of resistance, there are different ways they can be put into effect: Bauer suggests two types of resistance – active and passive. Active resistance is taking positive actions to avoid or fight against innovation. Passive resistance is ‘wilful inactivity’. One manifestation of this wilful activity is a delay (Mick and Fournier, 1998) or postponement (Szmigin and Foxall, 1998) in adoption of a product, with the expectation that one day it will be adopted, but for what ever reason it must be put off.

(Nabih, Bloem et al., 1997) attempt to bring together some of the ideas about how people reject or resist technologies with a simple linear adoption model. In a review of the literature they suggest that there are both active and passive resistance and acceptance of innovation that occurs at different levels of engagement with the product. Depending on how and when they rejected an innovation a non-adopter could be “classified as belonging to either resistors, postponers or rejecters” (Nabih, Bloem et al., 1997, p.192). On finding out about an innovation an individual can either ignore it (passive resistance), or in some cases proceed directly to trialling or using it (as in the case of many imposed systems). If they are interested and move to an evaluation stage and subsequently do to consider it worth adopting, then the resistance is ‘active’. However even when there is a desire to adopt the product, this may be postponed, for some reason. Finally if they trial it and it is not satisfactory, then this can be called rejection. They offer a diagrammatic summary of this argument.
Figure 4 conceptual framework of innovation responses (Nabih, Bloem et al., 1997)

This type of conceptualisation is probably useful and needs examined in the light of evidence.

There certainly various levels of resistance, expressed in different ways, and with different targets for resistance. We can resist physical influences in our everyday lives, and put up cognitive resistance to the external information such as the media. Cultural and symbolic resistance can also be created or used, such as participation in ‘alternative lifestyles’ (Gabriel and Lang, 1995; Douglas, 1996; Dobscha, 1998; Schor, 1998), consuming alternative media and cultural products, or making political or legal stands. What ever the type of resistance, these strategies are positive, and active, based on perceptions that the problems that the technologies will bring to our lives, such as ‘enslavement’ to the product, or the chaos and risk of early obsolesce that can come from adopting an early model. (Mick and Fournier, 1998).
It is clear that there are two issues: why people resist, reject or ignore, and how they do it. Both are related to the innovation and circumstances, and one often gives rise to the other.

2.14.3 Technophobia

One approach to explaining resistance to or avoidance of ICTs, and particularly computers has been to label this behaviour Technophobia. Technophobia implies some sort of irrational reaction to technology that is out of proportion with a 'normal' reaction to a machine. The source of this reaction, and whether it actually is irrational has been the subject of considerable research among sociologists and psychologists, particularly those studying gender and education, since technophobia appears to affect many more women than men\(^\text{111}\). Surveys and studies suggest that a third of the population show some of the signs of technophobia ((Brosnan, 1998) (BMRB, 1999))\(^{112}\).

Rosen and Weil (1990) suggest different dimensions of technophobia related to computers: anxiety about current or future interactions with computers or computer-related technology; negative global attitudes about computers, their operation or their societal impact; and specific negative connotations or self-critical internal dialogues during actual computer interaction or when contemplating future interactions. They identify three major groups of ‘technophobes’ (Rosen et al. 1993): *uncomfortable users*, who feel they lack some knowledge, *cognitive technophobes* who may appear calm, but have negative thoughts, and *anxious technophobes* with classic anxiety features, sweaty palms etc. There are a number of different ways that a computer phobic can react to technology: *behavioural, emotional* and in their *attitude*, all of which can be revealed by observation and in discussion about technology\(^{113}\).

While technophobia can lead to resistance and rejection behaviour, negative emotions and attitude can persist when we are obliged to use machines, when it can result in stress and poor performance. Even successful use can still entail negative attitudes and general avoidance, as we shall see in discussion of ambivalence.
2.14.4 Common Features of Non-adopters

When we look at a group of individuals, can we find similar reasons for not adopting a range of technologies, or are the reasons specific reasons for each person and their circumstances? This question addresses whether we can create analytical categories of ‘non-adopters’, ‘technophobes’, ‘technology rejecters’, united through common characteristics, or whether these categories exist only in contrast to ‘adopters’, ‘innovators’ etc. Another way is to try and link attitude and adoption of technologies to other characteristics, such as those identified in psychographic tests and demographic factors\textsuperscript{114}. Many marketing studies try to find different groups of consumers that have common consumption characteristics, based on demographics, such family status, employment, and education, grouped together with various ‘lifestyle’ attitudes and activities. Many of these can be useful, as long as they are continually updated. Even so, although they may offer a guide to whether a someone is more or less likely to adopt and use a technology, and how they use it, there are often many people in the group who do not conform to the stereotype. I will not attempt to recreate this type of categorisation according to demographics, although demographic issues emerge as being important: instead I look in much more detail at how particular contingent activities, life themes, events, relationships and experiences come together, illustrating how people become, and construct themselves as non-users, and how they experience this.

There are also many ways to be an non-adopter or a non-user. Just as there are ways to adopt, there are strategies to reject an innovation, avoid adoption, and avoid use. Strategies such as ‘wait and see’, or the avoidance of all contact with information about ICTs are common place. These strategies are developed in the light of different pressure and motivations both to adopt and to avoid, such as workplace pressure to use ICT, and fear of technology. As well as looking at the question – ‘why does X not use Y technology?’ one needs to look at the experience of non-use: what does it mean to be a non-user in a world where many people are adopting, and new technology is becoming an increasingly important part of everyday life. As other people become users, and people are offered at least the possibility to adopting, how do they feel and live as non-users. Does it affect relationships, job prospects, work efficiency, self-image? Are there positive benefits felt from not adopting particular
products, classes of products, or limiting their use to particular parts of life? Or are those who do not adopt new innovations held back by circumstances, and feel they could be missing something?

2.14.5 Non-Adoption of ICTs as Non-Consumption

While it is suggested that resistance should not be seen as the mirror of adoption, it is very useful to apply an analysis of consumption to resistance and non-use, to see the issues involved in ‘non-consumption. The model introduced by Holt that highlighted identity, practical and social uses and subjective engagement can be used to generate a more detailed set of possible factors involved in non-consumption of ICTs.

**Subjective reaction:** The emotional and attitudinal responses identified by Rosen and Weil (1990), including fear, anxiety, dislike, feeling overwhelmed, boredom on one hand, and feeling too old, that a technology is a waste of time and money, unhealthy, gut feelings of resistance and rejection of the technology or something about it, such as its political association with big business, or personal association with work, school etc.

**Integration** – *relevance, instrumental, practical, ownership, meaningfulness:* One is unable to integrate a technology into ones activities, whether productive or personal. This includes a judgement that a technology not relevant to personal activities, it is too expensive, of no use, or disappointment with its facilities, such as it not good enough or having poor performance, or comparing it with a better alternative. It may also be because one does not have appropriate skills, cannot get access, or can rely on someone else’s use. This leads to a failure to personalise/appropriate, or negative appropriation experiences.

**Classification:** This deals with to self-identity as a *non-user, non-knower, non-owner,* particularly judged against others. We may define others as what we think we are not, such ‘nerds’, computer people, TV people, experts, yuppies, business people, richer people. Against this our self identity can be both negative and positive Negatively, as a non-expert, an outsider, idiot, being too slow, feeling inferior or stupid. Positively, as having a more ‘natural life’, being an outdoors person, a people person, or a family person. This raises issues of the relationship between self and others similar, and self and users/adopters/experts.
**Play or Social Interactions:** This covers relationships with others around innovations. On a negative note being a non-user may mean not being able to take part, exclusion from conversations, being bored by others more enthusiastic, or avoiding situations where technology is a key shared experience. Social relationships can also be used to remain non-expert/user, relying or exploiting on others. A non-user can also be an active participant in ‘play’ around technology such as by arguing – playful or serious, where technology remains topic of conversation without use.

We can use this approach to hypothesise the responses to the imposition of a technology on someone who manifests some sort of resistance. There are three responses to this: a satisfactory appropriation, where the conflict of a non-user becoming a user is resolved; ambivalent consumption, where problems of appropriation are not solved; and dissatisfaction, where initial acceptance turns to resistance after a certain time.

*Resolution of conflict:* Initial fear of technology replaced by an attraction. There is a reclassifying of self and the technology. The technology becomes subject of social interactions; and it is integrated into everyday activities successfully.

*Continual problems* Barriers are not overcome. *Subjective dimension:* there is continuing uncertainty, insecurity, and dislike; *Classification:* there is a fear of becoming too much of a nerd, don’t want the responsibility for the machine or task, feel oneself becoming a poor user, or less efficient worker, or maybe a trouble maker for those around.; *Integration:* There are limits of time, space, resources for new learning and personalisation, the technology does not fit in, and does not make tasks any easier or satisfying; *Play:* Adoption takes him/her away from the social group, so that non-use is no longer a shared experience etc.

*Rejection after use:* After a time of use problems arise, such ‘over-integration’, social isolation, distrust of the machine, an frustration with problem. There has to be a process of ‘re-incorporation’, or ‘dis-integration (e.g. stopping home use of a computer after work takes up too much family time).

Of course many real situations will combine problems and benefits. Even if there are problems with a computer system at work, this can be a shared experience bringing people together. A piece of technology may be very attractive, but in fact turn out be
useless in any practical way. Depending on the type of problems that people find in their encounters with ICTs there are going to be and different strategies to solve or deal problems, some of which may be strategies of resistance. These strategies of resistance can manifest themselves in various degrees. Miles (Miles and Thomas, 1996) identifies a number of levels of resistance of technologies:

1. Resistance to using a particular feature of a technology
2. Resistance to changes in Product design
3. Refusing to apply technology to particular application.
4. Resisting any use by oneself
5. Rejecting any use at all

Limiting use of technologies is probably a feature of nearly all users, and represents the way that we make a bounded place for technology in our lives. These limiting and coping strategies are often the result of experiencing opposing attitudes and emotions towards technology, leading to ambivalence.

2.15 Ambivalence in Consumption
A number of researchers have investigated the concept of ‘ambivalence’ in the adoption and consumption processes. Ambivalence is the co-existence of opposing or contrary feelings. (Ottes, Lowrey et al., 1997) reviews the literature on ambivalence and in research on the consumption of a wedding dress bring out the different types of strategies people use to deal with ambivalence There are various dimension to ambivalence according to their analysis, psychological, cultural and sociological, along which conflicts can occur. These conflicts can all be seen around ICTs from studies in the domestication of technology literature, and are issues raised daily in the press. For example there is a huge choice of computers and mobile phones, let alone web sites to use. People need strategies to deal with this. Some are strategies that can be put in place oneself, but industry also responds to the need, with the development of Internet search engines, magazines on consumer goods and the Internet, shops advertising their ability to help the customer through the minefield of products etc.
Mick and Fournier conducted a series of in depth studies of the paradoxes of using and owning ICTs (Mick and Fournier, 1998) and found similar types of coping strategies. Their respondents had to deal with uncertainty and complexity (Table 4).

<table>
<thead>
<tr>
<th>Coping Strategies</th>
<th>Emotional Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-acquisition avoidance</strong></td>
<td></td>
</tr>
<tr>
<td>Ignore</td>
<td>Avoid information about technology, characteristics or availability</td>
</tr>
<tr>
<td>Refuse</td>
<td>Decline opportunity to own</td>
</tr>
<tr>
<td>Delay</td>
<td>Postpone ownership</td>
</tr>
<tr>
<td><strong>Pre-acquisition confrontation</strong></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>1. Use someone else’s temporarily, 2. Purchase intending to return</td>
</tr>
<tr>
<td>Extended decision making</td>
<td>Taking stock of needs, information search, calculated purchase</td>
</tr>
<tr>
<td>Extended warranty/maintenance contract</td>
<td>1. Buy additional insurance 2. Service agreement</td>
</tr>
<tr>
<td><strong>Consumption avoidance strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Neglect</td>
<td>Temporary indifference towards product</td>
</tr>
<tr>
<td>Abandonment</td>
<td>1. Discontinuation of use 2. Non-repair</td>
</tr>
<tr>
<td>Distancing</td>
<td>1. Restrictive rules of use 2. Placing object out of way</td>
</tr>
<tr>
<td><strong>Consumption confrontation strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Accommodation</td>
<td>Changing routines, preferences, tendencies according to perceived requirements, abilities or inabilities of a technology possession</td>
</tr>
<tr>
<td>Partnering</td>
<td>Establishing a close, committed relationship with technology possession</td>
</tr>
<tr>
<td>Mastering</td>
<td>Dominating a technological possession by thoroughly learning its operations, strengths and weaknesses</td>
</tr>
</tbody>
</table>

Table 3 Strategic behaviours for coping (Mick and Fournier, 1998)

The idea of ambivalence and coping appears to be a useful to the understand the conflicting emotions, and the problems faced when adopting new technology, or living in an environment where people are adopting. Such conflicts could include:
- non-adopters feeling left out, left behind
- adopters hating the computer but not doing without it
- mobile phone against principles, but need to have one

Otnes et al. (1997) show that there is conflict between expectation and reality. In the process of adoption and non-adoption this idea of ‘expectation’ is very important. We often have a number of expectations, both positive and negative, about adopting
a product, and of resisting it\textsuperscript{16}. Actual adoption may not be determined by expectations, but the way we appropriate is. Of course on adopting something expectations can be confirmed or overturned leading to satisfaction, disappointment, surprise at benefits or confirmation of negative expectations. One way to follow this process is do to a longitudinal study of technology encounters and adoption.

\textit{2.15.1 Satisfaction, Dependency and Love of technology}

The adoption of a product can lead to a number of different emotions. Our experience of these is not just based on a naïve engagement with the technology, but as we have seen it is just the next stage in an appropriation process that included the formation of expectations prior to adoption. Pre-adoption expectations are formed through our engagement with the idea of the being a user, or the benefits and costs, personal and vicarious trial etc. This process does not stop when we adopt, although of course this is a major event in confirming or disproving expectations. Mick and Fournier (1995) investigate the idea of satisfaction, taking it beyond a rational model of ‘satisfaction’ with a product based on pre-adoption criteria. They find that satisfaction is seldom based on pre-consumption assessment, but emerges and is constantly under revision. Building on models such as Oliver’s five modes of satisfaction – Contentment, Pleasure/Displeasure (relief/regret), Novelty and Surprise (Oliver and Swan, 1989), awe, love, trust, dependency, frustration and helplessness are identified as alternative dimensions of satisfaction\textsuperscript{17}. This highlights that satisfaction can come from absence of negative expectations as well as positive factors, and it often involves the development of quite intense subjective feelings towards the product.

Most consumer studies look at level of satisfaction based on the transaction, and the confirmation or dis-confirmation of pre-consumption standards, and how this can be used to predict attitude change, repeat purchase etc. Domestication studies tend to look at the place of the product in use and do not link it to pre-adoption expectations. These studies do not however appear to look at the pre-adoption processes, and the development of expectations. Mick and Fournier attempt to deal with this in their study that not only deals with pre- and post-adoption, but also the longitudinal
experience of consuming multiple generations of products and services. This is also the aim of my study.

2.16 Reactions and Engagement with ICTs

We have seen in this discussion a wide range of reactions to innovations and technology, and illustrated the many ways that people engage with them, from enthusiasm to hostility, as a tool for work, or an instrument for self-expression. Levy summarises very well what we as consumers are like, and the contradictory forces that drive us to search for the new, or stick with the old (Levy, 1998). On the one hand, consumers are curious; they want what is new and different; they want to acquire what is new and available; they are optimistic; they want to be part of the in group; they are impatient and petulant. One the other, consumers are sceptical; they think it is not good enough yet; they are stingy or conserving; they are technically challenged. Levy considers that we adopt many new technologies because of the gratifications they bring: they intensify personal expression, enhance communications, facilitate productivity and satisfy playfulness. There is also a search for entertainment and for knowledge. Two particular features are central to what we look for in new ICTs: their ability to bring us freedom and control. However these innovations also bring new frustrations too.

Focusing now particularly on ICTs, the domestication work suggested that people make a range of interpretations of technologies, that is intimately tied up with why they use them and how they use them. Examples were given from Livingstone, looking at issues of control, sociability, privacy and function (Livingstone, 1992). Aune (Aune, 1996) suggested that there were expressive, creative relationships with technologies and instrumental relationships. Hickman (Hickman, 1988) suggested a range of expressive ways we engage with technology. On a more everyday level Frissen and Punie (Frissen and Punie, 1998) study the meaning of technologies in busy households. They found that attitudes to ICTs were very mixed, never entirely positive or negative. Social non-acceptability has a retarding effect on adoption, e.g. people embarrassed about having a mobile even though they are very happy having it. Sometimes people wanted to make them selves unavailable sometimes, but find it
Table 4 Time saving v. Time consuming in (Frissen and Punie, 1998)

<table>
<thead>
<tr>
<th>Time saving technologies</th>
<th>Time consuming technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Useful instruments to organise life</td>
<td>Not useful</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Lack of flexibility and control</td>
</tr>
<tr>
<td>Mobility</td>
<td>Info/communications overload</td>
</tr>
<tr>
<td>Interactivity (telework)</td>
<td>Threat of privacy</td>
</tr>
<tr>
<td></td>
<td>Socially unacceptable</td>
</tr>
<tr>
<td></td>
<td>Surplus value not recognised</td>
</tr>
</tbody>
</table>

Mick and Fournier (Mick and Fournier, 1998) find more evidence for ambivalence and paradox in the consumption of technologies. In a study of use of ICTs they suggest eight practical paradoxes which must be coped with by the consumer:

Table 5 Paradoxes in consumption (Mick and Fournier, 1998)

<table>
<thead>
<tr>
<th>Paradox</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Chaos</td>
<td>For order or upheaval and disorder</td>
</tr>
<tr>
<td>Freedom/enslavement</td>
<td>Independent and less restriction, dependent, more restrictions</td>
</tr>
<tr>
<td>New/obsolete</td>
<td>Latest technology, or will soon be outmoded</td>
</tr>
<tr>
<td>Competence/incompetence</td>
<td>Facilitate feeling of intelligence and efficacy, or ignorance or ineptitude</td>
</tr>
<tr>
<td>Efficiency/inefficiency</td>
<td>Less time and effort/more time and effort</td>
</tr>
<tr>
<td>Fulfils/creates need</td>
<td>Fulfil needs and desires/ lead to awareness of needs and desire previously unrecognised</td>
</tr>
<tr>
<td>Assimilation/isolation</td>
<td>Facilitate human togetherness, lead to human separation</td>
</tr>
<tr>
<td>Engaging/disengaging</td>
<td>Facilitate involvement, flow or activity, lead to disconnection, disruption or passivity</td>
</tr>
</tbody>
</table>

Using this material I have been able to build up a more comprehensive picture of the range of contrasting reactions to and expectations of ICTs. One such opposition is between the Utility and Engagement attitudes, i.e. whether the ICT is seen as a tool for efficient and effective working, or as something to be explored. These types of reactions are often seen as contradictory, as in Aune’s Instrumental and Expressive users (Aune, 1996), who see computers as either functional tools of efficiency, utility, time saving and simplification, or toys, worlds to be explored, that excite curiosity, engagement, attachment and are used to fill time\textsuperscript{118}.

In both these interpretations there is often a need to ‘master’ the technology, to give maximum efficiency, or to give maximum understanding and pleasure\textsuperscript{119}. For some
people mastery is very important, either because they want a feeling of control over the technology for instrumental reasons (nothing must go wrong) or for expressive reasons (knowing how everything works). For others, mastering the technology is unnecessary or even undesirable. As many products have too many functions, it is a waste of time and energy to learn them all. Some people however find even mastering the basic functions difficult, and lack the confidence to try to master the technology. This can be a source of pride or insecurity. Some people are proud of not knowing how to use something, or how it works, while others feel that it is not their place to know, that they are unable to know. In all these cases self-identity is an important dimension of the actual knowledge and skill. Since we are looking at more than just the simple use of the technology, but the engagement with a constellation of evolving technologies and uses we can must refer to a range of different knowledge associated with technology. As Rogers points out there are different levels of knowledge: awareness of existence, how-to-use knowledge and knowledge of the principles of the innovation (Rogers and Shoemaker, 1971). The degree to which someone engages with a technology on these three dimensions is also an important guide to how they deal with technical change and consumption of technology in a community. The ‘master’ of a particular device may only know about that device and not be interested in any other. This will create a very different set of expectations and transferable skills in dealing with innovation than someone who is a ‘nerd’ knowing about all the products on the market, or has a detailed engineering knowledge of how it works. It is possible to hold contradictory attitudes towards different sorts of knowledge.

The next set of oppositions, that I suggest in the following tables, goes more deeply into the contradictory, positive and negative reactions or attitudes, and brings together on the findings of research previously reviewed. Here various sets of related attitudes are set out in groups, and in opposition to each other. The terms in each column can sometimes be grouped a pairs of reactions, but this is not a rule. More often a paradoxical or ambivalent reaction comes from attitudes in two quite different categories, e.g. a mobile phone could be an freedom giving tool, but at the same time the user could feel uncomfortable in owning and using it in certain circumstances.
### Table 6 Contrast interpretations 1

<table>
<thead>
<tr>
<th>Positive</th>
<th>Negative</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Chaos/out of control</td>
<td>What is the balance of freedom and control v. constraints and problems</td>
</tr>
<tr>
<td>Freedom</td>
<td>Struggle</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>Constraint</td>
<td></td>
</tr>
<tr>
<td>Convenience</td>
<td>Subjugation/enslavement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overload</td>
<td></td>
</tr>
</tbody>
</table>

**Social/interpersonal factors**

| Belonging | Compromise |         |
| Sociality | Exclusion |         |
|          | Isolation |         |
|          | Dispute   |         |
| Privacy  | Surveillance |         |
|          | Over availability |         |

| Productivity/time saving | Constraint |         |
| Functional tool | Frustration |         |
| Efficiency       | Struggle   |         |
| Effectiveness    | Inefficiency|         |
| Utility          | Burden     |         |
| Simplifying      | Complexity |         |
| Quality          | Necessity  |         |
| Cutting edge     | Reliance   |         |
| Empowering       |           |         |
| Self-sufficiency |           |         |

| Gratification/time-filling | Time wasting |         |
| Education | Boring | For non-work (paid or domestic) situation how is a technology judged? |
| Entertainment | Task |         |
| Play | Anti-social |         |
### Table 7 Contrasting interpretations 2

The technology itself may give rise to one or other of these emotions, but generally they are intimately tied up with activity or task. The technology takes on the meaning of the activity, such as being associated with work or with play, or corresponds to values and identity. There is a transfer of meaning or the attribution of a situation or activity to a technology. The technology and its context reinforce each other. The technology can also take on a meaning by the way it transforms the activity or sense of identity etc. This may be when the technology improves control or provides a sense of freedom, or turns a pleasurable activity into a boring bureaucratised chore. As an example, the mobile phone is a solution to a desire for flexibility and becomes loaded with idea of freedom when it provides this. For others it may take on a meaning of subjugation or surveillance.

These rather complex positive and negative reactions and emotions manifest themselves most obviously as an movement towards or away from the innovation – resistance or acceptance.
Avoidance | Interest  
---|---  
Delay | Acceptance  
Rejection | Curiosity  
Resistance | Engagement  
Avoidance | Enthusiasm  
Reluctance | Reinvention  
Submission | Addiction

Table 8 Avoidance v. Interest of ICTs

However as Mick and Fournier and Otnes point out these have to be turned into a behaviour through a number of coping strategies. This depends on the actual practical engagement with the technology. This could depend on the particular stage in the adoption process as suggested by Nabih et al. (Nabih, Bloem et al., 1997). However in many cases these strategies have to implemented for coping with the actual consumption and use of the technology, either personally or by others.

This huge range of interpretations of technologies, and on many different levels, makes it clear how ambivalence can arise, and unexpected individual disappointments and satisfaction can occur. The interpretation of ICTs is linked with the practicalities of everyday life, such as time, money and space constraints, and the demands of families and employers, but also with deeper life themes and experiences of the world. These are bound to come into conflict, and the complexities, limitations and demands on technologies only confound this. Even the most enthusiastic user of technology can recognise problems of dependence, and frustrations, just as those more resistant people can see obvious benefits and harbour desires for more accessible products that they can benefit from. In a social context, where one has to take account of, and be subject to others use of technology, ambivalences are increases, but can also be overcome through the resources and support of the personal community and network.

2.17 The Recent Adoption and use of ICTs

In the past few years ICTs have exploded onto the market and into people’s lives. While many of the large scale promise innovations have not materialised, or been very slow to arrive, many intermediate technologies and services, often the components of the grand visions, or early experiments have become prominent. The
PC is now an established feature in many homes and offices and on the road in the form of portable and compact computers. The mobile phone has surpassed all other technologies in the rate of its adoption and use. Most organisations now use computers and computer services. The Internet also developed to swamp all other visions of network technology and service.

In recent years there has also been a huge explosion in research on the adoption and use of ICTs. The period of my study is 1996-1998, already historical, so I need to situate it alongside general research on adoption of ICTs from this period: specific finds and figures from other research that can put my study into context. A comprehensive review of data for the adoption and non-adoption of the Internet and other ICTs in the late 1990s was conducted simultaneously to this study, and gives a qualitative background and a discussion of supply side issues (Stewart, 2000b). One of the studies that comes close to my approach and my concerns was conducted by Katz in the mid 1990s in the USA (Katz and Aspden, 1997). This only covered the Internet, but brought out dimensions of the social network, motivations to adopt, and sources of barriers and support for adoption. Katz found that socio-personal development was more important than business, and since them e-mail has emerged as the key application of the Internet. Those people with experience of Internet use had different priorities to non-users for adoption, and non-users have very different idea of what Internet is for, for example not identifying e-mail and communication as the main use of the computer. Local social and work networks were an important stimulus for getting on line, and these networks also played an important role in learning, suggesting that formal learning only plays a small part in the adoption and use of the Internet. In dealing with on-going problems, the majority of people would first turn to their close social network for help. These figures reinforce that importance of the social network in the everyday use of the Internet, as well as in its adoption.

Despite the help of formal and informal sources, there are still many problems to getting on line and staying there. Katz uses the idea of barriers, faced by nonusers and experienced users alike. Getting on line was difficult: 16% claimed it was very difficult, 59% a little difficult, 25% not difficult. Katz found three groups of people who saw different types of barriers: Group I: 59% cost was the barrier; Group II: no
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idea how to do it (48%), no way to get access (43%), too complicated (42%); Group III: discomfort using computers 21%

Once on line there were problems too: navigation and traffic were main issues in use, cost coming third. It was too slow and too complicated and people wanted it easier to use, better searches guides. Nonetheless, despite all these problems millions do use the Internet everyday and find the benefits outweigh the difficulties.

Venkatesh (1996) conducted longitudinal and cross sectional surveys as ethnographic studies into the adoption of ICTs in the home. He describes the gradual uptake of home ICTs as they have developed. After much excitement in early 80s, the home computer revolution did not appear to happen. However despite not following the hype or pessimism, something happened, there was a transformation. In the 1980s, the PC still not a ‘home computer’, it was not something integrated into household. It was extension of office space. Relevant software not available, the machine was stand alone with no personal communications facilities. In the 1990s this changed. Usability advances have meant that there is a new generation of users who do not have to master the technology. Many technologies are customised for home use now, and the emergence of new services on-line has revived consumer interest. Specifically he suggests a number of barriers to adoption that have existed, but are now changing with the latest generations of technology, such as technical limitations, job oriented image of computers, gender bias in use, and limited stand alone functionality. My research covered the beginning of this change. He finds many factors highlighted in other literature are important, such as gender issues, space, work-home boundaries, limited use of information services and general inapplicability of the computer to the home. However this has changed, as many households how adopt computer technology. What changed?

- Many new terms, e.g. multimedia etc.
- More areas in the household targeted – greater diffusion with in the context of the home.
- Many more software titles aimed at home use and household needs, powerful enough to fulfil them, and simpler to use.
- General acceptance as useful domestic technology. Computers are part of children’s lives
• Realisation that the home is place for technology to reach full potential, home has become main site for technological innovation.

There has been a technical change, a change in the industry now able to invest considerably in domestic products, the adoption of computers by education, the rise of computer games, and a change in culture and perception of users of the value of computers.

Venkatesh makes an important observation about the inappropriate industry model of the home – the computer industry, with it control and information model of computer use, did not understand what might be relevant in the home. Home users have generally had to make us of products for the commercial market marginally repacked for the home. For example the desktop computer is ideal for the fixed workplace, but for the home there is often not a ‘place’ for a computer. For a device that will be used for so many different purposes and by different people, having it in one place is very difficult. The television set once was fixed in one place and everyone had to use it the same way, but now most households have many sets in different places. Most people have only one computer, but few in industry have attempted to deal with this issue by selling portable computers for the home (except of course Apple). Haddon (Haddon and Hartman, 1997) highlights the need for appropriate content on the Internet which many studies have reveal. The content has to be relevant, and for most people, relevant information is local rather than abstract. We need information most in our lives for the ‘small, banal things of everyday life’.

2.18 A final note on terminology

There are a number of terms used to indicate the way that we take on board new innovations. Adoption, appropriation, domestication and consumption. All of them have spawned research programmes, and investigate similar issues from different angles. During the analysis of the study I constantly found myself switching between these terms, but a reading of the literature suggests that they are all highly flexible, and in the process of being redefined in use as more sophisticated models emerge of the way we engage with the material world in a consumer society. Because of this I decided to use the terms rather interchangeably.
Another terminological difficulty is over the verbs to *use* and to *consume*, and the nouns user and consumer. Much of technology studies analysis and certainly in the design of technology there are two roles, the designer and the user. However from the perspective of marketing, the person who buys the product or service is a consumer. As has been discussed before, the term consumer has traditionally been contrasted with producer, as reactive and active roles respectively. The term user tends to imply a rather intimate personal relationship with a technology, while the term consumer implies a relationship with a product that is still very much part of a broader symbolic and economic system that they are having to deal with. How can these be reconciled? One answer it is refer to the ‘user-consumer’, however I feel that in a similar way to the convergence of terms of appropriation, consumption etc, there has actually been a convergence of the analytic meaning of use and consume, recognising the intimate relationship with the machine, and the extended relationship with the commercial and cultural system in which it is embedded. Therefore I tend to use the terms consumer and user interchangeably too.

### 2.19 Summary

This literature survey started by introducing the idea of the study of the use and consumption of technologies, particularly within the home, but also within the broader areas of everyday life, and across the life space. The consumption of goods is both a personal and a social process, related to the physical affordances and obduracy of artefacts, and the meanings given to them in an evolving social and technical context. Consumption was described as a range of ways of engaging with products, including the adoption process, and living with technologies in a social world, but also resistance and refusal of technologies. A range of theories and evidence was introduced to demonstrate this. These include Holt’s suggestion that there are consumption activities focused on objects, and ones that are interpersonal, around objects, and the domestication theory, which looks at how technologies are appropriated. In technology studies, the concept of everyday life has been introduced as a domain to understand the use of technologies at a micro-sociological level rather than their design. I also introduce the idea of the life space introduced,
highlighting the way that new ICTs are used across most domains of life, and are increasing linking them and challenging traditional boundaries. This suggests we need to look at how consumption and domestication processes work across the life-space, as technologies are encountered and appropriated in heterogeneous networks and spaces.

The process of appropriation on new products has also been extensively studied in consumer research and the study of diffusion of innovations. A review of this literature introduces many alternative concepts and ideas, but again dealing with how new products are appropriated in a range of settings. Various dimensions of the adoption process are discussed, including the characteristics of the product, the individual, with concepts such as innovativeness, and the role of events and experience, and the social dimensions of adoption. The adoption of new products and classes of products may be an individual process, but it is also social. The social situation, whether it be within a closed community, or though a broader personal network, is a sources of ideas, products, support and values. A variety of types of social grouping or relationships are described, using the concept of social network: the family, different sort of community, at home and work – emphasising that personal communities cut across boundaries or cross over between domains of life but are nevertheless constrained – some people have access to a broader and more diverse range of contacts than others.

Evidence and arguments were presented for different ways in which networks of different sorts play a part in the adoption and diffusion of ideas and products, used for forming opinions or finding information. This also highlighted the role of particular individuals in communities or networks, playing the role of opinion leaders, or experts, or change agents shaping the diffusion of products. One important feature is the way individuals mediate information and attitudes between the various domains of their life, acting a bridges. This is links to the idea that those on the edge of networks or with a wide variety of relationships outside their core communities are important in bringing in new ideas to those groups.

The alternative interpretations and conflicts in households over new ICTs, especially between those who are more enthusiastic and those more sceptical or unable to
adopt, raises issues about how and why there is often a great deal of resistance to innovations, even those that eventually reach mass market penetration. A review of literature on non-adoption and resistance investigated issues of non-adoption, suggesting a range of reasons for resistance, degrees and focuses of resistance, and strategies for achieving it. Again resistance was characterised as both a personal and a social phenomena – related to needs and skills on the one hand, and meaning given to technologies, and an individual’s relationships to it. Even among those who do adopt, there is often considerable ambivalence about technologies, and coping strategies are developed do deal with problems at various stages of the adoption and in use. Even those most enthusiastic users are ambivalent about some aspects of their favourite products. Ambivalence arises from mixed feelings that people have about technologies, and the review shows how ambivalence and concept of satisfaction can be used to link the focus of adoption studies, which tends to be the process leading up to adoption, and consumption and domestication, which deals mainly with appropriation, post adoption, and technology in use.

There are a wide range of different interpretations of technology, not only in what one could term resistance, but in ideas about how and when it should be used, for example, as a practical tool, or engaging toy. Bring together a range of research themes over interpretations of technologies highlights range of dimensions for engaging with ICTs, the many possible attractions or problems and the unavoidable ambivalence that anyone is likely to feel towards living and working with, or near, new technologies.

The review finally gives some qualitative data on how and why people were adopting the Internet in the mid 1990s, and puts this in perspective of how the facilities and image of computer technologies have changed since the 1980s, making them more accessible, relevant, and acceptable in the home.

The rest of this thesis investigates the issues raised in this review, using the insights and theoretical tools that have been brought together from various disciplines. In particular it investigates claims for the role of the community, or social network in the processes of appropriation, and on-going consumption and use of ICTs, and the role of particular individuals in this processes. Within this context of social
consumption of technologies, the problems of adoption and ownership of technologies and the ambivalences and strategies for dealing with these problems are looked at empirically. The same will be done for issues of resistance and non-adoption, but trying to go beyond the rather static interpretation presented here, to understand changes in attitudes and use that occur as much of the population adopts ICTs in many aspects of their lives.
This chapter is an extract from