MODELS OF PERSONAL COMPUTER BUYING INTENTION AND BEHAVIOUR BASED ON THE "THEORY OF REASONED ACTION"

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ABSTRACT

This consumer buying intention study employs the "theory of reasoned action" as its background theory. The theory states that an individual's *intention* concerning any course of action can be predicted by two variables – *attitude toward the behaviour* and *social norm*. In addition, the theory claims that, where variables such as attitude, social norm, income, and expectation are concerned, intention is the best single predictor of *behaviour* and that intention mediates the influence of all other variables on behaviour. The validity of the theory's claims has been tested in a number of studies and findings are as diverse as the number of studies done.

This study attempts to test and improve the theory in the context of personal computer purchase. Using data from the Survey Research Centre, University of Michigan, it was found that *income* and its interaction with *expectation* have stronger systematic effects on intention and behaviour than the social norm. Income was also found to explain significantly higher variation than attitude in the PC purchase model. However, our finding concerning the role of intention as the best single predictor of PC purchase conforms with the theory but there was no sufficient empirical evidence to justify its mediating role.

Against the background of *logit* modelling, the study developed some alternative models of individual PC buying intention and behaviour which were found to be superior to the original theory. Thereafter, we developed a dynamic model of aggregate PC purchase within a structural time series framework. This model – with its *geometric-distributed lag* structure and a scheme that separates intenders from non-intenders – was also found to be superior to the Fishbein-Ajzen's theory.

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CHAPTER 1

INTRODUCTION

1.1: BACKGROUND

This research is a study in consumer intention and behaviour. Consumer behaviour has been defined by Engel, Kollat, and Blackwell in their precious book titled 'Consumer behaviour' as "the acts of individuals directly involved in obtaining and using economic goods and services, including the decision processes that precede and determine these acts" (Engel, et al. 1968, p.5). As a consumer behaviour study which could be located within the broader confines of human behaviour, the study employs one of the leading socio-psychological theories as its background theory. This theory is the Fishbein-Ajzen's *theory of reasoned action* and will be discussed in Section 3.6.

The theory states that an individual's *behaviour* concerning any course of action can be predicted by his corresponding *intention* and that intention can in turn be predicted by only two variables – *attitude toward the behaviour* and *social norm*. In addition, the theory claims that, where variables such as attitude, social norm, income, and expectation are concerned, intention is the best single predictor of behaviour and that intention mediates the influence of all other variables on behaviour (See Fishbein & Ajzen, 1975 and Ajzen & Fishbein, 1980). According to

Martin Fishbein and Icek Ajzen, their theory which was published in 1980 is a general theory applicable to any behavioural setting. Indeed, it has over the years been adapted to many situations such as voting behaviour (Singh, et al., 1995), drug and alcohol consumption (Laflin, et al., 1994), leisure behaviour (Young & Kent, 1985), dental care demand (Hoogstraten, et al., 1985), and infant-feeding method (Manstead, et al.; 1983, 1984) but research opinion is divided as to the validity of its claims.

While the theory has received a good measure of support from many studies (See Section 3.6.2) such as those of Young & Kent (1985), Dubinsky & Loken (1989), and Fisher, et al. (1995), some other scholars have gone beyond criticising the theory's claim of general applicability to attack its very foundation which is behavioural intention. They posit that the question is not really whether the theory is generally applicable but that intention, per se, is not a useful predictor of actual behaviour. They also cast enormous doubts on the existence of a causal relationship between *attitude toward the behaviour, social norm, intention, and behaviour* with the suggestion that the theory should be disregarded.. (See, for instance, Bagozzi & Warshaw, 1992 and Sarver, 1983; See also Section 3.6.3). This contrasts with the opinion of moderates in other circles who accept the theory in principle but argue that no single theory

propounded so far fully captures the multi-dimensional nature of consumer behaviour. They believe that consumer behaviour will be better understood and explained from the perspective of a combination of models and theories, each of which has something to offer in its own right.

For instance, Hill, et al. (1985) suggested that the *attitudinal* and *normative* components of the theory of reasoned action could be combined with the *barriers* component of another model called the health belief model to achieve a better diagnosis of precautionary measures taken by women against breast and cervix cancer. A suggestion has also been made by Schlegel, et al. (1987) for integrating the Fishbein-Ajzen's theory with Jessor's problem behaviour theory to obtain a better prediction of people's intention to get drunk.

Models and theories of consumer behaviour address the phenomenon from different angles and with varying degrees of emphasis. They are briefly introduced in the next section with further discussion in Chapter 3 to enable us have a holistic view of the whole phenomenon and hence a better understanding of the relevant concepts and the intricacies involved.

In this study, we adopt a moderate view of the reasoned action theory by bringing ideas from marketing/consumer research, social and economic psychology, and econometrics in conjunction with applied statistical modelling techniques to bear on the theory with a view not only to testing out its applicability to PC purchase but also to improving it. These will be done in Chapters 5 and 6.

1.2: THEORETICAL PERSPECTIVE OF CONSUMER BEHAVIOUR

In view of the complex multi-dimensional nature of consumer behaviour, the phenomenon has been studied from various angles by scholars in the fields of economic and social psychology, applied statistics, behavioural sciences, marketing research, consumer research, and advertising research. (See Sections 2.2 – 2.11 and 3.2 – 3.6). Efforts have been made in many studies to explain *what*, *how* and *why* consumers choose using concepts such as belief, attitude, purchase intention, brand loyalty, and personality characteristics. Many theories have thus been put forward to explain consumer behaviour, such as the theory of reasoned action, learning theory, group theory, conformity theory, and the theory of repeat buying, to mention but a few (Sections 3.2 – 3.6). Each of the theories and models view consumer behaviour from different perspectives but are sometimes complementary to one another. A seemingly irrational choice behaviour that cannot be adequately explained via the economic theory

of rationality of choice or utility maximisation may be justifiable on psychosocial grounds (See Section 3.7).

One aspect of the theoretical developments that we find very interesting and challenging is the claim made by Fishbein and Ajzen that their theory of reasoned action is *generally* applicable to any behavioural domain. (See Sections 1.1 and 3.6.1). Ideally, one would not expect a 'universal model' of buying behaviour that is relevant to all product fields and is capable of capturing the cultural idiosyncrasy and personality differences of various type of consumers. Kotler (1968) observes that consumer behaviour "is so complex that theory develops in connection with particular aspects of the phenomena". Lunn (1974, p.54) also believes that "no single theory or model should be expected to be fully comprehensive at this state of our knowledge" of cosumer behaviour. The situation is still the same up till today to the extent that there are now a myriad of concepts, models and theories describing consumer behaviour but none of them has yet to be universally accepted (including the reasoned action theory). Series of studies have been done (See Sections 3.6.2 and 3.6.3) to test out the applicability of the theory of reasoned action to various behavioural settings. This work is one of the many attempts at investigating the merits of the theory.

Unlike Ehrenberg's repeat purchase model (Section 3.5.2) which focuses on "fast-moving consumer goods", the theory of reasoned action claims to be relevant to all types of behaviour which include objects such as consumer durables and non-durables. The act of buying a durable product such as a computer – which is our focus in this study - is essentially a cognitive process: it is not a product that is normally acquired through *impulse buying* like consumer goods and smaller durables. The cost involved and the cognitive connotation of computer purchase makes this process worth modelling against the backdrop of the theory of reasoned action.

In broad terms, our objective consists of improving the theory through logit modelling and dynamic time-series modelling respectively of individual and aggregate personal computer purchase (See Section 1.4).

1.3: AN OVERVIEW OF THE PERSONAL COMPUTER MARKET

As noted in Section 1.2 above, computers have been chosen for this intention study because they constitute a major purchase and may require some level of planning and intention formation before actual purchase. It is a known fact that, for some years now, the computer market has been a flourishing market. According to the International Data Corporation in Framingham, Massachusetts, 26 million units of personal computers were

purchased in 1996 in the United States alone which represents about 40% of total global sales. While capacity utilisation in the manufacturing of non-durable goods have not been encouraging compared to durable goods, the US economy has witnessed increasingly high growth rates in the computer industry which remains the fastest-growing industry (See Corrado 1997). In terms of contribution to annual production growth rate, the computer industry has over the decade led other industries including steel, automobile, and aircraft (See US Federal Reserve Bulletin, Feb. 1997).

The massive growth of e-mail and Internet facilities has generated greater desire among the public to acquire or at least use a computer. In a 1996 survey of Britain's top 500 companies commissioned by KPMG consultants, it was estimated that about "17% of total sales would be conducted over the Internet" by the year 2002 (See Backhouse, 1997). With the impending take-over of NETSCAPE by the world's biggest provider of Internet and on-line services – AMERICA ONLINE – this idea of electronic commerce introduced by NETSCAPE stands to wax stronger with time and thus generate more interest in computer purchase.

The on-going global privatisation and liberalisation of trade gives impetus to the general vibrancy of computer markets worldwide. In Egypt, for

instance, a market study conducted by the US and Foreign Commercial Service in Cairo indicated that the market for personal computers and accessories, which stood at an estimated total of $100 million in 1997, would rise by about 70% to an expected total of $169 million in 1999.

We would like to emphasize that although interest in computers is growing world-wide, the market for home-use purchase of this product is generally less developed than those for business, industry, and government. In order to boost individual consumer demand for personal computers, packages of good price, free installation, preinstalled software, free telephone support for Internet access, and other incentives are being offered to customers. The market is also witnessing the introduction of PCs with new sleek designs that are not only attractive for home use but are also easy to install and use.

A significant development in the computer market is the now popular *'millennium bug'*. Information technology experts revealed that programming were done in such a way that computers would not recognise the usual two-digit code "00" as the year 2000, and this would create problems. As the year 2000 draws nearer, there is an increasing wave of concern among organisations and consumers about the expected crash of systems that are not "year 2000-compliant". We believe that taking remedial action such as system upgrade or outright purchase of

new computers in anticipation of these problems is not a luxury in this information age.

Within the last three years, there has been an increasing awareness among the public about the millennium issue. Consumers have been careful in their PC purchases as old ones that are not "year 2000-compatible" are still in the market. Global PC sales have been estimated by research companies such as the International Data Corporation to grow by about 12% a year for the next four years but there is a great possibility that there will be some backlog of old computers in many shops as we approach the new millennium. A suggestion has been made that resellers could embark on leasing and 'multi-year financing' packages to curb the amount of loss that PC vendors are likely to incur during 1999 (See, e.g., Caisse, 1997).

In advanced countries and a number of developing countries, the millennium bug issue is already being addressed. Many medium and large business organisations have in fact taken appropriate measures. According to a survey report partly published in *The Guardian – Online* publication of Thursday, November 26, 1998 (page 4), more than 50% of Europe's 500 top IT spenders – like Siemens, Royal Dutch-Shell, Daimler-

Benz, and British Telecom – consider the *millennium bug* as an opportunity to replace old systems.

It is expected that the stochastic level incorporated in our time-series model (See Section 6.2) will capture the expected change in PC sales arising from the millennium issue.

1.4: OBJECTIVES OF THE STUDY

The principal objective of this study is to test out the Fishbein-Ajzen's theory of reasoned action in the area of personal computer (PC) purchase, with a view to developing an improved variant of the model using a combination of advanced techniques. To achieve this, our specific objectives include the following:

1. To build logit models of personal computer buying intention and behaviour based on individual responses.
2. To evaluate the influence of new variables such as previous purchase, income, personal computer usage, business/economic expectations, and expectation of personal finances in relation to those of attitude toward buying a PC and social norm.
3. To identify the presence and significance of interaction effects among the relevant variables of the alternative model.
4. To examine the mediating role of intention and its role as the best single predictor of personal computer purchase.

5. To closely study the group of "planners" vis-à-vis the group of "non-planners" with a view to improving the prediction accuracy of the model.
6. To investigate the adequacy of simply using intention to approximate subsequent purchase for prediction purposes as claimed by the original theory.
7. To introduce time dimension into the models and compare the "time lag" effects of aggregate intention on behaviour with the instantaneous effects implicitly assumed by the original theory.
8. To build a bivariate geometric-distributed lag model of aggregate PC purchase.

The above objectives will be achieved through series of hypotheses stated in Section 4.1 which will be tested later in Chapters 5 and 6. The data set to be used is described in Section 4.2 and Appendix 1.

1.5: ORGANISATION OF THE REMAINDER OF THE THESIS

The study sets out with a qualitative analysis of issues central to the whole question of consumer behaviour in Chapter 2. In this chapter, we bring into focus the various principal factors that shape consumer behaviour and their implications for different societies.

Chapter 3 gives a brief discussion of existing models and theories relevant to consumer behaviour. The background theory for the thesis is also examined more fully. Together with the previous chapter, it prepares the ground for a thorough understanding of the phenomenon under study and serves as a springboard for developing our own alternative model.

Thereafter, we move to Chapter 4 which describes the methodology for the research including the hypotheses to be tested, description of the data set, and methods of analysis.

This is followed by logit modelling of personal computer buying intention and behaviour in Chapter 5 using the **GLIM**[1] statistical package. In this chapter, we shall critique the sufficiency principle of the reasoned action theory and examine the mediating role of intention and its role as the best single predictor of personal computer purchase. Attempts will be made to introduce some variables that are external to the original theory with a view to improving it and to seeking further improvements through a differential weighting scheme.

The study progresses by developing in Chapter 6 a geometric-distributed lag model of aggregate PC purchase using the **STAMP**[2] package. This

[1] Generalized Linear Interactive Modelling
[2] Structural Time-Series Analyser Modeller and Predictor

chapter makes a case for separate dynamic time series models for the groups of intenders and non-intenders which will ultimately be combined and modelled as a bivariate model.

Finally, the highlights of the research are summarised in Chapter 7 with conclusions and recommendations for further studies.

CHAPTER 2

UNDERSTANDING THE CONSUMER THROUGH AN ASSESSMENT OF MAJOR FACTORS AFFECTING CONSUMER CHOICE BEHAVIOUR

The centre-piece of this research is 'the consumer'. This chapter therefore deals with important issues and concepts relating to the consumer. In reaction to the theory of reasoned action (See Section 3.6) which claims that attitude and social norm are the two most important variables for predicting intention, this chapter serves to demonstrate the existence of a number of other factors which compete with the Fishbein and Ajzen's attitudinal and normative variables for relevance and importance. We shall discuss consumer choice behaviour against the background of the various factors that jointly and severally shape it. At the end of the chapter, it is expected that we would have been armed with the necessary conceptual framework to enhance our understanding of consumer behaviour with special reference to its implications for different societies.

2.1: Definition and A Broad View of Consumer Behaviour

Engel, Kollat and Blackwell in their precious work on consumer behaviour refer to consumer behaviour as "the acts of individuals directly involved in obtaining and using economic goods and services, including the decision processes that precede and determine these acts". (Engel, et al., 1968, p.5). Most recently, Wilkie in his book (also called 'Consumer

Behaviour') also defines consumer behaviour as "the mental, emotional, and physical activities that people engage in when selecting, purchasing, using, and disposing of products and services so as to satisfy needs and desires". (Wilkie 1994, p.14).

These activities that consumers engage in, consciously or unconsciously, form part of the pre-purchase, point-of-purchase and post-puchase decision processes. They include behavioural and normative beliefs, attitude, group/cultural values, perception, preferences, motives, intention, and product satisfaction, and will be discussed in this chapter. The factors form the bedrock of a number of consumer behaviour models and theories which will be dealt with in Chapter 3. In that chapter, we will see the interconnectedness of the various factors and how they have been used to build a network of flow-charts such as the Nicosia model (Section 3.4.1), the Engel-Kollat-Blackwell model (Section 3.4.2), the Howard-Sheth model (Section 3.4.3), and the Fishbein-Ajzen's theory of reasoned action (Section 3.6). We will also see later in Chapter 5 a cross-sectional appraisal of the reasoned action theory especially with regards the claimed superior role of its two explanatory variables – attitude towards the behaviour and social norm.

Before we open discussion on consumer choice behaviour, let us stop for a while and ask ourselves some relevant questions: Why do consumers choose a particular brand of a product? (See, e.g., Sections 2.2, 2.3, 2.4, 3.2.1, 3.2.2 and 3.5.2). Why do they decide to buy that product in the first place? Do other people and factors have influence on their choice behaviour apart from the consumers themselves? (The influence of significant others on an individual's choice behaviour is very germane to the theory of reasoned action – Section 3.6).

Indeed, it is easy to ask questions but the more important thing is how to address those questions. To say that consumers buy products because they need them will appear too simplistic and insufficient. This reasoning by no means implies that *need* and *buying* are unrelated. This will be evident if we bear in mind that luxury and ostentatious goods, for instance, are purchased not necessarily to satisfy consumers' basic needs. Similarly, a number of other products are consumed with the motive of keeping up with fashion, social pressure or societal expectation. Before habit or addiction set in, most people started drinking or smoking for the first time not because they really had to do so as a matter of necessity.

Abraham Maslow (1943) in his theory of human motivation has stated that human beings seek to realize their highest potential in a hierarchical

manner – from physiological needs, to safety needs, to belongingness and love needs, to esteem needs, and lastly to self-actualization needs. It should therefore come as no surprise that consumers sometimes choose to buy goods that are not regarded as basic necessities of life.

In capitalist countries, producers contribute enormously to consumers' crave for attributes other than need satisfaction in their choice of products and services. A whole range of products are constantly brought into the market and backed up by aggressive marketing strategies. In his critique of capitalism, Karl Marx (1867/1974, Chapter 24) observed that the capitalist economy necessarily entails continuous capital accumulation leading to the production of an ever-increasing quantity of goods. He argued further that this production is always geared towards making profit rather than meeting consumers' needs. Even Adam Smith, the father of free-market system, had earlier underscored this fact when he said:

> *"Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to, only so far as it may be necessary for promoting that of the consumer..... But in the mercantile system the interest of the consumer is almost certainly sacrificed to that of the producer; and it seems to consider production, and not consumption, as the ultimate end and object of all industry and commerce". (Adam Smith, 1776/1991).*

In socialist countries, there is hardly any difference between the producer and the consumer as the means of production are considered to be public

properties. Production and consumption are thus based on the principle that:

"From each according to his abilities, to each according to his needs". (Karl Marx, 1875/1962).

In capitalist economies, the survival instinct of man is greatly challenged, leading to the scramble for the limited resources. But in the final analysis, the poor working class members of the public often lose out to the wealthy class of producers. This has implications for conflict of interests and a widening gap between the producer and the consumer.

We believe each of the aforementioned economic systems has its merits and demerits. As such, this aspect of our thesis is not meant to glorify one economic system at the expense of the other; neither do we intend to test the two systems in this regard. It is meant to stimulate our thinking about what each system has in stock for the consumer and its implication for consumer choice. The dynamism of capitalism offers the consumer a wide range of products and brands to freely choose from whereas choice is somehow restricted under socialism. The restricted nature of consumer choice in socialist countries thus gives room for little or no advertising. This is in sharp contrast with capitalist economies like the United States where consumers are faced with a barrage of advertisements aimed at influencing their brand preference or maintaining their brand loyalty.

One of the major approaches to consumer behaviour study, which we consider useful and relevant for the purpose of this review, is the characteristics analysis of goods given by Lancaster (1966). As Lancaster rightly puts it, his theory is a "break-away from the traditional approach that goods are the direct objects of utility", and can be summarised as follows:

- The good, per se, does not give utility to the consumer; it possesses characteristics, and these characteristics give rise to utility.
- In general, a good will possess more than one characteristic, and many characteristics will be shared by more than one good.
- Goods in combination may possess characteristics different from those pertaining to the goods separately.

Lancaster obviously considered choice behaviour from the perspective that consumers choose a particular product or brand because they believe that the product or brand possesses some characteristics capable of satisfying their desires[3]. The question then arises - What are these characteristics, attributes, and desires? And how do they affect consumer choice behaviour? These and other factors that could influence consumer behaviour will be the subject of discussion in the ensuing sections.

These factors are:

[3] See William Wilkie's definition of consumer behaviour on page 21 with regards satisfaction of consumers' desires.

- Product branding
- Advertising and sales promotion
- Tastes, preferences and perceptions
- Fashion
- Public policy, price, income, and savings
- Personality characteristics
- Reference groups
- Attitude
- Family, household and other interpersonal influences
- Socio-cultural influences

2.2 : Consumer Behaviour and Product Branding

The term brand has been defined as "a name, term, sign, symbol, or combination of them intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competitors" (AMA 1960). Brands are now looked upon by experts as entities having "many of the attributes of living beings" (Hanby 1999) one of which Blackston (1992) referred to as *"brands' attitudes"* and which he suggested should be given as much attention as the twin traditional concepts of *brand image* and *brand personality*. There is a tendency for some consumers to repurchase the same brand of a product over and over again leading to what is referred to as 'brand loyalty'. Brand loyalty can be explained in terms of proportion of purchases, repeat purchase probabilities, brand choice sequences, and brand preference over time.

(See Fulop's book: "Advertising, competition and consumer behaviour – public policy and the market").

Brand choice behaviour has been of interest to consumer/market researchers just as product choice behaviour. A number of studies have been done on brand choice such as those that measure brand loyal and brand switching behaviour using the Markov approach. This approach assumes that the present purchase probability of a brand depends upon the brand purchased at the previous purchase occasion. Suppose we have a simple market situation with two alternative choices, say Brand 1 and Brand 0. Using a first-order Markov model, the conditional probability of purchasing Brand *i* at time $t+1$ given a purchase of Brand *j* at time *t* is given by the transition matrix $P(i/j)$:

		Brand purchased at time t	
		1	*0*
Brand purchased at time t+1	*1*	P(1/1)	P(1/0)
	0	P(0/1)	P(0/0)

Lipstein (1959) was one of the pioneer studies which used a first-order markov model to measure brand loyalty. He came up with the suggestion that the diagonal elements P(1/1) and P(0/0) of the transition matrix be used as indices of brand loyalty.

The above markov model, useful as it is, gave room for some worries when dealing with markets consisting of multiple brands. However, Massy, Montgomery & Morrison (1970) in their book called "Stochastic models of buying behaviour" suggested a way out by assuming that Brand 1 represents the brand under study while Brand 0 represents all other brands. An alternative way of dealing with this consists of extending the transition matrix P(i/j) to cover *n* brands (see, e.g., Givon, 1984) such that P(i/j) is given by the *nxn* matrix below:

Brand Purchased at time *t+1*	Brand Purchased at time *t*					
	1	*2*	*3*	*j*		*n*
1	P(1/1)	P(1/2)	P(1/3)	..... P(1/j)	.....	P(1/n)
2	P(2/1)	P(2/2)	P(2/3)	..... P(2/j)	.....	P(2/n)
3	P(3/1)	P(3/2)	P(3/3)	..... P(3/j)	.....	P(3/n)
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
i	P(i/1)	P(i/2)	P(i/3)	..... P(i/j)	.....	P(i/n)
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
n	P(n/1)	P(n/2)	P(n/3)	..... P(n/j)	.....	P(n/n)

In this case, indices of brand loyalty are given by:

P(1/1), P(2/2), P(3/3), ..., P(n/n).

That is, P(i/j) where i = j for all i = 1,2,3,.....,n.

In general, if the probability of choosing a brand increases given that the brand was purchased at the previous occasion, this is indicative of

consumer brand loyalty. Brand switching or variety-seeking behaviour exists if the probability of selecting a brand decreases given that the brand was purchased at the last occasion. [See Jeuland (1978), McAlister (1982), McAlister & Pessemier (1982) and Givon (1984)]. Kahn, Kalwani & Morrison (1986) have however identified cases where the purchase probability of a brand on each occasion is independent of the previous choices made, in which case we have zero-order choice behaviour.

An extension of brand loyalty is consumers' loyalty towards other attributes such as package size. Butler (1994, p.6) found that, when switching from one package size to another, there is a greater tendency for consumers to choose the same brand; and when switching brands, they are more inclined to buying the same package size. He argued further that brand loyalty is often considered more important than size loyalty.

Some scholars consider brand loyalty behaviour from the perspective that consumers use it as a way of reducing their perceived risk of a particular product. Of the eleven risk reduction methods, namely: brand loyalty, major brand usage, store image, free sample trial, government testing, endorsements, money back guarantee, shopping, private test, word-of-mouth information, and expensive model preference that Roselius (1971) tested, brand loyalty was

found to be the best strategy used by consumers to minimize the following types of risk:

1. loss of money to get a failed product repaired or replaced
2. loss of time to get a failed product repaired or replaced
3. risk to health or safety when the product fails
4. risk of feeling foolish when the product turns out to be defective

Most of the factors discussed in this chapter are interwoven, and so other sections such as Section 2.3 (advertising and sales promotion), Section 2.4 (tastes, preferences and perceptions) and Section 3.5.2 (Ehrenberg's theory of repeat purchase) also touch on aspects of brand choice.

2.3: Advertising and Sales Promotion Effects on Consumer Behaviour

It is difficult to measure the effects of advertising and sales promotion on consumer choice behaviour. In the market place, there is an interplay of promotion and distribution effects as well as price and product quality. Moreover, advertising and sales promotion are, technically speaking, not exactly the same thing. Promotion is an indirect effort targetted towards boosting sales. It includes such strategies as free samples, coupons, discount and special offers, raffle draws, refunds, and profiles/ documentaries on a company and its range of products. The consumer/market researcher thus has a challenging task of determining and disaggregating the overall influence of the various marketing mix variables on sales. He may sometimes have to make use of a

combination of survey methodology, experimental design, and econometric methods to solve this problem. The standard practice is to measure advertising effectiveness against the extent of consumers' awareness of the product or brand under study, their attitudinal changes towards the brand, improved brand image, and improved sales. (See, for example, Lea, Tarpy & Webley's book on "The individual in the economy").

Broadbent (1988) believes that some of the effects of advertising are produced by changes in some other factors within the environment. However, a general picture of the influence of effective advertising within the confines of these environmental disturbances has been presented by East (1990, p.199) in his book called "Changing consumer behaviour". (See Appendix 3A). The figure starts with a "base" and indicates a growing short-term effect while the advertising campaign lasts; this is followed by a declining effect which, in the long-run, comes down to a new base level, ultimately showing only a minimal effect. We believe this description is by no means exhaustive as there may exist in some cases little or significant variations due to the nature of the product or pattern of consumers' response to advertising.

Unlike most traditional economic theories, consumer behaviour theories do not assume that advertising and sales promotion convert regular customers from one brand to another. Consumer researchers believe that, more often than not, advertising and promotion strengthen already existing preferences and loyalty for brands that have been tested and found satisfactory rather than automatically cause brand switching. Prof. Ehrenberg has carried out some studies on heavily advertised consumer goods in stationary markets and his findings do not support the assumption that advertising converts *loyalists* from one brand to another. He believes that, on the aggregate, consumers purchase a few brands from a short list of acceptable brands with different but regular frequencies. (See Ehrenberg, 1969, 1972; and Chatfield, et al., 1966). This multi-brand analysis of choice behaviour was supported by McDonald (1970) and Achenbaum (1972) with the modification that the purchase frequency for each of the chosen brands is irregular. In a related work, Ehrenberg (1974) observed that advertising is minimally effective. Fishbein and Ajzen (1975) also suggested through their model of behavioural intention that all variables, including advertising and promotion, can only influence consumer behaviour indirectly. According to the model, advertising/sales promotion and other factors can only affect purchase behaviour through their impact on consumers' beliefs, evaluations, norms, motivation, and attitudes. However, in view of the

fact that advertising and sales promotion create at least product/brand awareness among the consuming public and their potential for influencing non-brand-loyal consumers or those with very weak loyalty, they are a factor worth considering in a consumer behaviour study.

2.4: Changing Tastes, Preferences and Perceptions in relation to Consumer Choice

The superior quality of a brand can lead to brand preference, but generally speaking, the average consumer does not base his choice decision on product/brand quality alone.. In making choice decision, consumers of technical products may, for instance, want to consider the various brands available in relation to their unique features, efficiency, convenience of use, reliability, durability, and maintenance cost. It is doubtful if consumers in reality do have enough information, time and patience at their disposal to enable them make a "rational" choice decision based on these considerations. Thier perception of the various brands is almost as important as any other variable such as price. Consider for instance a fast-moving consumer good like toilet soap: potential customers are susceptible to the attractive packaging of a brand in terms of the material, colour, labelling, or wrapping used, or even in terms of pack shape or pack size. In the ordinary sense of it, these features can be considered as trivialities but they are capable of influencing consumers' perception of that brand.

To illustrate the argument being made here, we cite a study that was carried out by Allison and Uhl (1964) in which beer drinkers were blindfolded and asked to taste and distinguish types/brands of beer. Thereafter, their sight were restored and they were asked to evaluate each brand shown to them. Surprisingly, the result showed that "participants in general did not appear to be able to discern the taste differences among the various brands, but apparently labels and their associations did influence their evaluations". To some extent, therefore, packaging could be a useful marketing strategy in certain product fields as it influences consumers' perception of a brand.

Taste is an important factor in a behaviour model and it can change as a result of learning from past purchase experience or habit formation (See, e.g., Kuehn 1962 and Jeuland 1978); it could also be due to variety-seeking behaviour on the part of consumers (See, e.g., McAlister & Pessemier, 1982; McAlister, 1982), or both reasons (Kahn, Kalwani & Morrison, 1986).

When consumers' preferences and buying habits are stable over time, a state of equilibrium is said to be achieved. According to the Law of Marketing Entropy proposed by the Hendry Corporation during the early 1960s, "the level of switching at equilibrium for brands in a directly

competing set is related to the distribution of their shares". This switching level reaches its minimum at equilibrium. For a non-stationary market, i.e. a market in disequilibrium, Butler (1994) argues that gain in preference from, say, Brand A to Brand B will bring about higher brand switching in favour of Brand B. He then suggested the use of a preference index to measure consumer brand switching behaviour and to determine the status of brands in markets which are not in equilibrium.

$$\text{Preference Index} = \frac{\text{Actual Preference} + \text{Change in Preference}}{\text{Expected Preference}}$$

Butler proposes that, in theory, the preference index should be equal to 1, but because of the imperfect nature of inter-brand switching in practical situations, a range of values from 0.93 to 1.00 could be acceptable. He also noted that the index may be a little higher than 1.0 when considering very small sample sizes. See Butler (1994, pp.5 &7).

2.5 : The Impact of Fashion on Consumer Behaviour

In studying consumer behaviour, it is necessary to consider the nature or type of products involved as well as the potential motives for purchasing them. While food and other necessities are purchased with utilitarian motives, expensive jewelleries and perfumes, customised cars, expensive holidays, leisure services, designer suits, designer dresses, designer shoes, and other luxury goods and services are psychosocial desires. These

desires are highly influenced by the general trend of fashion within the relevant product field. Within such product fields, the possibility cannot be ruled out that most consumers will go for a particular brand name just because it is the latest fashion. Holbrook and Hirschman (1983) argue that fantasy, feelings, and fun must be considered to enable us have a better understanding of consumer behaviour. People go to the beach , or cinema to watch films that could otherwise be watched free on their televisions at home, because of the fun and pleasure derivable from being in company of others. However, we believe that the latent desire in man for pleasure and fashionable goods and services is generally limited by the extent of his income. A lower-income consumer will find it more difficult than a wealthy person to transform this type of desire into effective demand.

The choice mentality of most fashion-conscious consumers is such that they will prefer new, fashionable goods to old-fashioned ones even for higher prices. This choice behaviour generally changes with changes in fashion. The latest fashion of today will after some time become obsolete. Studies have shown that producers also contribute to the rapid obsolescence of goods by introducing new variants of the same product possibly with superficial modifications or minor additional accessories. This is further explained by the *"planned obsolescence theory"*.

2.6: Public Policy, Price, Income and Savings as determinants of Consumer Behaviour

A country's national government discharges its role of giving economic direction through the use of monetary and fiscal policies such as taxation, exchange rate, lending rate, and interest rate on savings. Government may want to discourage the consumption of beer, tobacco and certain ostentatious products through levying what Wilkie (1994, p.315) referred to as "luxury taxes". It is also commonplace for governments to impose import restrictions or prohibitions on some products. The combined effect of all these policies may have implications for changes in consumer behaviour. These may be in form of an increase or decrease in the availability of the products concerned, the general price level, disposable income, savings, and the propensity to spend.

Mariger (1986) has studied the effects of government fiscal policies on consumption behaviour and published the following results in his book:

- A 10% incremental tax on labour income immediately decreases the consumption of families represented by the sample by 18.4% of the incremental tax revenue. This change would only be 25% as large if no families were liquidity constrained; that is, if borrowing and money transfers were not allowed.
- A 10% incremental tax on labour income, followed by an anticipated reduction in the rate of tax on labour income ten years later that keeps

the present value of the government's revenue constant, immediately reduces consumption by 9.0% of the initial incremental tax revenue. This consumption change would be only 20% as large if no families were liquidity constrained. The lagged effects of this policy are significant in spite of liquidity constraints: Over nine years, consumption falls by 33.4% of the initial incremental tax revenue.

He therefore concluded that:

1. In the short-run, the effects of government fiscal policies on aggregate consumption are rather small. These effects are however greater than what they would be if borrowing and money transfers were highly constrained.
2. The long-run effects of government fiscal policies on aggregate consumer behaviour are highly significant.

Consumers are generally limited by the extent of their income and savings in the quantity of goods they purchase and in taking decisions regarding brand preference. Assuming other factors such as tastes, fashion, and group or family influence are held constant, a typical low-income person will choose lower-priced brands; whereas a wealthy individual will be able to afford the luxury of choosing costlier brands. From Appendix 2A, we can see that over 80% of previous empirical studies revealed a positive association between income and

innovativeness - an important aspect of consumer behaviour. In product planning, therefore, management should keep abreast of the relevant policies of government vis-a-vis their potential impact on price level, consumers' disposable income, savings and ultimately purchase behaviour.

2.7: Personality Characteristics Effects on Consumer Behaviour

A generally-accepted definition of personality is: "the characteristics that determine the general pattern of behaviour in a higher animal, especially as it makes the individual distinctive in relations with others". (See Hebb 1966 – "A textbook of Psychology"; See also Engel, Kollat & Blackwell's book). With reference to individuals, personality is so unique that Kempner in his dictionary of management published in 1976 described its study as essentially the study of individual differences. It includes a person's motives, emotions and response traits. A widely-accepted hierarchical classification of motives has been suggested by Abraham Maslow, viz:

Physiological motives → *Safety* → *Belongingness or Love* → *Esteem* → *Self-actualisation.*

Personality traits can be measured using tests such as the Edwards Personal Preference Schedule, the Gordon Personal Profile, the Thurstone

Temperament Schedule, and the California Personality Inventory. The Edwards Personal Preference Schedule, for instance, consists of "sets of paired statements in which each sentence in a pair describes a personality need and from each pair, the respondent selects the statement he feels best portrays himself". (See, e.g., Markin, 1974; p.351). To avoid the complexity of dealing with too many variables in a particular situation, factor analysis is often used to identify the most important characteristics in human personality and further analyses are based on these principal factors or characteristics.

There is a general belief among scholars that it should be possible to predict behaviour using a set of relevant and reliable personality characteristics. For instance, it is logical to assume that "achievement motivation" and "drive for success" could be used to predict behaviour in achievement-related tasks. Similarly, the desire for pleasure, comfort, fashion, or variety may respectively be indicative of pleasure-seeking, comfort-seeking, fashion-seeking, or variety-seeking behaviour. While a fashion-conscious consumer will normally choose the latest fashion, paying little attention to price and other factors, a variety-seeking individual will always switch from one brand to another. Furthermore, it can be argued that an adventurous person will readily try new and unfamiliar products. It will therefore be interesting to know whether a

consumer is flexible or rigid, liberal or conservative, innovative or adaptive, risk-perversed or risk-aversed, individualistic or conformist, or whether the consumer has a light, moderate or heavy consumption drive. Researchers believe that these could serve as useful indicators of product/brand preference and some other aspects of consumer behaviour.

An aspect of consumer behaviour that has attracted the attention of market researchers is consumers' innovativeness. Based on the thinking that innovators are different from later adopters, market researchers and practitioners are interested in knowing which variables are correlated with innovativeness so they can design new products that will appeal to the majority of consumers. Appendix 2A gives a summary of the results of such correlational studies. The table illustrates the fact that a considerable percentage of research findings revealed positive association between some selected consumer characteristics and innovativeness. In most cases, however, the correlation of these variables with choice behaviour are not strong enough - the correlation coefficients are generally in the neighbourhood of 0.3. (See Foxall, 1980; p.59).

In related research developments, attempts have been made to psychographically classify consumers on the basis of variables such as social class, life-cycle and personality. One of such attempts was

Martineau (1957) which studied owners of Chevrolet and Ford cars in the United States and found that there were three basic personality types underlying automobile purchase behaviour, namely:

(i) conservatives, (ii) moderates or sociables, and (iii) attention getters.

He then concluded that:

- Personality is the main variable in automobile brand choice.
- Personality is an important factor in any product, brand or store choice.

Two years later, Evans (1959) subjected owners of Ford and Chevrolet to personality tests using the Edwards Personal Preference Schedule. His findings did not confirm Martineau's hypothesis - he discovered that personality is of relatively little value in predicting whether a consumer will buy a Ford or a Chevrolet. Westfall (1962) also used another personality measure (Thurstone Temperament Schedule) to study the impact of product personality on the consumer. He concluded, inter alia, that compact and standard car owners do not seem to differ to any marked degree. We wish to adopt the tabular summary given by Foxall (1980, p.61) to illustrate the influence of personality on consumer choice, as shown in Appendix 2B. The table shows that only a small proportion of the variability in purchase behaviour could be ascribed to personality traits. Hence, it remains to be seen whether we can achieve a reliable

psychographic classification of consumers based on personality characteristics.

Although personality characteristics have been found to be correlated with perception and behaviour, the coefficients are weak and besides, significant causal relationships are yet to be established. To that extent, any claim that personality characteristics have a strong predictive power over behaviour stands to be backed up by research evidence. This is not to say that it is worthless considering the personality dimensions of consumer choice. The trend of research opinions is that personality and other variables such as income, price and product characteristics as well as the environment interact to influence consumer behaviour. The interaction effect and the situational or environmental context of behaviour are however more important in predicting consumer behaviour than personality or other variables considered singly. Kassarjian (1971, p.416) has underscored this fact when he expressed the view that "personality researchers in consumer behaviour much too often ignore the many inter-related influences in the consumer decision process, ranging from price and packaging to availability, advertising, group influences, learned responses, and preferences of family members". He concluded that "to expect the influence of personality variables to

account for a large proportion of the variance of consumer behaviour is most certainly asking too much".

2.8: The Influence of Reference Groups on Consumer Behaviour

A reference group is any interacting aggregation of people with whom an individual compares himself, his attitudes, beliefs, values, behaviour and performance. (See Foxall, 1980, pp.92 &93; and Engel, et al., 1968, p.309). Examples of reference groups include clubs, work groups within an organisation, and professional groups. The practicalities of reference groups are such that an individual normally belongs to more than one reference group, and each of these has potential influence on his attitudes and behaviour.

Broadly speaking, groups can be primary or secondary. Homans in his book titled 'The Human Group' refers to a primary group as a group consisting of "a number of persons who communicate with one another often over a span of time, and who are few enough so that each person is able to communicate with all the others, not at second-hand, through other people, but face-to-face....." (Homans 1951, p.1). Unlike primary groups, secondary groups may not exhibit intimate, face-to-face interaction between members. They are essentially bigger and usually comprise more than one primary group. Examples are trade unions and students' union. Primary groups can serve as pressure groups within a

secondary group much the same way as they can positively contribute to the achievement of overall group objectives and goals. These goals are common to all members. Groups also have ideology, beliefs, values, and norms of behaviour to which members are expected to conform. Although total conformity is a utopian situation, the generality of members are more often than not influenced by the so-called "bandwagon effect" of majority opinion or decision. However, to what extent members conform to the group's values and norms is a question of empirical study and analysis.

Venkatesan (1966) has studied the concepts of conformity and independence in relation to consumer behaviour. His findings support the claim that consumers generally conform to group norms in making brand choice decisions but when they realise they are being forced to conform to the group's decision, they may react otherwise by asserting their independence and freedom of choice. Francis Bourne and his colleagues at the Foundation for Research on Human Behaviour, U.S.A. have also studied the influence of reference groups on consumer behaviour. They singled out conspicuousness as the most pervasive product attribute involved in reference group influence. They believed that reference group influence varies from product to product and brand to brand, and attempted to categorise products/brands according to the

strength of reference group influence. The result was that the strongest influence were exhibited in relation to those products and brands for which there existed strong group norms. Examples are cars, cigarettes, beer, and drugs. As far as these and other similar categories of products/brands are concerned, reference groups can be said to have a strong influence on consumption patterns, brand preferences, and other aspects of consumer behaviour. However, the point has to be made that the degree of influence of a particular reference group on the buying behaviour of individual consumers depends on the level of commitment of the individual to the goals, values, norms, and aspirations of that group. This is because an average consumer belongs to many different groups and may not rank the groups equally important as a reference point for his attitudes and buying behaviour. Further explanation of consumer behaviour from the perspective of group theory and conformity theory will be given in Chapter 3.

2.9 : The Role of Attitudes in Consumer Behaviour

There are scholars who approach the study of consumer behaviour from the perspective of consumer attitudes. These scholars do not, of necessity, deny the existence of all the variables already considered. Instead, they believe that those variables do not have direct impact on consumer behaviour. The variables are rather assumed to exercise their influence through attitude. The study of attitudes has been considered

vitally important especially in the field of social psychology. As Murphy, et al. (1937, p.889) observed in their book called 'Experimental social psychology', "perhaps no single concept in the whole realm of social psychology occupies a more nearly central position than that of attitudes". However, a number of research findings have raised doubts over the existence of a strong relationship between attitudes and behaviour. Social psychologists took this up as a challenge and severally made attempts to either confirm the importance of attitudes in predicting behaviour or find better predictor variables.

These attempts paid off with the significant break-through recorded by Fishbein and Ajzen which was published in their popular book titled 'Belief, attitude, intention and behaviour: an introduction to theory and research' (Fishbein and Ajzen 1975). The duo came up with a model often referred to as the "Extended Fishbein's Model" because of the earlier works of Fishbein on the subject-matter. This model threw tremendous light on the relevance of attitude to behaviour. Moreso, it aroused the interest of consumer researchers in attitude studies. Rather than jettison "attitude", Fishbein and his colleague suggested that "attitude" can be incorporated into a model which involves other variable(s) and which predicts "behavioural intention" instead of behaviour. The model states that :

Purchase Behaviour $\cong$ BI $= w_1.AB + w_2.SN$

where: BI = Behavioural Intention

Aact = Attitude towards the purchase behaviour

SN = Social Norm

w_1 and w_2 are empirically determined weights

Social norm refers to what the individual thinks of other people's beliefs and expectations concerning the purchase act. These other people could be his or her spouse, close relatives, or significant others. The whole question of attitudes, social norm, and further description of the model itself will form part of the discussion in Section 3.6. Thereafter, we will operationalise and seek ways of improving the model in subsequent chapters.

2.10: Family, Household and Other Interpersonal Influences on Consumer Behaviour

The term "family" can be used to refer to the nuclear family or the extended family. *Nuclear family* consists of husband, wife, and child(ren), if any; while the *extended family* consists of the nuclear family as well as grandparents, uncles, aunts, nephews, nieces, cousins, in-laws, and other relatives. The nuclear type of family is predominant in industrialized societies whereas the extended family system is commonplace in developing countries. Behavioural scientists also make a distinction between what they regard as *family of orientation or origin*

(which is the family an individual is born into) and the *family of procreation* (which is the one established by marriage)[4]. It is pertinent to note that global variations exist not only in the nature of family composition but also in the roles, functions, responsibilities and rights of the spouses and children as well as the inter-relationships between them.

As a primary reference group, the family allows intimate, face-to-face interaction between its members. These interactions have the potential of influencing the tastes, perceptions, preferences, attitudes, values, motives, personality characteristics and, indeed, purchase decisions of individual members. Thus, the extent to which the husband influences the wife – and vice versa – with respect to various types of purchases will be very useful to the marketer to enable him direct advertising and sales promotion efforts appropriately. It is however very difficult to make a categorical statement regarding the nature and degree of influence of the various members of the family on consumer behaviour. The relative influence of family members depends on the product or brand being considered.

As the role of members is not fixed for all products, various role structure category systems have been put forward by researchers. Engel, et al.

[4] See, for example, Berelson, B. and Steiner, G.A. (1964, p.297). *Human Behaviour: An Inventory of* Scientific Findings. New York: Harcourt, Brace & Jovanovich, Inc.

(1968, p.335) argue that these "role structure categories can be used to describe the general pattern of decision-making or the pattern of decision-making for specific products or even brands". One of the major classification schemes suggests that, in collective purchases, product/brand decisions can be categorized as *husband-dominant, wife-dominant,* or *joint.* (See, for example, Foxall, 1980; p.123). As an illustration, the role of the wife is generally dominant in groceries, kitchenware and other domestic product purchases; whereas the husband exercises greater influence concerning the replacement of their car tyres or battery. Other decisions such as choice of school for the children or holiday for the family may be taken jointly. Philip Kotler in his popular book titled "Marketing management" identified five buying roles which are very useful in analyzing family purchase behaviour. These are: the *initiator*, the *influencer*, the *decider*, the *purchaser*, and the *user* (kotler 1972). Although parents make the final decision and purchase, children are the end-users of toys, cartoons and computer games, and to that extent they can initiate and strongly influence what is purchased. Advertisers recognise the influence of children on family purchase behaviour and often appeal to parents through their children.

An important factor deserving of mention in relation to family purchase behaviour is *family life cycle.* To a great extent, the stage or phase that a

family attains determines its pattern of expenditure. (See Foxall's book: "Consumer behaviour – a practical guide"). We present here an illustrative extension of Foxall's idea: Apart from essential goods like food, younger or newly-established families concern themselves with new acquisition of products such as furniture, television set, video, toaster and other home appliances and equipment. When they have their first and subsequent babies, purchase of baby foods, children's wears, toys, school uniforms, bags and books form an important part of their expenditure. On the other hand, older families concentrate on renewing or replacing already-acquired equipment that are performing poorly or have broken down or become obsolete. High-income families can also afford the luxury of making additional purchases of some durables such as cars and television sets while still retaining the original ones. The aim of this kind of purchase behaviour is to have multiple ownership of those products such that, for instance, the husband and the wife each has access to a car at any point in time; or in the case of television, one set each may be placed in the living room, master bedroom and children's room.

The interpersonal influence of neighbours, friends and acquaintances on consumer behaviour should not be under-estimated. In most developing countries where the extended family system is prevalent, people interact

relatively closely with other members of the entire family and with their neighbours. They are constantly aware of each other's major purchases and may be influenced by them. Young & Willmott (1957) have discovered that extended family members do have some influence on consumers' general purchase behaviour. We cannot, however, make a reliable generalization based on this because the study was addressed only to families in East London.

If we look at family institution as a special type of reference group, it will be appropriate to view the behaviour of family members against the background of group and conformity theory. Individuals have the tendency to conform with group tastes and preferences. They would naturally not want to fall below perceived standards within the family/household and among friends. As a matter of fact, the variable referred to as "social norm" by Fishbein and Ajzen in their behavioural intention model is an embodiment of the practical influence of family members, close relatives and significant others on consumer behaviour. This theory is the primary focus of our study – it will be fully discussed and operationalized in subsequent chapters.

2.11: Socio-cultural Perspectives of Consumer Behaviour

The definition of culture is by no means exhaustive. One of the most acceptable definitions is that of Ralph Linton. Linton (1945, p.32) defines

culture as "the configuration of learned behaviour and results of behaviour whose component elements are shared and transmitted by the members of a particular society". Culture affects our perception and gives meaning and interpretation to our actions and behaviour. As Markin (1974, p.461) observes, culture influences behaviour "through an underlying system of values and norms".

Culture is dynamic - it changes over time. This has implication for corresponding changes in consumer behaviour. Culture is pervasive within a given society. Behaviour patterns arising from social interaction and culture are usually common to virtually all members of the same socio-cultural group. There are however customs, values and norms that are common to all cultures - these are regarded as "cultural universals". Moreover, the advent of cable television, satellite communication, internet, and other modern communication systems has improved not only the degree of social interaction between members of different cultures but also its frequency and speed. These interactions lead to what is referred to as "cultural borrowing". Some scholars argue that there now exists a massive homogenization of world culture. (See, e.g., Osgood, 1972; p.22). Much as we recognize the fact that the world is becoming a global village, we believe that the different peoples of the world still cherish their cultural identities. Therefore, individuals and

companies who want to operate and succeed in the international business arena must consider the cross-cultural differences of consumer groups world-wide.

In societies where the influence of culture is very strong, members of the same cultural group conform, consciously or unconsciously, to societal standards, beliefs and value system[5] . They tend to have similar attitudes, tastes and preferences towards the consumption of certain products. Better understanding of a society's culture in relation to other cultures thus enhances the prediction of the purchase behaviour of its peoples. Furthermore, it gives the marketer useful insights into the nature of his market, enables him to segment the market, and design products that will meet the cultural aspirations of the various segments. Products should be designed in such a way that they possess characteristics that identify with relevant aspects of the people's culture. Consumers may develop negative attitudes towards a product whose attributes conflict with their cultural values. Similarly, a product with a narrow cultural appeal will most likely be less competitive in international markets than a more popular one. Therefore, in order to produce goods that are widely acceptable in both domestic and overseas markets, multinational

[5] Total conformity to cultural norms is a utopian situation. Allowance should be given to the presence of a few cultural deviants.

corporations should adopt appropriate marketing strategies based, among others, on a sound knowledge of the societal differences in culture.

Culture is a complex phenomenon and is not based on national boundaries. Within a given society, subcultures could evolve along racial, nationality, ethnic, regional or religious lines. Each of these subcultures may constitute large and significant market segments for certain products. We shall discuss briefly some of the major subcultures as follows:

Racial Subculture

Some studies conducted in the U.S.A. have shown that differences in subcultural values among different races affect their consumption patterns. It has been found that black and white Americans of similar incomes differ in their spending behaviour on some products. The claim is that blacks spend less than their white income colleagues on food and housing, more than their white colleagues on clothing and furniture, and prefer quality higher-priced automobiles. (See Bauer, et al., 1965; pp.1-6 and Akers, 1968; pp.283-290). However, a number of scholars believe that most of these consumption behaviour are attributable to other factors apart from black subculture. Markin (1974, p.480), for instance, argues that the expenditure pattern just described is a result of the interplay of culture and "social, political and economic discrimination".

Nationality Groups

In China, it is a cultural taboo to present a clock to a business associate or any person, as this has a funeral connotation. Clock retailers in this community should therefore not expect increased sales during festive seasons when people exchange gifts. Like other peoples, Chinese people cherish their cultural values. Oliver Yau in his recent book on Chinese cultural behaviour developed a model of consumer satisfaction/dissatisfaction based on Chinese cultural values and some other variables. He proposed that "cultural values, types of products and use situations are better determinants of consumer satisfaction than other intra-personal determinants such as expectations, performance and disconfirmation".

Ethnic Subculture

An ethnic group is identifiable not only by its language or the physical characteristics of its members but also by its food culture. Food culture however varies from one ethnic group to another. Some dishes that are readily preferred in one ethnic group may be unattractive to members of the other groups. Alexander (1959) came up with an interesting report of his study on the attitudes of members of Jewish, Puerto Rican, Black, and Italian subcultures in Greater New York to six different convenience foods: frozen dinners, frozen red meat, frozen fruit pie, instant coffee, cake mixes, and dehydrated soups. The result of this study is

summarized in Appendix 2C. The table is self-explanatory and clearly shows appreciable differences among ethnic subcultures in the degree of acceptance of the six foods. It should be noted that food has been used as an illustration and that ethnic dimension to consumer behaviour is not limited to food alone.

Regional Groups

In the U.K., the Office for National Statistics (ONS)[6] conducts on a yearly basis a survey called the *Family Expenditure Survey*. This survey covers a wide range of products and services, and its results are analyzed in terms of age, sex, income, social class, product type, occupational and regional groups. Here, we are interested in analyses based on regions. These often reveal remarkable regional patterns of expenditure which could serve as useful information for marketing and advertising practitioners. Statistical analyses of the 1997-98 Family Expenditure Survey[7] show, for example, that:

- people in South West region were, on the average, the lowest spenders on tobacco and gas.

[6] The Office for National Statistics (ONS) is a government agency created in April 1996 by the merger of the Central Statistical Office (CSO) and the Office of Population Censuses and Surveys (OPCS).

[7] Survey results published in *Family Spending: A Report on the 1997-98 Family Expenditure Survey By the Office for National Statistics.*

- the biggest spenders on housing, telephone, restaurant and café meals, fares and other travel expenses were in London, but they recorded the lowest car/van ownership;
- Northern Irish folks led other regions in the average amount spent on clothing and footwear, electricity and other fuels, fresh milk, beef, biscuits, cakes, bread, and rolls;
- West Midlands people spent the biggest amount on television, video and computer purchase but the lowest on fares and other travel expenses;
- The South East region ranked highest in terms of car, van and motorcycle ownership.

Religious Subculture

Culture and religion are interwoven in some societies. The Islamic culture, for instance, forbids the consumption of pork and alcohol and this tremendously affects the sale of such products in countries like Saudi Arabia, Kuwait and Iran, to mention only a few. Consumption behaviour may also be influenced in similar or other respects by Christian, Jewish, Hindu or other religious values and traditions.

2.12: Summary and Conclusion

Series of factors that impinge on consumer choice behaviour have been discussed in the previous sections. We note that these factors are bound

to vary from one individual or society to another. For different individuals, markets and societies, for instance, price and income levels are not exactly the same; tastes, preferences, perceptions and attitudes vary; government policies differ; personality and cultural differences exist, and so on. Even for a particular individual or society, these variables are never static - they keep changing with time. They act interdependently to influence one another in ways that are possibly unique to each consumer or consumer group. The interaction between the variables ultimately produces some effects on consumer behaviour. Telser (1962) studied the effect of price on patterns of brand switching behaviour over time; he found a linear relationship between the "transition probabilities" and the "difference between the price of a particular brand and the average price of all other brands". Other studies have also shown that brand loyalty may occur as a result of price, habit formation, or superior quality of the chosen brand.

Against the background of the qualitative analysis done in this chapter, we note that none of the factors can fully account for changes in buying behaviour – they need to be combined appropriately to achieve a better explanation. We conclude that the *interaction effect* of all the factors on purchase may theoretically be more important than each of them considered singly. Interaction effects can however be rendered

redundant in the event of some variables being nothing more than linear combinations of some others. The effects of interaction between two or more variables on PC buying intention and behaviour will be put to test in Chapter 5.

In view of the dynamic nature of the variables, the different ways they manifest themselves in different consumers, and the potential interaction between them, it should not be a surprise that consumer choice not only changes with time but also varies from one individual, group, region or society to another. The significance and contribution of theories/models in describing and explaining this complex phenomenon will be the subject of discussion in Chapter 3.

CHAPTER 3

CRITICAL APPRAISAL OF EXISTING RELEVANT MODELS/THEORIES OF BUYING BEHAVIOUR

In this chapter, we give a brief review of relevant models and theories of consumer behaviour with emphasis on the background theory for this work . This is necessary to enable us have a clear understanding of the overall concept and to provide us with reliable links to the past and current theoretical developments in this area. With this theoretical framework, it should be possible to develop our own alternative model in line with current thinking among experts.

3.1: MEANING AND SIGNIFICANCE OF MODELS AND THEORIES

We saw in Chapter 2 how various factors influence consumer behaviour. These factors manifest themselves in different dimensions for different individuals, product fields and markets. They operate interactively to give a complex pattern of purchase and consumption. Theories and models attempt to study this underlying pattern, and are therefore very important for a better understanding of consumer behaviour. These theories/models are not only many but they come in various forms and approach consumer behaviour from different perspectives – some *explore* into what consumers buy, others *describe* how they arrive at their decisions through series of purchase processes; some other groups *explain*

why particular decisions were made and possibly go ahead to *predict* consumer behaviour.

At this juncture, one may want to ask the question: what is a model? By a model is simply meant, an abstraction of real world situation. According to Rothman (1986, p.71) in the 'Consumer market research handbook', "a model is a set of assumptions about the factors which are relevant to a given situation and the relationships which exist between them". Zaltman (1977) defines it as "a simplified but organized and meaningful representation of an actual system or process". In statistical modelling terms, Aitkin, et al. (1989, p.68) considers models as "smooth approximations to the rough, irregular complete population".

A model specifies the important elements of the system being modelled as well as the relationships between those elements. Key elements in a consumer buying behaviour model, for instance, may include consumer attitudes, beliefs, intentions, motives, perceptions and purchase behaviour. Theories provide the conceptual framework for models, and are more universal in nature. This means a model can be regarded as a theory if it presents ideas that serve as a framework or input for other models. In practice, it is sometimes not easy to say whether a model is, strictly speaking, a model or can also be considered as a theory. Simon &

Newell (1963) and Lunn (1974) actually used the two terms interchangeably. Where the line of distinction should be drawn between theories and models of buying behaviour is not the primary concern of this study.

We do not intend in this study to dabble into the details or technicalities of all existing theories of buying behaviour – doing so may take us into the full realm of fields such as social psychology, economic psychology, or behavioural science; and this has implication for a loss of focus. Our aim is to give a brief review of some relevant theories and models of buying behaviour, bringing out the salient aspects of each of them and the complementarity of one to the other. Thereafter, we shall apply appropriate statistical and computing techniques to seek ways of improving our chosen model. For the purpose of this chapter, the theories to be discussed have been classified into various headings to make for clarity. They will be discussed in turn in the sections that follow:

3.2: TRADITIONAL ECONOMIC THEORIES

3.2.1: The Theory of Rationality of Choice

Economic theories are largely based on the concept of "rationality". Human behaviour is assumed to be rational "in the sense that it can be understood by asking how a well-informed individual would act to secure

his or her best advantage" (Lea, et al., 1987, p.103). The specification of an inverse relationship between price and quantity of goods purchased, as encapsulated in the great theory of demand, is based on the principle that consumers are rational in their choice of product, brand, quantity purchased, and time of purchase. They will, for example, buy more of a product/brand at a lower price and buy less at a higher price. Essentially, the potential effects of other factors such as fashion are held constant. The idea of a rational behaviour is relative to individuals and buying situations. Purchase decisions principally influenced by the consumer's crave for fashion may not be fully explained by rationality of choice (See Section 2.5).

As we shall see later in Section 3.6.1, the background theory for this work is premised on the principle of rationality of human behaviour. Consumers require relevant, up-to-date and timely information to make rational judgements in their purchases. These information are not always readily available, and when available, consumers are typically limited by time or their mental capacities to process them. There is a great deal of wisdom in the opinion expressed by Etzioni (1986) in the Journal of Economic Psychology that "rationality is the exception, not the rule in human behaviour, because rationality involves cost of information

acquisition, cognitive elaboration, information processing, selection of an alternative, and the implementation of the choice".

3.2.2: Utility Maximization Theory

The idea of rationality is not an end in itself; it is a means to an end. Consumers are assumed to be rational in their purchase behaviour with a view to maximizing utility - the satisfaction or value derived from consuming goods and services. It is assumed that they will choose a product or brand that gives them maximum benefits. This utility maximization objective is usually constrained by price, income, information access, and other factors. It is doubtful if consumers can and do carry out an objective assessment of which product/brand gives them the highest utility. Van Raaij (1988, p.97) in the 'Handbook of economic psychology' argues that "humans have limited capacities and are not always motivated to maximize utility". However, other models such as the Trade-off model (See Section 3.5.1) have employed the idea of utility maximisation to determine brand preferences.

3.3: BEHAVIOURAL AND SOCIO-PSYCHOLOGICAL THEORIES

3.3.1: Behaviouristic Learning Theory

Consumer behaviour from the standpoint of psychology and behavioural science differs from the rationality approach adopted by economists. Rather than assume that consumers are rational in their choice behaviour,

psychologists believe that human beings are naturally born with instincts to behave in a particular manner but their tastes, preferences and attitudinal dispositions are *learned* as they grow up. They argue that man has a capacity to learn. Behaviouristic learning theory views consumer behaviour as a complex psychological field consisting of a sequence of stimulus-response processes. The major variables operating in the field are drive, cue, response, and reinforcement. Other variables and processes are regarded as unobservable and are either not considered at all or held constant.

- *Drive*, according to Engel, et al. (1968, p.27), refers to "an internal stimulus activated by a need or motive, thereby energizing behaviour and prompting action".
- *Cues* are "external or internal stimuli which serve to direct an appropriate response to satisfy the aroused drive". (Engel, et al., 1968; p.27).
- *Response* is "an organism's reaction to a configuration of cues". (See Markin, 1974; p.64).
- *Reinforcement* occurs if the behaviour proves to be rewarding or satisfying.

Man has a tendency to repeat response patterns that have yielded positive results in the past and to avoid those that were negative. He

learns from his achievements and mistakes. He learns from past purchase experiences which, if positive, could serve as a basis for loyalty towards a particular brand. Research evidences have shown that repetitive purchasing improves a consumer's learning experience and has implication for a reduction in his perception of risk and uncertainty within the product field concerned (See Section 2.2 and Roselius, 1971 for further details).

3.3.2: Cognitive Learning Theory

Cognitive psychologists are of the opinion that the behaviouristic approach to consumers' psychological field is too "mechanistic". Markin (1974, p.64) described their *stimulus-response model* as a "mechanistic set of learned responses to invoked stimuli". Cognitivists argue that all aspects of the field must be considered apart from those processes that the behaviourists regard as observable. They believe that consumers generally have beliefs, values, and expectations which serve as the bases for their perceptions, emotions, attitudes and behaviour. They also believe that consumers do not just respond to a set of stimuli; rather, they exercise conscious processes of thinking, reasoning, learning, information processing, storage, retrieval, and behaviour and are always motivated to achieve their goals and aspirations. Through these processes, consumers learn about existing products/brands, their relative quality, price attributes and other characteristics, availability of alternative brands, and are able to

make a reasonable choice. Their choice behaviour are continuously modified as a result of learning. Scholars who belong to the cognitive school recognize that various types of learning exist, each applicable to different purchase situations such as *routine decision-making, limited problem-solving,* and *extensive problem-solving.* They strongly believe that their own approach addresses the extensive problem-solving behaviour of consumers.

Theories of learning have significantly contributed to a better understanding of consumer behaviour but none of them actually specifies the exact pattern of relationship between consumers' learned attitudes and subsequent behaviour. A form of relationship has been proposed by Fishbein and Ajzen in their theory of reasoned action (See Section 3.6.1).

3.3.3: Theories of Social Influence

Unlike learning theories, the primary focus of theories of social influence is the socio-cultural environment of the consumer's psychological field. These theories propose that consumer choice behaviour is largely influenced by the interaction of people within the social system. A lot of social interactions go on between consumers of different backgrounds and personality characteristics, especially through formal and informal groups. These groups have been found to have significant impact on the beliefs, values, attitudes, and choice behaviour of consumers. Social

influences such as those attributable to reference groups, family, and culture have been discussed in Sections 2.8, 2.10, and 2.11 respectively).

One of the major theories of social influence is *group theory*. This theory explains the intermixing of consumers and the fact that those who belong to the same reference group are expected to conform to the group's standards, values and norms. In general, they do conform but this *conformity* may be conscious or unconscious. Due to intimate and continuous interaction, consumers are always aware of each other's buying behaviour and may find themselves conforming to a new purchase behaviour started by a few members of their group. This new purchase pattern has the potential of "filtering" through the whole group and the society, thus leading to what is commonly called "diffusion of innovations".

Diffusion models attempt to explain trends in the adoption of a new product by consumers. From a global point of view, we may look at western orthodox medicine as an innovation which diffused and is still diffusing through the traditional medical practice of the African countries and other parts of the world. The choice between orthodox and traditional medicine is usually influenced by reference groups and other factors such as income, literacy level, social class, personality

characteristics, perception, and experience learned from previous medical services.

3.3.4: Theory of Reasoned Action

This socio-psychological theory was developed by Fishbein and Ajzen. The theory will serve as the background theory for this study and so is fully discussed in Section 3.6.

3.3.5: Summary

Unlike theories such as the theory of reasoned action and Ehrenberg's repeat-purchase model (See Section 3.5.2) which specify some mathematical form of relationships between behaviour and the explanatory variables of their models, learning theories are more difficult to test. However, they are not unimportant as they offer a generally useful set of theoretical constructs which serve as inputs for more specific models even outside the fields of behavioural science and psychology. For instance, the popular Markov approach to explanation of consumers' brand loyalty/brand switching behaviour which considers consumers as *transiting* from one "state" to another (See Section 2.2) is founded on learning theory principles. Based on what consumers learned from past purchases, they can retain their state through repeat purhase or change it by switching to other brands. Similarly, decision process models like those of Howard & Sheth; Engel, Kollat & Blackwell; and Nicosia use

learning constructs such as brand comprehension, attitude, confidence, and satisfaction to describe the purchase process (See Appendices 3B, 3C and 3D). This brings into focus the complementary nature of the various models of buying behaviour.

3.4: DECISION PROCESS MODELS

Decision process models attempt to explain why consumers choose particular courses of action. They consider the act of purchasing as consisting of stages which consumers pass through. According to Foxall (1980, p.22), the buying process is simply made up of the following stages which are applicable to both durables and non-durables:

1. The development and perception of a want or need;
2. Pre-purchase planning and decision making;
3. The purchase act itself; and
4. Post-purchase behaviour which may lead to repeat buying, repeat sales.

Some of the major decision process models are discussed in the subsections that follow:

3.4.1: The Nicosia Model

The Nicosia model relates to the purchase of consumer goods and smaller durables. It models consumer behaviour not from the buyer's perspective alone but it also recognises the role of the seller in modifying

consumers' predispositions and attitudes towards the seller's product. As shown in Appendix 3B, the model is made up of four fields consisting of communication variables, attitude, motivation, purchase decision, and consumption/storage. The first two fields place emphasis on processes that precede the act of purchase such as dissemination and receiving of advertising and sales promotion messages, attitude formation, search and evaluation of available brands, leading to motivation to buy a particular brand or act otherwise. The last field is the feedback which consists of consumption and storage. These ultimately give rise to positive or negative influences on the consumer's predispositions and attitudes towards the brand purchased depending on whether the consumer had positive or negative post-purchase experience or whether he was satisfied or dissatisfied with the brand. The purchase process then continues as a cycle with possibility of repeat purchase of the same brand over and over again or search for, evaluation, and purchase of alternative brands.

The relationship between the variables of the various fields is assumed to be linear. However, Nicosia argue that, when dealing with specific products or brands, "the variables and functional relations that concern a specific case must be determined individually, and frequently, since they change" (Nicosia 1966, p.157).

There have been some measure of support for Nicosia's model but some researchers are of the opinion that some of his variables such as attitude and motivation are not well-specified and may be difficult to operationalize due to measurement problems. (See, e.g., Zaltman et al, 1973; Lunn, 1974; and Tuck, 1976). Similarly, the assumption of linearity of functional relations has been criticized by Tuck (1976) who also made a case for a change in the order of precedence of the "fields" to reflect the possibility of simultaneous occurrence of some of the processes.

3.4.2: The Engel-Kollat-Blackwell Model

The Engel-Kollat-Blackwell model was developed in 1968 and was revised.by Engel & Blackwell (1982). The model is presented in Appendix 3C. The authors state that their model is similar in one respect to the Howard model and the Howard-Sheth model (See Section 3.4.3) in the sense that all three propose that "a change in attitude leads to corresponding changes in intention and behaviour, all things being equal" (Engel & Blackwell, 1982, p. 689). They also argue that their model reflects the prescribed relationships of Fishbein and Ajzen's behavioural intention model.

We note that, with respect to the decision process variables (beliefs, attitude, intention, motives, evaluative criteria, life-style, normative compliance and informational influence), and external influences (cultural norm & values, and reference group/family) which have been shown to have indirect effects on choice through intention, the authors' claim is valid. However, one of the external variables – unanticipated circumstances – has been shown to have direct influence on choice. This contrasts with the Fishbein-Ajzen's model which assumes that, given a perfect correspondence between intention and behaviour, knowledge of attitude toward the behaviour and social norm is sufficient to predict that behaviour. (See Section 3.6 for full description of the Fishbein-Ajzen's model). Like the Nicosia model, this model has been criticized on the ground of being untestable. Moreover, the flow chart is complex and so are the relationships among variables (See Tuck, 1976; Friedman, 1988).

3.4.3: The Howard-Sheth Model

This model was presented in 1969 as a build-up on the Howard (1963) model. It also relates to fast-moving consumer goods and smaller durables and has been described as being one of the most developed decision process models. It explains why consumers behave in certain ways using variables such as intention, attitude, brand comprehension, confidence, perceptual bias, marketing variables (e.g. quality, price, availability), and social factors (family, reference groups, social class).

Functional relations among these variables are assumed to be linear. The model is illustrated in Appendix 3D.

It can be seen from the flow chart of the Howard-Sheth model that the only variable which has a direct causal link with purchase is intention – all other variables have indirect influence on purchase through intention. This tallies with Fishbein and Ajzen's position on the role of intention in mediating the effects of other variables on behaviour. However, according to this model, the principal determinants of intention are attitude, brand comprehension, and attention. This does not conform with Fishbein-Ajzen's theory which claims that the only two components of intention are attitude and social norm.

The need to improve this model by considering non-linear relationships among variables has been stressed by Laroche & Howard (1980). Like most other decision process models, the Howard-Sheth model suffers the setback of complexity. In an attempt to be comprehensive by including all conceivably relevant variables in explanation of behaviour, decision process theorists end up with complex flow charts. Foxall in his book (Foxall 1980, p.21) describes these models as "elaborate computer flow diagrams....." while Ehrenberg (1972, p.218) categorizes them as "models without facts".

3.4.4: Summary

All the models discussed in the previous sub-sections essentially relate to heavily-advertised consumer and smaller durable products. They do not propose any specific mathematical statement of relationships in form of equations. The Nicosia model only suggests that variables and functional relations must be determined to suit specific products and brands. It is less comprehensive than the Engel-Kollat-Blackwell and the Howard-Sheth models. However, it lacks the practical dimension of simultaneity of some of the processes leading to choice decision (See Appendix 3B). This was exhibited by the other two models which although appear too comprehensive (See Appendices 3C & D).

Due to the comprehensive nature of relationships depicted by the flow-charts and the absence of mathematical statements, the models are generally untestable. Common variables among the models include search, attention, brand comprehension, motives, evaluative/choice criteria, attitude, intention, purchase, and satisfaction. These and other variables relate with purchase indirectly through intention. This is consistent with the position of the theory of reasoned action (See Section 3.6) concerning the mediating role of intention but, unlike this theory, the principal determinants of intention under the Howard-Sheth model are attitude, brand comprehension, and attention.

With the broad ideas obtained from these flow charts and our background theory in mind, we intend to develop an alternative chart for PC purchase later in this thesis and back it up with appropriate equations.

3.5: MARKET RESEARCH MODELS

Some market research models are similar in approach to decision process models. *Jenkins' Marketing Continuum Model,* for instance, views consumer behaviour as changing from *unawareness* stage to the stages of *awareness, comprehension, conviction, preference, intent-to-buy, purchase decision, purchase evaluation,* and finally *repurchase* of selected brand. Quite a number of market research models are derived from empirical studies of the choice behaviour of a panel of consumers over time.

3.5.1: The Trade-Off Model

The trade-off model[8] is based on utility maximization theory (See Section 3.2.2) and can be applied to both durables and non-durables. It consists of asking a sample of consumers to rate the brands of a product according to some scaling method. Respondents use the same scaling method to rate the characteristics or dimensions they expect an ideal brand to possess. They also assign importance weights to the various dimensions.

[8] See Westwood, et al. (1997, pp. 6-20)

This model allows respondents to differ in their opinions, judgement, perceptions, choice of product characteristics, and the relative weights which they assign to them. The scale scores are analyzed to obtain the utilities that respondents attach to different product characteristics such that brand *preferences* are determined by the sum of these utilities. The brand with the highest sum of utilities is considered to have the highest preference in the product field concerned. In other words, suppose:

$$U_i = \sum_{j}^{m} \lambda_j x_{ij}, \quad \text{for all } i = 1, 2, \ldots\ldots, n$$

where U_i = utility of brand *i*

x_{ij} = scale score of brand *i* on product characteristic *j*

λ_j = importance weight allocated to product characteristic *j*

Then, brand *i* has the highest preference in the product field if, for a sample of respondents k = 1, 2, ..., p:

$$\sum_{k}^{p} U_{ik} > \sum_{k}^{p} U_{jk}, \qquad \text{for all } i \neq j.$$

3.5.2: Ehrenberg's NBD/LSD Theory of Repeat Buying

Prof. Andrew Ehrenberg came up with this theory after series of empirical studies and analyses based on household panel survey data. These data included those of Attwood Statistics, Audits of Great Britain (AGB), Research Bureau, and Sales Research Services in the United Kingdom as

well as the Market Research Corporation of America (MRCA), and Chicago Tribune in the United States. Essentially, the theory deals with consumer goods but can be applied to smaller durables. It was developed under the following assumptions:

- That the market is 'stationary'. That is, there is little or no change in the total purchases of a given brand over successive periods of time.
- That individual purchases of a brand within a certain period follow a poisson distribution, viz:

$$f(x) = \frac{e^{-\lambda}\lambda^{x}}{x!} \quad \text{for all } x = 0,1,2,3, \ldots\ldots$$

where: X is a random variable denoting 'quantity purchased';

$\lambda>0$ and is the mean of the distribution.

- That the long-run average purchase rates or frequencies for individuals follow a gamma distribution, viz:

$$f(r) = \frac{\lambda e^{-\lambda r}(\lambda r)^{k-1}}{(k-1)!} \quad \text{for all } r \geq 0$$

where $\lambda>0$, $k>0$, and k is a parameter describing the long-run differences in the average purchase rates of different consumers.

The theory states that the possibility of repeat purchase of a brand follows a distribution called *Negative Binomial Distribution (NBD)*. That is,

$$f(r) = {}^{x-1}C_{r-1}p^r(1-p)^{x-r}$$

where *p*, the probability of making *r* purchases in a period, is given by:

$$p = [(1-x)/(x+k)]^{-k} \qquad 0 \leq p \leq 1$$

and *k* is a factor estimated from purchase frequency and brand penetration data. A computer program called **NBD** has been developed to facilitate the solution of the factor *k*.

The theory states further that, when the market penetration of a brand is low, repeat purchase follows a simpler *Logarithmic Series Distribution (LSD)*, viz:

$$f(r) = \frac{-(1-p)^r}{r \ln p}$$

The weakness of the NBD/LSD Theory of Repeat Buying has to do with the enormous task involved in its application where the necessary software support such as the NBD Program are not available. However, the theory enables us to predict repeat purchase and new purchase rates for different periods. It is possible to predict the number of consumers who, having purchased a particular brand during the previous periods, will buy the same brand again or cease to buy during the next periods. The theory, according to Rothman (1986, p.82), can "claim to be the best founded of all market research models". (For further details about the theory, see Ehrenberg 1968, 1969, 1972).

3.6: FISHBEIN-AJZEN'S THEORY OF REASONED ACTION

3.6.1: Description of the Theory

Although Fishbein and Ajzen's theory became known as the theory of reasoned action (TORA) in 1980, it was introduced in 1967 (Fishbein 1967) and reviewed in a comprehensive work in 1975 (Fishbein and Ajzen 1975). Aspects of the theory have also been published in Fishbein and Raven (1962), Fishbein (1963), Ajzen and Fishbein (1970, 1974), Fishbein (1973), and Ajzen & Fishbein (1977). Before 1980, scholars referred to the theory as the "extended Fishbein's model of behavioural intention". This was in realisation of Fishbein's earlier works in this area especially Fishbein (1963) and Fishbein (1967). Ajzen and Fishbein (1980) contains a general description of the theory and a demonstration of its usefulness.

The theory is based on the assumption of rationality of human behaviour (See Section 3.2.1) and "systematic use of the information available" (Ajzen and Fishbein 1980, p.5). Its ultimate goal is not only to predict but to explain and understand behaviour based on the concepts of intention, attitude, social norm, as well as behavioural and normative beliefs. Fishbein and Ajzen claim that their theory is designed to explain virtually all types of human behaviour" (Ajzen and Fishbein 1980, p.4). They argue that the theory of reasoned action is general in nature and can be applied to consumer behaviour, voting behaviour, family planning

behaviour, occupational orientation, and other behavioural categories. Their approach is different from those of other theorists in the sense that they use only a few variables to explain behaviour of various types. While most theorists specify different variables for different behavioural domains, Fishbein and Ajzen argue that behavioural intention could be used to predict behaviour of any kind and that behavioural intention itself is determined by only two variables, viz: *attitude toward the behaviour* and *social norm*. They argue further that, given a perfect correspondence between intention and behaviour, knowledge of these two variables alone "is both necessary and sufficient for understanding and influencing human action" (Ajzen and Fishbein 1980, p.47). The authors define the variables as follows (See Ajzen and Fishbein 1980, pp.6-7, 56-57):

- *Attitude toward the behaviour*: a person's judgment as to whether performing the behaviour is good or bad, whether he is in favour of or against performing the behaviour (See Section 2.9).
- *Social norm*: a person's perception that important others desire the performance or non-performance of the behaviour. That is, the person's perception of the expectations of his/her spouse, children, friends, reference group members, and other social influences regarding performing or not performing the behaviour. (Social influences have been discussed in Sections 2.8, 2.10, 2.11, and 3.3.3).

- The beliefs underlying a person's attitude toward a particular behaviour are known as *behavioural beliefs* while those underlying his social norm are referred to as *normative beliefs*.

From the standpoint of the theory of reasoned action, all other factors (See Chapter 2) such as income, personality characteristics, demographic variables, situational variables, and other socio-economic, cultural and psychological variables that could be used to explain variations in any particular behaviour are considered as external variables. These external variables can only influence behaviour through one or more of the variables of the theory. Mathematically expressed, the theory states that:

$$\text{Behaviour} \cong BI = w_1AB + w_2SN$$

Where: BI = Behavioural intention

AB = Attitude towards the behaviour

SN = Social norm

w_1 = Relative weight or importance of AB

w_2 = Relative weight or importance of SN

Using any of the standard attitude scaling techniques, attitude towards the behaviour can be measured by asking respondents to evaluate some relevant belief statements and to indicate the strength with which they hold their beliefs. An individual's attitude towards a behaviour is given

by the product of his pair of *belief strength* and *evaluative score* summed over all the *n* scales. That is,

$$AB = \sum b_i e_i$$

Similarly,

$$SN = \sum NB_j MC_j$$

Where: b_i = i^{th} behavioural belief strength

e_i = outcome evaluation of i^{th} behavioural belief

NB_j = normative belief with respect to j^{th} referent

MC_j = motivation to comply with j^{th} referent

As an illustration, attitude toward purchasing a personal computer within the year may be measured by asking respondents to check each of the four scales below:

Buying a personal computer this year is:

1. a good idea _____ : _____ : _____ : _____ : _____ : _____ : _____ a bad idea
   (+3) (+2) (+1) (0) (-1) (-2) (-3)

2. desirable _____ : _____ : _____ : _____ : _____ : _____ : _____ not desirable
   (+3) (+2) (+1) (0) (-1) (-2) (-3)

3. affordable _____ : _____ : _____ : _____ : _____ : _____ : _____ not affordable
   (+3) (+2) (+1) (0) (-1) (-2) (-3)

I need to buy a personal computer this year so I can use the internet and e-mail:

4. Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree
   (+3) (+2) (+1) (0) (-1) (-2) (-3)

An alternative method of measuring attitude toward the behaviour is to elicit direct responses to statements such as:

My attitude toward buying a personal computer this year is:

favourable _____ : _____ : _____ : _____ : _____ : _____ : _____ unfavourable

By the same token, a measure of a person's social norm can be obtained from his response to the following statement:

Most people who are important to me think:

I should _____ : _____ : _____ : _____ : _____ : _____ : _____ I should not
buy a personal computer this year

It should be noted here that Fishbein and Ajzen obviously view *attitude toward the behaviour* as a two-dimensional variable. The normative component of the theory *(social norm)* and *behavioural intention* are also each evaluated on a bipolar dimension.

The theory of reasoned action accommodates the fact that, for different tasks and situations, there exist different sets of beliefs, belief structures, attitudinal and normative considerations. The relative importance of the two components of the theory, measured by w_1 and w_2, will depend on the behaviour being considered, the individual's personality traits, demographics, and situational factors. Fishbein and Ajzen believe that individuals may differ in their allocation of weights w_1 and w_2. In general, the theory considers the influence of a person's social norm on a

given behaviour as being independent of his attitude toward the behaviour.

Appendix 3E indicates a sequence of relationships from beliefs to attitudes and social norm, to intention, and ultimately to behaviour. Based on the foregoing description and the appendix under reference, we wish to summarise Fishbein and Ajzen's claims and the main features of their theory as follows:

1. The theory of reasoned action, according to Fishbein and Ajzen, is a theory which has general application in various behavioural domains: consumer behaviour, voting behaviour, family planning behaviour, leisure behaviour, etc. Its purported general applicability was demonstrated by Ajzen and Fishbein (1980, pp.197-216) based on studies of the 1974 general parliamentary election in Great Britain and the 1976 Oregon Nuclear Safeguards Referendum in the USA. The studies confirmed the role of beliefs, attitudes and social norm in determining voting intention and ultimately predicting voting behaviour (See Section 3.6.2 for more supporting research works).

2. Intention predicts behaviour. According to the theorists, this prediction is expected to be accurate if:
   - the intention measure corresponds to the behaviour under study. In other words, all parameters relating to the behaviour

performance must be specified in the intention measure. For example, *intention to perform behaviour Y at time t* must be used to predict *performance of behaviour Y at time t.*

- the intention is measured just prior to the behaviour. That is, the intention should be measured as close as possible to the time the behaviour is observed; otherwise, respondents may change their intentions before the behaviour is performed. Unforeseen external variables such as loss of job, illness, accident, unexpected income, and natural disasters contribute to the unstable nature of individual intentions. (See also Section 5.3 for reasons why people may change their intentions). However, Fishbein and Ajzen argue that, at the aggregate level, individual estimation errors cancel out; this is because some respondents under-estimate their intentions while others over-estimate theirs leading possibly to a zero-effect. According to them, aggregate intentions are more stable and give more accurate prediction of behaviour than individual intentions do. The authors note that this may not always be the case especially in a situation whereby an extraneous variable influences the intentions of a sizeable proportion of respondents in the same direction. For instance, a substantial price increase may lead a vast majority of people to change their intentions and buy lower quantities of a certain

commodity than they previously intended. In general, however, they believe that "buying intention is the best single predictor of actual buying behaviour" (Ajzen and Fishbein 1980, p.166).

3. Behavioural intention is determined by only two variables, namely attitude toward the behaviour and social norm. These variables are "sufficient" for predicting intention – all other factors not specified by the theory are considered as external variables.
4. Attitude toward the behaviour and social norm mediate the influence of external variables on behavioural intention while intention in turn plays a mediating role between independent variables and actual behaviour.
5. The impact of social norm on behaviour is independent of an individual's attitude toward the behaviour.
6. The variables of the theory are essentially two-dimensinal.
7. The theory is simply a behavioural intention theory specifying a multiple linear relationship between the dependent and explanatory variables.

3.6.2: Research evidences in support of the theory

This sub-section discusses post-Fishbein research works relating to and confirming the validity of the theory as a whole, and the validity of its various claims outlined above. First, we note the finding of Lowe & Frey (1983) which confirmed the validity of the theory in a study of childbirth

intentions and outcomes. This was in spite of the differences in methodologies and demographic characteristics of the two samples used. The usefulness of the theory in predicting individual behaviour as well as organisational behaviour, as demonstrated by Elliott, et al (1995), is also noteworthy. As we shall see later in this sub-section and the next, the theory has been widely used and tested in many behavioural domains. In fact, scholars argue that the theory of reasoned action has provided the framework for a vast majority of attitude-based research works published so far in reputable journals. We think however that there is a need to subject the theory to further tests in a wide range of behavioural settings with a view to confirming or disproving its claim as a theory of general application.

The predictive utility of the theory of reasoned action was demonstrated by Harrison, et al (1985) in a longitudinal study of college plans and subsequent educational attainments. The findings of Manstead, Proffitt & Smart also partly conform with the theory – pregnant women's attitudes to breast-feeding/bottle-feeding methods predicted their intentions to breast-feed or bottle-feed their infants; intentions in turn predicted their actual feeding method. Young and Kent (1985) studied the leisure behaviour of a sample of 100 residents of a city through questionnaire method and found support for the theory: camping intentions influenced

camping behaviour; attitude toward camping and social norm gave a very good prediction of camping intention, with attitude having a stronger weight than social norm. Pryor (1990) also found that attitude played a bigger role than social norm in influencing intention to participate in a professional continuing education programme. He confirmed the predictive value of Fishbein's theory, as more than 41% of the variance in participation intention were explained by the two components – attitude and social norm. These components alone have also been shown to explain significant percentage of the variance in philanthropic intentions (Konkoly & Perloff, 1990), drug and alcohol use (Laflin, et al, 1994), intention to minimize the risk of contracting AIDS disease (Greene, et al, 1995), and in other behavioural domains.

Dubinsky and Loken (1989) tested the constructs of the theory (behavioural intention, attitude, social norm, behavioural beliefs, normative beliefs, outcome evaluations, and motivation to comply) and confirmed their influence in decision-making as prescribed by Fishbein and Ajzen. In particular, the relationships among these variables, as demonstrated by Fisher, et al (1995) in their study of AIDS-preventive behaviour, were consistent with the theory.

One of the claims of the reasoned action theory is that intention is the strongest predictor of behaviour. This was supported in a study of exercise behaviour among disabled adults. It was found that intention to exercise was stronger in predicting exercise behaviour than any of attitude, social norm, education, habit, disability type, or fitness level. (See Godin, 1986).

In line with the position of the theory on external variables, occupational variables such as occupation type, work status, and total number of years worked were found to be correlated with childbearing intentions only if they were correlated with attitudes toward having a child or social norm or both (See Loken and Fishbein, 1980). Jeffres, et al. (1987) also discovered that interpersonal communication between residents influenced their intention/commitment to remain in a neighbourhood or metropolitan community only through their beliefs and attitudes toward the neighbourhood or community. Ross and Rosser (1989) in their own study argue that education and information improve people's knowledge about HIV (human immunodeficiency virus) but any ultimate change in AIDS risk behaviour is effected through attitudinal change. Similarly, Yordy and Lent (1993) reported that the influence of prior exercise activity on future exercise behaviour was mediated by Fishbein's variables. In a study which predates the theory of reasoned action,

Mueller (1963) found by means of time series regression analysis that income change was important in influencing consumers' discretionary spending on durables such as motor cars but that this influence may manifest itself through attitudes. He concluded that "consumer spending is not wholly governed, nor well predicted, by the traditional financial variables" (Mueller 1963, p.916).

The theory of reasoned action has been modified in a number of ways by several scholars – one of the closest modifications is Ajzen's 1985 theory of planned behaviour. According to this theory, a third variable called *perceived control* (a person's perceived ability to act according to his wish) could be used in conjunction with the attitudinal and normative variables of reasoned action theory to obtain a better prediction of behavioural intention. However, Yordy and Lent (1993) found no improvement in predictive ability attributable to the theory of planned behaviour. Fishbein and Stasson (1990) compared the effects of the components of the theory of reasoned action with that of perceived control and found that:

(i) employees' desire to attend training session were predicted accurately from attitudes toward the training and social norm.

(ii) Perceived control made no difference to the accuracy of prediction.

East (1990, p.110) believes that the inclusion of perceived control as one of the determinants of behavioural intention "lacks logical support". As discussed in the next subsection, we note that although the theory of planned behaviour has received some measure of support in terms of its predictive value and superiority, this has only been demonstrated in certain behavioural domains and does not affect the relative standing of the theory of reasoned action in broad terms.

A number of studies have been done comparing the theory of reasoned action with other models. For instance, in the area of dental care demand, Hoogstraten, et al (1985) confirmed the superiority of Fishbein-Ajzen's theory over Rosenstock's health belief model. However, Hill,et al (1985) found that the *barriers* component of health belief model could be combined with the *attitudinal* and *normative* components of reasoned action theory to achieve a better analysis of measures taken by women against breast and cervix cancer. Similarly, the findings of Schlegel, et al (1987) suggest that a model that integrates Fishbein-Ajzen's variables with the distal variables of Jessor's problem behaviour theory would give a better prediction of people's intention to get drunk.

3.6.3: Critical evaluation of the theory

The theory of reasoned action has been critically examined in various published works with reference to its overall validity and its specific features. Suggestions have been made toward improving the theory and thereby advancing knowledge and understanding of human behaviour. Research opinion is divided regarding which variables and models are relevant in various behavioural domains. Ajzen and Fishbein (1980, p.166) in an application of their theory argue that "buying intention is the best single predictor of actual buying behaviour". But earlier studies such as Mueller (1963) had suggested that intentions were not as consistent as attitudes in predicting motor car purchase. Juster (1964, 1966) had also revealed that surveys of buying intentions were inefficient predictors of purchase frequencies and were less accurate than *purchase probability surveys*. Instead of simply asking consumers whether or not they intend to buy a product, he suggested the use of purchase probability measures, viz:

> *Taking everything into consideration, what do you think are the chances that you or anyone in your household will buy (the specified product) within the next six month?*

Certain, practically certain (99 in 100)	10
Almost sure (9 in 10)	9
Very probable (8 in 10)	8
Probable (7 in 10)	7
Good possibility (6 in 10)	6
Fairly good possibility (5 in 10)	**5**
Fair possibility (4 in 10)	4
Some possibility (3 in 10)	3

Slight possibility (2 in 10)	2
Very slight possibility (1 in 10)	1
No chance, almost no chance (1 in 100)	0

(See Juster 1966, p.672)

There have also been criticisms of the reasoned action theory's position on the influence of external variables such as personality traits, demographic variables, and attitudes toward people or institutions. But Fishbein and his colleague argue that:

> *"Although we do not deny that external variables of this kind may sometimes be related to behaviour, from our point of view they can affect behaviour only indirectly. That is, external variables will be related to behaviour only if they are related to one or more of the variables specified by our theory". (See Ajzen and Fishbein 1980, p.82).*

Although many studies have confirmed the overall validity of Fishbein and Ajzen's theory, research evidence for its exclusiveness is rather scarce; doubts have actually been raised regarding the principle of sufficiency of the two variables (attitude and social norm) of the theory. (See, e.g., Hoogstraten, et al, 1985). In a study designed to predict participation in breast cancer screening, Curry and Emmons (1994) compared the theory of reasoned action with prospect theory, health belief model and transtheoretical model, but found out that none of the theories on its own was sufficient. They then suggested a framework that seeks to combine variables from the four different models. This is consistent with findings reported in the last paragraph of the previous section. However, stronger criticisms of the theory have been offered –

Bagozzi and Warshaw (1992), for instance, critique the role of attitude, social norm, and intentions in "goal-directed behaviours" with the report that these variables do not have predictive influence on behaviour.

As the theory continued to be tested and applied in a wide range of behavioural domains, new variables are being discovered. Some of these variables are narrower in scope than Fishbein & Ajzen's variables but have been found to be more important than or at least complementary to them in predicting behavioural intention. For instance, according to Norwich and Duncan (1990), *perceived preventive factors, past learning behaviour,* and attitudes are better than social norm in predicting intention and behaviour in secondary school science learning. *Attitudes toward the candidate* and *party affiliation* also play bigger roles than social norm in explaining variance in voting intention (see Singh, et al 1995). Granberg and Holmberg (1990) however introduced *prior voting behaviour* and *self-identity* as determinants of voting intention. Godin (1986) found that *cause of disability* could be used to explain disabled adults' exercise behaviour. Conner (1993) reported that *demographic variables* have direct influence on food choice behaviour – this influence is not mediated by the components of reasoned action theory; neither do the components mediate the influence of *arousal* and *trait* on aggressive behaviour (See Welsh and Gordon 1991).

In a 1983 study of smoking attitudes and behaviour, Marsh and Matheson showed that *previous experience* of attempting to stop smoking had a direct influence on intention to stop smoking. East (1990, pp.108-109) also made a case for the unmediated potential effect of *past experience* when he stated that "through experience, people learn about their abilities and the opportunities that they have and these may not be fully measured by AB and SN". Although the findings of Friend & Adams (1964) were largely inconclusive concerning whether stock prices, length of the work week, and other non-attitudinal variables had direct or indirect effects on automobile purchase and other kinds of purchases, they believed that these variables could be used as effective proxies for attitudes.

Bagozzi and Yi (1989), analysing the relationship between attitude and behaviour, found that the degree of intention formation determines whether attitudes have direct or indirect effects on behaviour through intention. Simply put, the mediating role of intention is enhanced when intentions are well-formed; but attitudes influence behaviour directly when intentions are not properly articulated. In a related work, Bagozzi, et al (1990) argue that the amount of effort required to perform a behaviour moderates the mediating role of intention – a behaviour that

requires little effort is capable of being influenced directly by attitudes, and vice versa. In general, Fishbein and Ajzen's idea that intention, attitude and social norm have mediating roles in prediction of behaviour presupposes the existence of a causal sequence of relationships between variables. This has been found to lack support in some behavioural domains. (See, e.g., Sarver 1983).

The impact of other variables such as situational factors on behaviour have been assessed and found to be important. Sheppard, et al (1988) identified *type of activity* and *choice situations* as important factors while Kahle and Beatty (1987) used *habit* and *task situation* as additional variables in their study of coffee consumption among college students. Furthermore, suggestions have been made for improvement of reasoned action theory to allow for interaction effect of attitudinal and normative components on intention. (See, e.g., Shimp and kavas 1984; Grube, et al 1986).

Series of comparative studies have been done on the theory of reasoned action vis-à-vis other theories and models. With the introduction of another variable called *perceived control*, the theory of planned behaviour was found to improve accuracy of prediction especially when considering "goal-directed behaviours" (see Ajzen 1985; Ajzen and

Madden 1986; Madden, et al 1992; and Blue 1995). Similarly, Netemeyer and Burton (1990) found that the theory of planned behaviour predicted voting intention better than the theory of reasoned action. Burak (1994) showed that the planned behaviour theory explained 64% of the variance in teachers' intentions to teach HIV/AIDS education while 47% were explained by the theory of reasoned action. Furthermore, research finding has shown that the utilitarian approach of traditional conjoint analysis was better than Fishbein-Ajzen's attitudinal approach in predicting consumer choice among alternative brands of word processing software (Nataraajan 1993). It has also been reported (Dzewaltowski 1989) that Bandura's social cognitive theory performed better than the theory of reasoned action in predicting exercise behaviour based on two variables, namely *self-efficacy* and *self-evaluated dissatisfaction*.

3.7: SUMMARY AND CONCLUSION

In the preceding sections, we have been able to discuss some of the existing models and theories of buying behaviour with particular emphasis on the study's background theory. These models come from different fields and play important roles in consumer research efforts aimed at explaining, predicting, and obtaining a better understanding of consumer behaviour. We note that, although these theories approach consumer behaviour study from different perspectives, laying emphases on different aspects of the phenomenon, they do complement each

other. A seemingly irrational choice behaviour (such as a high demand for a fashionable product at high prices) that cannot be adequately explained via the economic theory of rationality of choice or utility maximisation may be justifiable on psychosocial grounds. However, the principle of rationality serves as the basis for theories such as the theory of reasoned action while the trade-off and allied models are predicated on the concept of utility maximisation. Furthermore, most decision process models use learning constructs such as brand comprehension, attitude, confidence, and satisfaction in the various flow charts depicting choice process (See Appendices A, B, and C).

This review is by no means exclusive as several other theories/models dealing with specific aspects of consumer behaviour do exist. A critical examination of all the models and theories reveals that none of them can be considered to have universal application in all product fields, markets, or societies. As Engel, et al (1968, p.31) put it, "it is increasingly recognized that a buyer's psychological field is complex and that one cannot analyze one aspect of it to the exclusion of others". We share the view that concepts, variables, and ideas could be combined from various theories to improve accuracy of behaviour prediction. To the extent that consumer choice behaviour is complex and keeps changing with time, individual, and place, it is very difficult for a single model to be so

comprehensive as to fully capture the socio-economic conditions, attitudinal dispositions, and cultural idiosyncrasies of consumers in every society at all times. However, at the present stage, the simple fact that models and theories have made significant contributions to our understanding of consumer behaviour is of greater importance than the non-existence of a universally accepted one.

Of the many models that have been put forward, we note that some of them such as the Nicosia model (Section 3.4.1), the Engel-Kollat-Blackwell model (Section 3.4.2), the Howard-Sheth model (Section 3.4.3), and theories of learning (Sections 3.3.1 & 3.3.2) are either very difficult or practically impossible to operationalise. Moreover, most decision process models like the ones mentioned above tend to be too comprehensive and they may not apply to large durables. Similarly, some other models that are testable apply mainly to fast-moving consumer goods and smaller durables. An example is the Ehrenberg's theory of repeat buying (Section 3.5.2). The trade-off model (Section 3.5.1) is testable and is relevant to durables and non-durables but it is principally concerned with brand preference. The chosen theory of reasoned action can be applied to non-durables as well as durables like personal computer which has been selected for this study. Previous research efforts have also shown that it is applicable to other types of

behaviour apart from consumer behaviour. The theory however makes some categorical claims about the exclusive roles of its only two explanatory variables – *attitude toward the behaviour* and *social norm* (See Section 3.6.1). While not preempting the outcome of the analyses to be carried out in Chapter 5, we are of the opinion that the influence of attitude and social norm should not be over-stretched especially with respect to certain product fields and/or consumer groups.

For instance, it might be possible in line with Fishbein-Ajzen's approach to explain people's intention to embark on leisure travels with attitude and social norm, but *income* will be an important factor in arriving at a final decision. The importance of income appears to be more obvious when dealing with low-income consumers whose leisure travel decisions will depend not so much on whether they have positive attitudes toward travelling nor whether their spouses and colleagues expect them to travel, but whether they can afford it. For most groups of consumers, income is very important – perhaps more important than attitude and social norm – in determining leisure and some other types of behaviour including major acquisitions such as private jet, chauffeur-driven limousine, swimming pool, and so on. We recognize the logical idea behind the theoretical constructs of the theory of reasoned action but we think that the

sufficiency principle of attitude and social norm is somewhat questionable.

Although advances have been made – and are still being made – in many product fields through the introduction of new variables and improvement of the theory, more research works still need to be done in other areas such as PC purchase. This is necessary because the theory claims to be generally applicable to any type of behaviour. Most past research works on the theory of reasoned action used nothing more than simple methods of investigation and analysis; some have come up with inconclusive findings. This study is also based on Fishbein-Ajzen's theory. As the market for personal computers keep growing, organisations such as INTEL (the world's largest PC microprocessor firm) in the United States are becoming increasingly interested in surveys of PC buying intentions. Our attempt is to identify additional variables in conjunction with the original variables of the theory and to use advanced techniques to manipulate our data sets with a view to advancing the theory in the area of personal computer purchase.

CHAPTER 4

RESEARCH METHODOLOGY

4.1: MAJOR HYPOTHESES OF THE STUDY

The main objective of this study is to advance the theory of reasoned action with particular reference to personal computer purchase. Following this main objective and the specific objectives outlined under Section 1.4, the following are the major hypotheses to be tested in the study:

H.1: *Attitude toward the behaviour* and *social norm* are sufficient for predicting individual respondents' intention to buy a personal computer (Section 5.2).

H.2: Interaction effects among the explanatory variables are significant for predicting intention and/or behaviour (Section 5.2).

H.3: The respective influence of *attitude towards the behaviour, social norm,* and "external variables" on purchase only operate through intention. In other words, the influence of explanatory variables on purchase are indirect (Section 5.2).

H.4: Personal computer buying intention is the best single predictor of actual purchase (Section 5.3).

H.5: The use of intention as an explanatory variable rather than the dependent variable improves the original model (Section 5.3).

H.6: The group of "planners" are significantly different to the group of "non-planners" in terms of intention fulfilment (Section 5.3).

H.7: Stochastic level fits the data better than fixed level model (Sections 6.2 and 6.5).

H.8: Incorporating distributed-lag effects of aggregate intention yields an improved model for predicting aggregate PC purchase (Sections 6.3 and 6.5).

H.9: The impact of previous purchase on current period's aggregate PC purchase is not significant (Section 6.4).

H.10: Separating intenders from non-intenders is better than considering the two groups as a single entity (Sections 6.4 and 6.5).

Having articulated our research objectives and hypotheses, the next section deals with a description of our data set; this will be followed by a discussion in Section 4.3 of the methods that we hope to use in modelling the data in subsequent chapters.

4.2: SOURCE, NATURE AND RELIABILITY OF DATA

Data for this research were sourced from the Survey Research Centre (SRC) of the University of Michigan, USA. The SRC have since 1946 conducted series of periodic surveys on consumer attitudes, attitudinal change, expectations, intentions to buy, and fulfilment of these intentions. The SRC's *Survey of Consumers* is conducted monthly through a minimum of 500 telephone interviews on a representative sample of all American households, excluding those in Alaska and Hawaii. An independent cross-section sample of households is selected every month and the respondents so selected are re-interviewed six months later. Details of the sample design are given in Appendix 1.

The monthly surveys ask respondents about 50 core questions covering personal finances, business conditions, buying conditions, and purchase plans. We have identified and collected data on survey questions that are found relevant for this study; some of the major ones are given in Appendix 1.

On the basis of economic significance and statistical adequacy of the surveys, the Index of Consumer Expectations, constructed by the *Surveys of Consumers*, is included in the Composite Index of Leading Indicators published by the U.S. Department of Commerce, Bureau of Economic Analysis. Our data are therefore secondary in nature and are very reliable.

4.3: METHODS OF ANALYSIS

This section discusses the methods that we shall use to analyse the data with a view to testing the foregoing hypotheses and achieving our research objectives. Practical aspects of the modelling exercise and other details are dealt with in Chapters 5 and 6.

4.3.1: Generalized Linear Modelling Approach

In this subsection, we give a broad description of the methods we shall use to carry out logit analyses of personal computer buying intention and behaviour in Chapter 5. Data will be analysed using the *Generalized Linear Interactive Modelling* ***(GLIM 4)*** software – a statistical package of the *Royal Statistical Society*. To achieve this, necessary GLIM programs will be written in Chapter 5.

We recall from Section 3.6.1 that Fishbein-Ajzen's theory of reasoned action states that:

$$\text{Behaviour} \cong BI = w_1.AB + w_2.SN$$

Where: BI = Behavioural Intention

AB = Attitude towards the Behaviour

SN = Social Norm

w_1 = Relative weight or importance of AB

w_2 = Relative weight or importance of SN

This model is a multiple regression model and can be considered as a special case of a generalized linear model. Suppose we change the notation of the variables as indicated below:

$$Y \equiv BI, \qquad X_1 \equiv AB, \qquad X_2 \equiv SN,$$

$$\beta_1 \equiv w_1, \qquad \beta_2 \equiv w_2$$

Let us define Y, X_1 and X_2 as follows:

$$\{Y = y: y \in (0, 1)\}$$

$$\{X_1 = x_1: x_1 \in (1, 2, 3)\}$$

$$\{X_2 = x_2: x_2 \in (1, 2, 3)\}$$

Let y = 1 if the respondent intends to buy a PC within 6 months.

= 0 if the respondent does not intend to buy a PC within 6 months.

x_1 = 3 if the respondent has positive attitude toward buying a PC within 6 months.

= 2 if the respondent has liberal attitude toward buying a PC within 6 months.

= 1 if the respondent has negative attitude toward buying a PC within 6 months.

x_2 = 3 if the respondent is highly exposed to social norm concerning PC purchase.

= 2 if the respondent is moderately exposed to social norm concerning PC purchase.

= 1 if the respondent is virtually not exposed to social norm concerning PC purchase.

Then, Y is distributed as a bernoulli distribution with:

$$Pr(y = 1) = \pi$$

$$Pr(y = 0) = 1-\pi$$

Generalized linear models were originally proposed by Nelder & Wedderburn (1972) and later extensively developed in McCullagh & Nelder (1989). Basically, a generalized linear model (GLM) consists of a systematic component, a random component, and a link function. The systematic component $x'\beta$ also referred to as the linear structure or the linear predictor of the model consists of explanatory variables and their corresponding parameters. The second component of a GLM is the random component which is nothing but a specification of the probability distribution of the y-values, thereby leading to further specification of a function which relates the systematic component with the mean of the y-values. This function is called the link function η. For the bernoulli distribution being considered, we have:

$$E(y_i) = \pi_i$$

and the link function is given by:

$$\eta_i = \ln [\pi_i/(1-\pi_i)]$$

so that: $\ln [\pi_i/(1-\pi_i)] = x_i'\beta$

This link function is called the *logit* link.

Against this background, we can fit the original and alternative models in GLIM and test for goodness of fit using the scaled deviance and the associated p-values obtained from the chi-square statistic. The choice of a model depends on which one maximizes the variation due to the systematic component, or put differently, the one that minimizes the variation due to the random component. This implies we are trying to minimize the scaled deviance for model selection purposes.

Using GLIM, decision rule is based on a comparison of the scaled deviance with χ^2_{n-k} where n is the number of observations and k is the number of fitted parameters. If the scaled deviance is significantly different from χ^2_{n-k}, the model does not fit the data. The influence of each varaible can be identified and assessed through incremental modelling procedure which consists of a step-by-step dropping of explanatory variables and fitting a new model. Any variable or model that does not satisfy the test criteron will be dropped. In each case, goodness of fit can be measured via the generalized Pearson χ^2 statistic. Based on this, we can compare variables and draw conclusions, since the difference between the deviances of two models also follows χ^2 with $df_c - df_p$ degrees of freedom, where:

df_c is the degree of freedom for the current model;

df_p is the degree of freedom for the previous model.

Under normal distribution assumption, the chi-square distribution of the deviance is exact, but with other distributions such as binomial and poisson, the scaled deviance is only asymptotically distributed as chi-square. This has implication for using the chi-square statistic and the corresponding p-value with caution in assessing our logit models.

We intend to introduce new variables and critique the "sufficiency principle" of the theory of reasoned action via the GLIM approach; we also intend to examine in the same chapter the role of intention in a model aimed at predicting behaviour. As far as intention is concerned, we hope to adopt an approach that amounts to breaking away from the traditional practice of making intention the dependent variable as against behaviour. Similarly, we would like to consider the group of "planners" as being different to the group of "non-planners" by allocating different weights to each group.

We are also interested in investigating the effects of interaction among the relevant variables of our model. Main and interaction effects of variables and goodness of fit of a model can be assessed as described earlier. At each stage, the type of effects we are interested in studying will determine the way we specify the FIT directive in GLIM.

4.3.2: Structural Time Series Approach

This subsection relates to the dynamic model of aggregate PC purchase that we hope to build in Chapter 6. The Fishbein and Ajzen's theory of reasoned action only claims that, having predicted intention with the two variables of their model, it should be possible to approximate behaviour with the knowledge of intention. In this study, it will be interesting to see whether or not aggregate intention to buy a personal computer perfectly approximates aggregate purchase behaviour over time; it will also be interesting to find out if it is sufficient to just state – like some scholars did – that intention and behaviour are related. We think it would be very useful from statistical modelling and socio-psychological point of view to probe into the exact form of relationship between the two variables in the context of our data set.

We adopt a structural time series approach to construct a dynamic model of aggregate PC purchase over time. The introduction of dynamic element into the model will enable us to assess the cumulative effects of aggregate intended purchase on actual purchase over time.

Suppose we formulate the Fishbein-Ajzen's theory of reasoned action as a time series regression model, viz:

$$y_{t+1} = x_t + \varepsilon_t , \qquad t = 1, 2, ..., T$$

Where: y_{t+1} represents aggregate personal computer purchase at time t+1.

x_t represents aggregate intention at time t.

ε_t is the disturbance term

It is doubtful if this model is capable of fully capturing the time-varying features of the process being modelled. In this circumstance, we will try some dynamic alternatives that include lag values of the dependent and/or explanatory variables, bearing in mind the fact that each sample spans a period of 6 months.

Using the *Structural Time Series Analyser, Modeller and Predictor (**STAMP 5.0**)* developed at the London School of Economics, we intend to construct a geometric- distributed lag model of aggregate PC purchase. For reasons that will be discussed in Chapter 6, our focus is on the trend component; so the resulting model will be one that consists of neither seasonal nor cyclical fluctuations. Decision rule will be based on the p-value concerning accepting or rejecting any of the variables of the model, namely: previous aggregate purchase (as represented by the autoregressive aspect of the model), lagged values of aggregate intention, and the stochastic level. If the *level* effect is found to be significant, the appropriateness of its being considered as stochastic rather than fixed will be judged by the magnitude of the variance of the disturbance associated

with the level. If the variance is non-zero, then modelling the level as a stochastic level is in order; otherwise, the level should be considered fixed.

Following from our research objectives, the ultimate goal of Chapter 6 is to develop a bivariate geometric-distributed-lag model of aggregate PC purchase. The constituent parts of the bivariate model represent a separation of the group of "intenders" from that of "non-intenders" – a clear departure from the standard treatment. The choice of an appropriate model based on normal approximation will depend on a balanced consideration of the values of the Durbin-Watson (DW) statistic, coefficient of determination r^2, prediction error variance, normality statistic, and heteroscedasticity statistic.

The STAMP estimation report normally includes the value of the Durbin-Watson statistic defined by:

$$DW = \frac{\sum_{t=2}^{T} (e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2}$$

This statistic measures the possibility of residual autocorrelation which could be a sign of model mis-specification or variable omission. The presence of residual autocorrelation in a model will produce misleading inferences about the variables and parameters of the model. We shall therefore use the Durbin-Watson statistic to assess the extent of residual autocorrelation in the models to be considered. The goodness of fit of any model specified will be determined by the value of the coefficient of determination r^2.

Under the assumption of a normal distribution for the responses, departure from normality and constant variance may not augur well for the fitted model and its corresponding inferences. Hence, the normality statistic and heteroscedasticity statistic will also play some role in assessing the various options.

Theoretical exposition of structural time series models is contained in Harvey (1989).

CHAPTER 5

LOGIT IMPLEMENTATION AND CRITIQUE OF THE THEORY OF REASONED ACTION IN THE CONTEXT OF PERSONAL COMPUTER PURCHASE

5.1: INTRODUCTION

Several models and theories have been put forward to explain consumer behaviour in broad terms or with particular reference to certain product fields. A discussion of some of these theories was carried out in Chapter 3 and this revealed that each of them identified and used predictor variables in relation to the aspect of consumer behavior being studied. Each of the models and theories has its strengths and weaknesses: whereas the decision process models such as those of Nicosia, Howard & Sheth, and Engel, Kollat & Blackwell (See Section 3.4) are too comprehensive and are somewhat untestable, the Ehrenberg's theory of repeat buying (Section 3.5.2) relates more to consumer products than durables such as personal computer. The theory of reasoned action – which is our focus in this work – is amenable to personal computer purchase modelling but it makes some far-reaching claims about the roles of intention, attitude, and social norm vis-à-vis those of "external variables" in influencing behaviour (See Section 3.6.1).

This work is an attempt to further investigate the theory critically. The major challenges posed by the theory's claims are taken up in this chapter with a view to improving the theory in relation to personal computer

purchase. The chapter evaluates – within the framework of logit modelling using the **GLIM 4** package (See Section 4.3.1) – the influence of income, expectation, PC usage, and their interaction effects on personal computer buying intention and behaviour. It then compares these with the influence of the theory's only two variables – attitude towards the behaviour and social norm.

We also investigate here the theory's claim concerning the mediating role of intention over all other variables and its role as the best single predictor of personal computer purchase. Thereafter, we propose a PC purchase model that incorporates intention as an explanatory variable rather than the dependent variable as is the case with the Fishbein and Ajzen's model. Within that framework of analysis, attempt will be made to achieve further improvement through a differential weighting of the influence of "planners" and "non-planners".

5.2: AN EVALUATION OF THE INFLUENCE OF EXPLANATORY VARIABLES LEADING TO AN ALTERNATIVE SYSTEMATIC COMPONENT

In chapter 2, we discussed a number of potential determinants of consumer behaviour, with the conclusion that consideration should be given for interaction effects among the variables as interaction effects may sometimes be more important than the main effects of the corresponding variables. We note however that the background theory for this work – the theory of reasoned action – considers only "attitude towards the

behaviour" and "social norm" as the most important predictors of intention while conceivably all other relevant variables are consigned to the domain of "external variables" which at best influence intention and subsequent behaviour through the two variables of the theory. These claims have found almost as much support (See Section 3.6.2) as criticisms (See Section 3.6.3) in research circles. While for instance, Harrison, et al. (1985) validated the predictive utility of the theory with regards college plans and subsequent educational achievements, Singh, et al. (1995) found that *attitudes toward the candidate* and *party affiliation* were more important in explaining variations in voting intentions. The significant roles of attitudes and expectations in automobile purchase has also been demonstrated by Curtin (1982) through a measure called the *"Index of Consumer Sentiment"* although the study was not done within the context of the reasoned action theory. We do not think that a knowledge of the Fishbein and Ajzen's attitudinal and normative variables alone is sufficient to describe, explain, and predict intention and behaviour for all types of products. We think that the type of product being studied determines to a great extent the set of variables that are relevant in choice decision.

In this section, we test the reasoned action theory with respect to PC purchase by investigating the exclusive influence arrogated by the theory to its two variables in relation to the main and interaction effects of the

so-called external variables such as income, expectation, and PC usage. We also examine the magnitude of these relationships under the circumstance that purchase behaviour rather than purchase intention is the dependent variable.

Within the framework of logit modelling in GLIM (Section 4.3.1), the position of the theory of reasoned action implies that other variables apart from attitude and social norm do not belong to the *systematic component* of either the intention or behaviour model. The part consisting of predictor variables and their corresponding parameters constitutes the systematic component. The first task here is to find out whether the effects of all other variables apart from the attitudinal and normative variables are truly random – in keeping with the theory – or systematic. Whichever variable is found to have significant systematic effect will be included in the model while those with random effects will be removed.

The appropriate GLIM program for modelling the data and conducting significance tests is shown in Appendix 5. A measure of "lack of fit" of any of the logit models fitted is given by the *scaled deviance* output by GLIM. Change in the scaled deviance arising from the inclusion of a new variable at each modelling stage is similar to a change in residual sums of squares in the familiar multiple regression. Our strategy for variable/model selection is to choose the best three variables that lead to

the highest change in scaled deviance while models are assessed on the basis of which one minimises the scaled deviance (See Section 4.3.1).

Using incremental modelling procedure, the variables (which are described in Appendix 4) are dropped in turn and the deviances attributable to each of them are as shown in Appendix 7A. The largest main effect within the intention model was produced by AB (26.73), followed by INCBKT (8.845) and EXPECTN (8.466). Both SN (0.4939) and RPCUSAGE (0.2192) have extremely low impact on intention and their associated p-values, which respectively stand at 0.7812 and 0.6397, are too high. Each of these two p-values are by far greater than $\alpha = 0.05$ and so we conclude that, at 5% significance level, the influence of SN and RPCUSAGE on intention are not significant. The p-values for EXPECTN (0.0759) and INCBKT (0.0651) are also slightly higher than 0.05 but are not as remote from the significance level as those of SN and RPCUSAGE. It should be noted here that the p-value only serves as a guide and should be used with caution in appraising logit models because the scaled deviance is only asymptotically distributed as chi-square.

The interaction effect between income and expectation (INCBKT.EXPECTN) accounted for a considerably high amount of scaled deviance (25.39) and is chosen for inclusion in the alternative model.

This confirms the importance of interaction effects earlier stressed in Section 2.12. The deviance explained by AB.INCBKT is not as high as that of INCBKT.EXPECTN – this interaction term is therefore de-selected. The other interaction term AB.EXPECTN is also not selected. Apart from recording a very low deviance and a very high p-value, one of the combinations of the levels of AB.EXPECTN is collinear with the reference level . This means that the former is a linear combination of the latter and so is rendered redundant. The 3-way interaction term AB.INCBKT.EXPECTN is also dropped on the ground of collinearity, notwithstanding the relatively high amount of deviance explained.

When purchase behaviour was chosen as the dependent variable to replace purchase intention, there were some significant shifts in the pattern of relationships previously exhibited between the explanatory variables and intention (See Appendix 7A): The amount of deviance earlier explained by income in the intention model rose sharply from 8.845 to 23.43 in the purchase model while that of AB dropped from 26.73 to 19.11. This brought about a reversal of the leading role played by AB in the intention model. The implication is that AB was the most important variable in explaining variation in intention whereas income played this leading role in explaining actual PC purchase. Another significant shift observed had to do with the influence of social norm which increased enormously by over 1,000% in the purchase model

(although the resulting amount of deviance was not appreciable enough in relative terms to justify its inclusion in the purchase model). Furthermore, the main effect of expectation was weaker in the purchase model than in the intention model.

In view of the foregoing, we could not justify the proposition of the reasoned action theory that potential explanatory variables affect behaviour only in so far as they affect behavioural intention. The explanatory variables of our model do not, of necessity, influence subsequent PC purchase on account of their influence on buying intention. There is therefore a breakdown of the theory's claim that buying intention has a mediating influence between explanatory variables and actual purchase.

It is clear that, within the intention and behaviour models, income and its interaction with expectation (INCBKT.EXPECTN) are far more important than the social norm. The main effect of expectation also have greater impact on intention than the social norm. In addition, income ranks higher than all other variables including AB in influencing PC purchase. The exclusive role arrogated by the theory of reasoned action to its two variables – AB and SN – could therefore not be sustained by our analyses within the context of personal computer purchase. Against this background, we reject the theory's claim that attitude towards the

behaviour and social norm are the two most important predictors of behavior through intention.

Under the scenario that missing observations were to be excluded from the foregoing analyses, the original GLIM program was amended as indicated in Appendix 5 and re-run accordingly. There were some minor shifts but results were not essentially at variance with the previous cases when the missing observations were estimated and replaced. The interaction term INCBKT.EXPECTN became the leading variable in the intention model having pushed the AB (favoured by the original theory) to the second position. Like the main effect of income, it was found to be stronger than the AB in the actual PC purchase model (See Appendix 7B). These findings, in conjunction with the previous ones, confirm the argument we made earlier in Section 2.12 of our qualitative analysis concerning the importance of interaction effects. The findings here also press home the conclusions made in the last two paragraghs concerning the rejection of the theory's claims.

Having assessed the relative influence of the explanatory variables, the next stage is to consider and evaluate some alternative models with a view to obtaining an improved variant of the original theory. Appendix 7C shows the deviances associated with each of the models under the four scenarios. The Fishbein and Ajzen's model consisting of only AB

and SN as explanatory variables yielded the biggest amounts of scaled deviance across the board thus making it less superior to the alternative models. The dropping of SN from the original model together with the addition of more variables gave rise to some improvement. In particular, the model with the linear structure:

$$\alpha_1 AB + \alpha_2 INCBKT + \alpha_3 EXPECTN + \alpha_4 AB.INCBKT + \alpha_5 AB.EXPECTN + \alpha_6 INCBKT.EXPECTN + \alpha_7 AB.INCBKT.EXPECTN$$

brought about considerable reduction in the variation explained. Although this model achieved the least deviance in all cases among the various alternatives considered, it has a weak potential of being accepted due to lack of parsimony. Besides, two of its interaction terms – AB.EXPECTN and AB.INCBKT.EXPECTN – had problems of collinearity. The next best model with the structure:

$$\beta_1 AB + \beta_2 INCBKT + \beta_3 INCBKT.EXPECTN$$

is therefore accepted. It is simple, parsimonious, and is not bedevilled by collinearity problem. Above all, it performs better than the Fishbein-Ajzen's model.

The alternative model is convenient to operationalise. As new data sets become available, parameter estimates for the chosen model can be obtained by retrieving, editing, and re-inputting the program (Appendix 5) which is saved as a GLIM *journal* file and then giving the directives:

$EXTRACT %PE $

$PRINT %PE $

The major task required at the editing stage is to change the data filename and its standard length (number of units) accordingly. To predict the value of the response variable based on a set of known values of the explanatory variables, the following commands are invoked:

$REINPUT 'H:\MODEL1.JOU' $

$PREDICT (STYLE = 1) AB = int1, INCBKT = int2,

EXPECTN = int3 $

Where *int1, int2, and int3* are positive integers representing the known values of the corresponding variables.

We summarise this section by noting that there was a breakdown of the reasoned action theory's assumption of exclusive role for its two variables. This was largely in view of the superior predictive power of income and its interaction with expectation. There was also a breakdown of the theory's proposition that the influence of all explanatory variables on behaviour are mediated by behavioural intention. We submit that, as far as personal computer purchase is concerned, our alternative model is better than the original model.

5.3: IMPROVING THE ORIGINAL MODEL WITH INTENTION AS AN EXPLANATORY VARIABLE AND A DIFFERENTIAL WEIGHTING SCHEME

In the initial part of the previous section, personal computer buying intention was chosen as the dependent variable based on the original

model. Results obtained were later compared with the case when actual purchase was used as the dependent variable. This section seeks to further improve the original model through the idea of using intention as an explanatory variable and a weighting scheme that allocates different weights of influence to planners (respondents who fulfilled their PC buying intention) and non-planners (those who changed their plan). Instead of predicting intention with the assumption that intention approximates subsequent behaviour in line with the original theory, we think it is better to incorporate it as an explanatory variable within a behaviour model so it can effectively play its role as the best single predictor of behavour. Examining the role of intention in this capacity in relation to other explanatory variables, we observe that purchase intention had overriding predictive power on actual PC purchase followed by income and attitude towards buying a PC (See Appendix 6 for the GLIM program and Appendix 7D for the results). When missing observations were excluded from the analyses, the influence of income waxed stronger while that of intention diminished but the latter still remained the best single predictor of actual PC purchase. Unlike PINTX, INCBKT, and AB, the impact of the other variables are not significantly high enough to justify their inclusion in the model being developed here.

Having included intention as an explanatory variable, the model so obtained may not adequately reflect the flexible nature of intention

statement although it serves as an improvement to the Fishbein-Ajzen's theory in its own right. Quite often, people are likely to change their intention for a number of reasons which include:

i. Significant change in price or income or expectation of such change.
ii. Unsuccessful bid for credit facilities.
iii. Unforeseen general economic downturn.
iv. Expectation of new technological innovations.
v. Industrial unrest leading to supply shortages.
vi. Natural disasters which have massive effects on consumer optimism and confidence, business and living conditions.
vii. The fact that the intention was unrealistic or weakly-formed in the first place.
viii. Too much space of time between declaration of intention and when it is due for fulfilment.

The incidence of intention instability is higher among the group of intenders than non-intenders. As a result of this unstable nature of intention, output showed that fitted values of actual PC purchase were not close enough to the observed values corresponding to those respondents who changed their intention – this made the corresponding residuals to be too high. We therefore intend to improve the model by introducing a simple strategy that is sensitive to the possibility of intention change through an unequal treatment of planners and non-planners in the analyses. The strategy simply consists of a differential weighting of the

group of planners and non-planners via the GLIM syntax below (See Appendix 6):

$$\$CALC\ W = \%IF((PINT = = 1\ \&\ NEWPC = = 0)$$
$$?\ (PINT = = 0\ \&\ NEWPC = =1),\ 0.75,\ 1)\ \$$$
$$\$WEIGHT\ W\ \$$$

The weight variate W so declared in the syntax above discriminates between planners and non-planners by allocating prior weights in the ratio of 1: 0.75 in favour of planners such that, during the model fitting process, the variance of each observation from amongst the so-called "planners" is divided by 1 while the variances of other observations from the group of non-planners are divided by 0.75. This allocation of prior weights ensures that the influence of non-planners in the fit are weighted down by 25% with a view to improving the prediction capacity of the model with the linear structure:

$$\lambda_1 PINTX + \lambda_2 AB + \lambda_3 INCBKT$$

Unlike the case with the unweighted models, fitted values of the response variable are now closer to the observed values thus bringing down the residuals to a more manageable level. Moreover, comparing columns 1 & 2 and 3 & 4 of Appendix 7E, it is clear that the weighted models achieved lower scaled deviances than the unweighted models irrespective of whether missing observations were replaced or excluded.

The improvement recorded here through the use of intention as an explanatory variable and a differential weighting of planners and non-planners will be consolidated upon within a time series framework in one of the sections in the next chapter where we will make a case for building separate models of *aggregate* PC purchase for the group of intenders and non-intenders.

5.4: FINDINGS

Against the background of the theory of reasoned action and its application to personal computer purchase, the following are our major findings:

1. Modelling evidence shows that PC purchase intention is the best single predictor of actual PC purchase. It explained the highest amount of variation (scaled deviance) in PC buying behaviour irrespective of whether missing observations were included or excluded from the analyses (See Section 5.3 and Appendix 7D). This conforms with the Fishbein-Ajzen's theory. But there is no evidence to support the theory's claim concerning the mediating role of intention. The confirmed superior role of intention will be used to our advantage within a time series dimension in Chapter 6.

2. From Appendix 7A, we can see that attitude towards buying a personal computer (AB) exercised the greatest influence on purchase

intention but it ranked second after income in influencing actual purchase. However, Appendix 7B shows that the leading role of AB within the intention model was superseded by the interaction effect between income and expectation (INCBKT.EXPECTN) when missing observations were excluded from the analyses. These findings weaken the position of the reasoned action theory as far as the exclusive role of its explanatory variables are concerned (See Section 5.2).

3. Although income (INCBKT) explains a much lower variation in intention than AB, it is more influential than AB in determining purchase decision (See Appendices 7A and 7B). Indeed, it is reasonable to expect that income – as important as it is – may play a less prominent role in intention formation, but in the final anaysis, actual PC purchase decision will be influenced by financial capability. This contrasts with the theory of reasoned action.

4. Expectation (EXPECTN) played some role in the intention model but its marginal main effect was further reduced within the purchase model. However, the interaction of this variable with income, i.e. INCBKT.EXPECTN, was significantly high and played a leading role in both models (See Appendices 7A and 7B). The prominent role played by INCBKT.EXPECTN over and above most of the main effects

buttresses the argument made under Section 2.12 concerning the importance of interaction effects. Other interaction effects such as AB.INCBKT.EXPECTN were also sufficiently big enough but were rendered redundant due to collinearity problem. This fear of redundancy in a variable that could otherwise be a useful predictor of behaviour was also expressed in Section 2.12.

5. Personal computer usage at work (RPCUSAGE) is not significant – the deviances explained by this factor in all cases considered, as shown in Appendices 7A and 7B, were extremely low (See Section 5.2). The reason for this can be traced to the possibility that access to a personal computer in the workplace may, on the one hand, encourage an individual to intend to and actually buy a PC for home use so that he and his family could also access the Internet, e-mail, and other facilities from home. On the other hand, it could dampen his willingness to buy since all the facilities that he would want to use are available in the office. Therefore, access or non-access to a PC in the office does not have any significant systematic effect on intention and PC purchase for home use

6. The influence of social norm (SN) on purchase intention was found to be very low. This variable is obviously weaker than other variables except RPCUSAGE. Interestingly however, when actual PC purchase

was modelled as the dependent variable, the effect of SN was considerably increased by over 1,000% but the resulting quantum of variation explained relative to other variables was not sufficiently high enough for us to accept this variable (See Section 5.2 and Appendices 7A & 7B). The subsequent improved performance of SN within the purchase model after a poor performance within the intention model can be ascribed to the fact that consumers tend to give greater consideration for the normative beliefs of their spouse, children and significant others when making purchase decisions than when forming intentions.

7. With regard to the very weak performance of SN vis-a-vis the important role of INCBKT and INCBKT.EXPECTN, the theory's assumption that AB and SN are sufficient in determining personal computer buying intention and behaviour could not be upheld (See Section 5.2).

8. Using either intention or purchase behaviour as the dependent variable, the model with the linear structure:

$$\beta_1 AB + \beta_2 INCBKT + \beta_3 INCBKT.EXPECTN$$

performed better than the Fishbein-Ajzen's model ($w_1AB + w_2SN$). This was largely on account of lower set of scaled deviances recorded

all through by this alternative model compared to the original model (See Section 5.2 and Appendix 7C).

9. In view of the superior predictive power of purchase intention, it is reasonable to incorporate it into the PC model as an explanatory variable with a view to predicting buying behaviour rather than buying intention. Under this circumstance, the weighted model with the structure: $\lambda_1 PINTX + \lambda_2 AB + \lambda_3 INCBKT$ also performed better than the reasoned action theory and its extension. (See Section 5.3 and Appendix 7E).

5.5: CONCLUDING REMARKS

Without prejudicing the improved status of our models compared to the Fishbein & Ajzen's model, we believe that the search for the best model for a complex process such as consumer behaviour is not a *fait accompli* type of exercise. It is a continuing exercise. As the search continues, we expect that future studies of this type will find our alternative models very useful as a working model in the quest for better alternatives. We think it should be possible to achieve further improvement by using a non-linear rather than linear predictor for the models. We therefore recommend for future studies the exploration of non-linear alternatives to the models considered.

Meanwhile, this study progresses in Chapter 6 with a dynamic time series modelling of aggregate PC purchase that attempts to build on the confirmed strength of intention as an explanatory variable.

CHAPTER 6

DEVELOPING A BIVARIATE GEOMETRIC-DISTRIBUTED LAG MODEL OF AGGREGATE PC PURCHASE BASED ON THE THEORY OF REASONED ACTION

6.1: INTRODUCTION

Chapter 5 gives the results of carrying out logit modelling of individual PC buying intention and actual purchase – these were based on variables such as attitudes, income, and consumers' expectations of their personal finances and business/economic outlook. We saw how these and other variables as well as their interaction effects impact on intention and behaviour; we also saw how intention was found to be the best single predictor of individual PC purchase. This tallies with the claim of the popular theory of reasoned action that, within any behavioural setting, intention is the best single predictor of subsequent behaviour (See Fishbein & Ajzen, 1975 and Ajzen & Fishbein, 1980). In this chapter, we intend to consolidate on the predictive status of intention within the framework of structural time series using aggregate data.

Although the theory has received a good measure of support from many studies (See Section 3.6.2), some other scholars have cast enormous doubts on the predictive power of intention over behaviour with the suggestion that the theory should be disregarded (See Section 3.6.3). In this chapter, rather than jettison the theory, we intend to use it as a springboard for building a dynamic model of aggregate personal

computer purchase based on intention data from the Survey Research Centre of the University of Michigan.

This chapter is concerned with the time-lag effects of aggregate intention especially between the time intention is formed and the time it is due for fulfilment. Our aim is to advance the theory by building, within a structural time series framework, a *geometric-distributed lag* model of aggregate personal computer purchase consisting of some time-varying component and aggregate intention as explanatory variables. The statistical package to be used is the ***STAMP 5.0*** package (See Section 4.3.2). We reckon with the fact that, at the aggregate level, individual errors of over-estimation or under-estimation of intention may cancel out; the effects of some extraneous variables may also cancel out due to their randomness. But between the time intention is formed and the expected time of fulfilment, many things happen within the environment which could systematically impinge on intention because consumers never expected such occurrences or they did not adequately plan for them. We recall that a number of reasons why people may possibly change their intentions have been outlined under Section 5.3.

The environment of business is generally characterized by change and the information technology (IT) industry within which the computer market is situated is a typical example of this phenomenon. The

dynamism of this industry suggests that, over time, intention alone may not perfectly predict subsequent personal computer purchase for all categories of consumers. We therefore intend to introduce the element of time and dynamic component into the original model to enable us capture the changing times. We also propose a scheme that separates intenders from non-intenders instead of lumping them together. These issues aimed at improving the reasoned action theory in the area of personal computer purchase are addressed in the sections that follow:

6.2: INCORPORATING STOCHASTIC TREND IN A STRUCTURAL TIME SERIES MODEL FOR PREDICTING AGGREGATE PC PURCHASE

One of the most vibrant sectors of most economies today is the IT industry. The market for hardware and software is an ever-changing one – new products are constantly being brought into the marketplace at a rate faster than consumers could imagine. As new products which are faster, more powerful, more efficient, and more "user-friendly" come into the market, old ones are rendered obsolete. These technological innovations as well as other changes within the environment of business and the overall economy are a continuous process. To the extent that these changes also occur after declaration of *intention* by consumers, intention data alone cannot be expected to be so stable over time as to perfectly predict actual personal computer purchase in line with Fishbein and Ajzen's theory. It should be expected that most consumers would

normally review their stated intentions in line with the prevailing situation at different times.

A useful way of capturing the dynamics of personal computer purchase over time is that of Box-Jenkins ARIMA methodology. If we were to use this method, data on personal computer purchase would initially be considered as a non-stationary series (ARIMA) which would then be made stationary (or at least approximately stationary) by "differencing" and other possible transformations to obtain an autoregressive moving average (ARMA) series. Typical ARMA models consist of lagged values of both the observed variable and the disturbance term and are very useful in dynamic modelling (Harvey, 1993; p.3). However, we think that a deterministic trend that an ARMA methodology stands to offer may not be appropriate as this amounts to a fixed level and a fixed slope. Rather than fix the level to a particular constant value μ for all time periods together with a fixed slope, we adopt an alternative approach – *structural time series* – which offers the possibility of modelling the trend as a stochastic process. A stochastic trend consists of a stochastic level and a stochastic slope – it is an ideal choice especially when there are changes in consumers' tastes and preferences. (See Koopman, et al, 1995, p.45). Besides, the dynamic modelling results we shall see later in this paper reveal that the level is not fixed as the variances associated with each of

the level disturbances are non-zero which means stochastic level is appropriate.

As stated earlier, our strategy is to build a dynamic model and since this can also be done within the framework of structural time series (See Harvey 1989; Harvey 1993, p.152; and Koopman 1995, p.45), our choice of this approach is reasonably justified. With the structural time series approach, we can combine intention as an explanatory variable with unobserved time-varying components such as trend, cyclical and seasonal variations. But in this particular case, there is no reason to support incorporating seasonals and cycles into the model:

- Computer purchase is not typically a seasonal purchase, besides the monthly data available are not sufficient to reveal any meaningful seasonal pattern. This component is not relevant to the model and this is reflected in STAMP by specifying "No seasonal".

- For the same reason that data do not span long period of time, it is assumed that the periods covered fall within the same business cycle and so there is no basis for any useful comparison of cycles. We note however that cyclical variation would be worth looking at in this kind of study if there were sufficiently larger number of observations. Lack of adequate data is apparently one of the limitations of the analysis. In the circumstance that cyclical component is also included in the

model, this can be pooled with trend and irregular variation to produce a multiplicative structure for the unobserved components, viz:

Trend x Cycle x Irregular

Where trend is in absolute units and cycle and irregular are percentages or indices.

- For theoretical and empirical reasons that we shall discuss in the last section of this paper, trend will be modelled with a stochastic level and no slope specification which amounts to a *local level model* and a minor shift from the desired *stochastic trend model.* This is yet another limitation arising from the small size of the data.

6.3: THE SEARCH FOR A DISTRIBUTED LAG STRUCTURE FOR AGGREGATE PERSONAL COMPUTER PURCHASE

For the purpose of this paper, the Fishbein-Ajzen's theory of reasoned action which serves as our background theory can be modified and represented in time series notation as:

$$y_{t+1} = x_t + \varepsilon_t \qquad (6.1)$$

Where y is the aggregate personal computer purchase and x denotes aggregate intention to buy a personal computer.

For the simple fact that intention and purchase data were not obtained at the same time, the model appears to exhibit an element of dynamism but

strictly speaking it is not *dynamic*. The model depicts an *instantaneous* effect of intention on behaviour and this makes it to lose the real essence of a dynamic model. Quite apart from the existence of "non-contemporaneous" relationship between explanatory variable(s) and the dependent variable, the nature of dynamic models[9] is such that the full effect of the explanatory variable manifests itself gradually over a number of time periods. As highlighted in the introduction to this paper, our interest here is to seek a structure which addresses the dynamic aspect of the data set. One useful dynamic model in this regard is the distributed lag model.

Unlike static models, a distributed lag model implies that the value of y (dependent variable) at any point in time does not depend on the value of x corresponding to that particular time period alone. It depends on a set of lagged values of x. In practical terms, the total amount of personal computer purchase for a time t covering the period February 96 – August 96 will depend not only on the total number of intenders corresponding to that same period but also on the total number of intenders from samples corresponding to March – September 96 as well as those from April – October 96, May – November 96, June – December 96, July 96 – January 97, and August 96 – February 97. Each sample covers a six month period so that we have:

[9] See, for instance, Harvey (1990, pp.225-263) for a full discussion on dynamic models.

$$y_t = \beta_0 x_t + \beta_1 x_{t-1} + \ldots\ldots\ldots + \beta_6 x_{t-6} + \varepsilon_t, \quad t = 1, 2, \ldots\ldots, T \qquad (6.2)$$

We are faced with two problems here:

1. The lag cofficients $\beta_0, \beta_1, \ldots\ldots, \beta_6$ of the distributed lag model in equation (6.2) above have to be estimated. By the time we introduce a stochastic level component and possibly a lagged value of aggregate purchase into the model, there will be relatively too many parameters and we may run into estimation problems.

2. The variables $x_t, x_{t-1}, \ldots\ldots, x_{t-6}$ are essentially consecutive values of the same original series x_t. In view of this, the explanatory variables stand a high risk of being correlated with one another. In particular, there is a high potential of collinearity between x_t and x_{t-1} on the one hand, and between x_{t-1} and x_{t-2} on the other hand – the same thing applies to other combinations of adjacent values. The result of this is multicollinearity which adds to the problem of parameter estimation already mentioned above.

The problems enumerated above are traceable to our quest for a dynamic model – while trying to solve a problem with our dynamic approach, we have run into yet another problem. How do we reconcile these? How do we deal with the cumbersome problem of parameter estimation without necessarily losing the much desired dynamic content or the desired number of lags in the model? The way out is to impose some

constraints on the lag coefficients with a view to reducing the number of parameters that would be estimated. Various methods of doing this exist but we shall adopt a *geometric-distributed lag*[10] structure as it presents a very useful set of coefficients for our dynamic model. As the name goes, a geometric-distributed lag structure consists of approximating the lag coefficients $\beta_0, \beta_1, \ldots\ldots, \beta_6$ with a set of coefficients that form a geometric progression (GP), viz:

$$1, \beta, \beta^2, \ldots\ldots, \beta^j, \ldots\ldots, \beta^6$$

This means that the lag coefficients are constrained to exponentially decline into the past, i.e. as the lag length j increases. The understanding behind this is that past observations have progressively smaller weights than recent observations. By using a geometric-distributed lag structure, a knowledge of β alone is sufficient to estimate all the other coefficients in the structure.

It should be noted that each of the lags constructed corresponds to a sample in reverse order. On the strength of this reverse ordering, we would like to make a case for what we call a modified geometric-distributed lag model. Unlike the typical geometric lag, this involves exponentially declining set of coefficients as the lag length decreases. Against the background of the problems discussed earlier in this section, the model being developed has the following merits:

[10] See, e.g., Harvey (1990, p.226).

i. By reducing only the number of lag coefficients, we are able to remove the problem of having to estimate too many parameters while at the same time retaining the desired number of lags.

ii. The risk posed by multicollinearity among the variables $x_t, x_{t-1}, \ldots\ldots, x_{t-6}$ is avoided since we only have to know one of the coefficients, say β, and the rest are just exponents of β.

iii. Even though the model now consists of 8 variables, it is very parsimonious as only 3 parameters have to be estimated instead of 8.

iv. Instead of allowing the lag coefficients to be freely and uniquely determined through parameter estimation, restricting them to assume exponentially declining values conforms with the progressively declining pattern of influence of consecutive samples. So we have not done any damage to the dynamic structure of the model by imposing some constraints – the model still maintains its dynamic features after necessary adjustments.

The ensuing sections will deal with further issues of concern aimed at improving the reasoned action theory.

6.4: A CASE FOR SEPARATE AUTOREGRESSIVE MODELS FOR THE GROUPS OF "INTENDERS" AND "NON-INTENDERS"

In this section, we propose the idea of separating the group of intenders from that of non-intenders and then build separate models for each group. We note that Fishbein and Ajzen's model does not discriminate between the two groups. Both intenders and non-intenders are lumped together as a single entity represented by one variable which the theorists claim should be able to approximate subsequent behaviour. It is doubtful if this is sufficient for prediction purposes. In the logit modelling of Chapter 5, we saw how some improvements were made in the prediction accuracy of the theory of reasoned action after down-weighting the influence of "non-planners" group in the model to 75%.

Our idea of separating intenders from non-intenders is very similar to – and actually draws wisdom from – the usual practice in marketing and consumer research whereby consumers are not just considered as a unitary whole. Experts believe that consumers as individuals or as groups differ from one another in certain respects – tastes, preferences, habits, income status, personality characteristics, culture, sociodemograhics, etc. (See Chapter 2). An awareness of these differentials shapes a company's product design decisions and guides them in adopting strategies such as market segmentation, product differentiation and product branding. In the same vein, separating intenders from non-intenders would enhance

our understanding of the relationship between intention and behaviour so that we can focus attention on the factors that encourage intenders to keep to their intention and those that persuade non-intenders to change their previous plans. As a matter of fact, experience has shown that intention statement cannot be taken for granted – perhaps some of those who do not intend to buy a personal computer are unnecessarily being pessimistic about their future finances or they expect that prices would fall in the nearest future while some of the intenders are just mere optimists. Consumer optimism and other aspects of an individual's personality characteristics as they affect choice behaviour have been dealt with in Chapter 2.

The literature on consumer intention is replete with a largely bipolar shades of opinions on the predictive power of intention over behaviour. Some scholars like Fishbein and Ajzen believe that intention predicts behaviour very well while others argue that intention data has no predictive value and so should be discarded (See Sections 1.1 and 3.6). But, the crux of the matter lies in the fact that intention predicts behaviour relatively well among those with realistic plans while it is not good enough for the so-called non-planners. Moreover, data sets and survey reports by the Director of the *Surveys of Consumers* of the University of Michigan reveal that, on the average:

- Only 10% of the total number of respondents usually express intention to buy a personal computer and that 40% of them actually do buy.
- 90% of the total number of respondents always declare "no intention to buy a personal computer" but that 7.5% of them normally change their mind.

The striking thing here is that 7.5% appear relatively small but, small as it is, the magnitude of those who buy from this group outnumbers that of the intenders group. In view of the fact that non-intenders who changed their plans account for greater purchase volume than intenders who actually bought a personal computer, we cannot disregard the former group in an effort to predict aggregate purchase. However, instead of lumping the two groups together – like Fishbein and Ajzen did – with the assumption that aggregate intention predicts aggregate purchase, we advocate a separate model for each of the two groups. Within the intenders group, we identify those who fulfilled their intentions (i.e. planners) but within the group of non-intenders, our focus is on those who changed their intention not to buy a personal computer (i.e. non-planners), so that:

Aggregate total purchase = Aggregate planned purchase + Aggregate unplanned purchase

i.e. $Yp = Ypx + Ypz$

Essentially therefore, our own position is not one of total acceptance of the Fishbein-Ajzen's approach or its outright rejection.

Using some set of distributed lag structures for aggregate intention, the results of building separate univariate models for each of Ypx (intenders group) and Ypz (non-intenders group) are given in Appendices 8A and 8B. These show, among others, values of prediction error variance, coefficient of determination, and Durbin Watson statistic associated with each structure. Theoretically speaking, it is desirable to have the value of Durbin Watson close to 2; values that are far greater than or less than 2 signal the presence of residual autocorrelation or wrong specification of model which may invalidate our conclusion. From the appendices, we can see that improvements recorded in the prediction error variance and coefficient of determination are moving in the opposite direction to that of Durbin Watson statistic. There is therefore a need to strike a balance between a precise model that fits the data well and a model that does not suffer too much from residual autocorrelation or wrong specification. In the STAMP estimation procedure, a normal model was adopted and so the programme also output values of the normality and heteroscedasticity statistics as shown in the appendices. These respectively measure departures from normality and constant variance.

Choosing any one particular structure to represent each model on the basis of the foregoing criteria is not that straightforward. However, since the univariate models being constructed here are not the ultimate, all we do is just to select the best 3 structures to represent each group and these will be combined in the bivariate model that we propose in the next section. The selected structures are given as follows:

Intenders Group:

1. $\ln Ypx_t = 2.3254 + 0.0112\ Ypx_{t-1} + 0.0113\ Xp79_t$ (6.3a)
2. $\ln Ypx_t = 2.3028 + 0.0107\ Ypx_{t-1} + 0.0114\ Xp80_t$ (6.3b)
3. $\ln Ypx_t = 2.2785 + 0.0102\ Ypx_{t-1} + 0.0116\ Xp81_t$ (6.3c)

Non-intenders Group:

1. $\ln Ypz_t = 8.1285 + 0.0051\ Ypz_{t-1} + 0.0067\ Zp76_t$ (6.4a)
2. $\ln Ypz_t = 8.2734 + 0.005\ Ypz_{t-1} + 0.0068\ Zp77_t$ (6.4b)
3. $\ln Ypz_t = 8.4175 + 0.005\ Ypz_{t-1} + 0.0068\ Zp78_t$ (6.4c)

Additional output shows that convergence was very strong for each of the models but, at 5% significance level, the p-values corresponding to the lagged value of aggregate planned purchase (Ypx_{t-1}) and the lagged value of aggregate unplanned purchase (Ypz_{t-1}) are too high. The two variables are expected to account for the influence of previous purchases but are found to be insignificant. Ypx_{t-1} and Ypz_{t-1} are therefore dropped from their respective models. Results also indicate that the variances of the disturbance driving the level coefficients are each non-zero which means

we were right to have specified a stochastic level rather than a fixed level for the models.

6.5: TOWARDS A BIVARIATE GEOMETRIC-DISTRIBUTED LAG MODEL OF AGGREGATE PC PURCHASE

This section consolidates the ideas set out in the preceding sections. Having separated the groups of intenders and non-intenders, we can now bring them together under a single bivariate model in which each one still retains its separate identity. We recall that:

$$Yp_t = Ypx_t + Ypz_t$$

Ypx_t and Ypz_t are obtained from the same series but for the purpose of the bivariate model, they are considered as "seemingly unrelated time series equations" (SUTSE).

In the univariate modelling of the previous section, we selected 3 structures to represent each group. In this second stage, each of the variables Xp_{79}, Xp_{80}, and Xp_{81} which severally define the lag structures for intenders are combined with each of Zp_{76}, Zp_{77}, and Zp_{78} defining the structures for non-intenders to obtain some set of bivariate models. As usual, the parameters within the lag structures are pre-specified rather than estimated. STAMP output showed that convergence was very strong all through; covariance matrix of disturbances associated with the models' stochastic levels consists of non-zero variances for both groups. This implies fitting a stochastic level rather than a fixed level was proper.

As shown in Appendix 8C, the p-values associated with the estimated coefficients of unobserved component and explanatory variables are very low – each of them being less than 0.05. There is therefore only a very small chance that the corresponding effects of the stochastic level and explanatory variables are equal to zero, and so these variables have justified their inclusion in the model. The principal task at this juncture is to select one of the pair of options shown in Appendix 8C. The best pair is the one that provides the best model in terms of the coefficient of determination R^2 and other statistics indicated in the table. The pair that contains Xp_{80} and Zp_{77} as explanatory variables obviously presents the best option – it achieves the least prediction error variances for both groups as well as the highest coefficient of determination. Durbin Watson statistics for both groups are also closer to the desirable value (2) using this pair than any other pair. Similarly, under the assumption of normal distribution, departures from normality and constant variance as measured by the normality and heteroscedasticity statistics respectively are kept at a minimum compared to other pairs.

We therefore choose the pair that consists of Xp_{80} and Zp_{77} as explanatory variables to obtain the bivariate model:

$$lnYpx_t = 2.5491 + 0.0137\,Xp80_t \qquad (6.5)$$

$$= 2.5491 + 0.0137\,[(0.8)^6 Xp_t + (0.8)^5 Xp_{t-1} + \ldots\ldots + (0.8)^{6-j} Xp_{t-j} + \ldots\ldots + Xp_{t-6}]$$

$$= 2.5491 + 0.00359\,Xp_t + 0.00449\,Xp_{t-1} + 0.00561\,Xp_{t-2} +$$
$$+ 0.00701\,Xp_{t-3} + 0.00877\,Xp_{t-4} + 0.01096\,Xp_{t-5} +$$
$$+ 0.0137\,Xp_{t-6} \qquad (6.6)$$

and

$$lnYpz_t = 10.071 + 0.00909\,Zp77_t \qquad (6.7)$$
$$= 10.071 + 0.00909\,Zp_t + 0.007\,Zp_{t-1} + 0.00539\,Zp_{t-2} +$$
$$+ 0.00415\,Zp_{t-3} + 0.0032\,Zp_{t-4} + 0.00246\,Zp_{t-5} +$$
$$+ 0.00189\,Zp_{t-6} \qquad (6.8)$$

Compared to the theory of reasoned action (Appendix 8D), our alternative model achieves a far lower prediction error variance and a better fit. Above all, we have been able to build a dynamic model of aggregate personal computer purchase within the context of our data set and we submit that this model not only demonstrates the applicability of the reasoned action theory to personal computer purchase, it also serves as an improvement to the theory.

6.6: IMPLICATIONS, PRACTICAL USES, AND LIMITATIONS OF THE ALTERNATIVE MODEL

The implications, practical application, and limitations of our model are discussed below:

1. We note that ARMA methodology is also very useful for modelling dynamic processes such as ours, but this geometric distributed lag

model was constructed within a structural time series framework. It advances the theory of reasoned action, being both a descriptive and predictive model of aggregate personal computer purchase over time. Using lagged values of aggregate intention and a stochastic level, it also demonstrates the power of the STAMP package to combine time series with regression (See Sections 6.2 and 6.3).

2. The expanded forms of the alternative models [Equations (6.6) and (6.8)] make them look a bit complex but they are parsimonious. As a matter of fact, only 3 parameters need to be estimated and Equations (6.5) and (6.7) lend credence to the models' parsimony. This is a gain arising from the distributed lag structure of the models (See Section 6.5).

3. We have not given any special consideration for a separate intervention variable in our model; we think it is not necessary as there were no reports of industrial strikes, natural disasters or similar incidents within the time period which could have affected supply and/or demand of computers systematically. The stochastic level is expected to capture some of the future effects of intervention if present at all.

4. As a predictive model, the alternative model is useful for marketing planning purposes. It gives wholesalers and retailers useful insights

into the way personal computer market demand is going to move during the next six months. Such insights are very useful in guiding suppliers concerning realistic re-order quantities. The advantage of the model is that forecasts covering the next 6 months are available every month as long as the survey continues – which means every 6-monthly period overlaps with others and a complete review of the previous forecasts is embedded in the current forecast. However, this model is not targetted towards production planning purposes as production planning cycle generally takes longer time to get completed. By the time computer chips and other components get produced and assembled up to the final hardware production stages, the forecast period may have gone past resulting in the forecasted values being rendered useless.

5. This model is limited by "period length" – the number of time periods available for modelling. Due to period length limitation, we could not go ahead with a stochastic trend specification for the model; neither could we include a cyclical component (See Section 6.2). Preliminary checks we did revealed that, with a stochastic level and a stochastic slope, STAMP could not proceed with estimation because the resulting "hessian matrix"[11] was too large. In other words, there were

[11] Hessian matrix is an *nxn* matrix of second-order partial derivatives of coefficients aimed at obtaining estimates of the *n* parameters of a given model.

too many parameters than the model could accommodate. It should be possible however to do these with a much longer time series data. But since we could not fit a stochastic slope here, we take consolation in the fact that stochastic slopes can in any case render forecasts somewhat unstable because they are prone to being over-sensitive to changes in the series (See Koopman, et al, 1995; p.31).

6. Our model does not claim to be a general model – it is a model built specifically in relation to the realities of our data set covering American PC consumers.

CHAPTER 7

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter gives a summary of important observations as well as major challenges and findings of the study. It also draws conclusions, as necessary, and makes recommendations for future studies.

7.1: Summary

In Chapter 2, we discussed a number of factors that influence consumer choice behaviour bringing to the fore – in the conclusion – the importance of interaction effects and the need to consider them for explanation of behaviour, barring any incidence of collinearity between the variables concerned. Building on the conceptual framework of Chapter 2, we gave a brief theoretical background in Chapter 3 aimed at broadening our understanding of consumer behaviour. It was observed that series of variables have been used in model development. We note that the interconnected nature of variables has been illustrated by the so-called flow-chart models of buying behaviour such as the Engel-Kollat-Blackwell model (Section 3.4.2/Appendix 3C), and the Howard-Sheth model (Section 3.4.3/Appendix 3D).

This interconnected flow of relationships between explanatory variables can lead to some form of interaction effects on choice behaviour as previously argued in Section 2.12. These, in conjunction with the

propositions of our background theory and the findings of Chapter 5, form the bedrock of the chart given in Figure 7.1 (page 160) depicting our alternative model of PC purchase.

It is noteworthy, however, that Fishbein and Ajzen did not consider the effect of interaction in their theory of reasoned action. Neither did they consider that other variables (such as income and expectation) apart from their attitudinal and normative variables play centre-stage role in determining intention and subsequent behaviour (See Section 3.6.1).

These issues were fully addressed in Chapter 5 and findings support the idea expressed in the qualitative analysis of Chapter 2 with regards the potentially important role of interaction effects. In particular, the *interaction* between income and expectation played a prominent role within the intention and behaviour models. It can be seen from Figure 7.1 that the interaction of income and expectation constitutes the only factor that has a very strong influence on both personal computer buying intention and buying behaviour. Only one of the variables of the theory of reasoned action (attitude toward the behaviour) has been found suitable for inclusion in the alternative models. The other variable – social norm – was found to be weaker than income as well as the interaction effect between income and expectation.

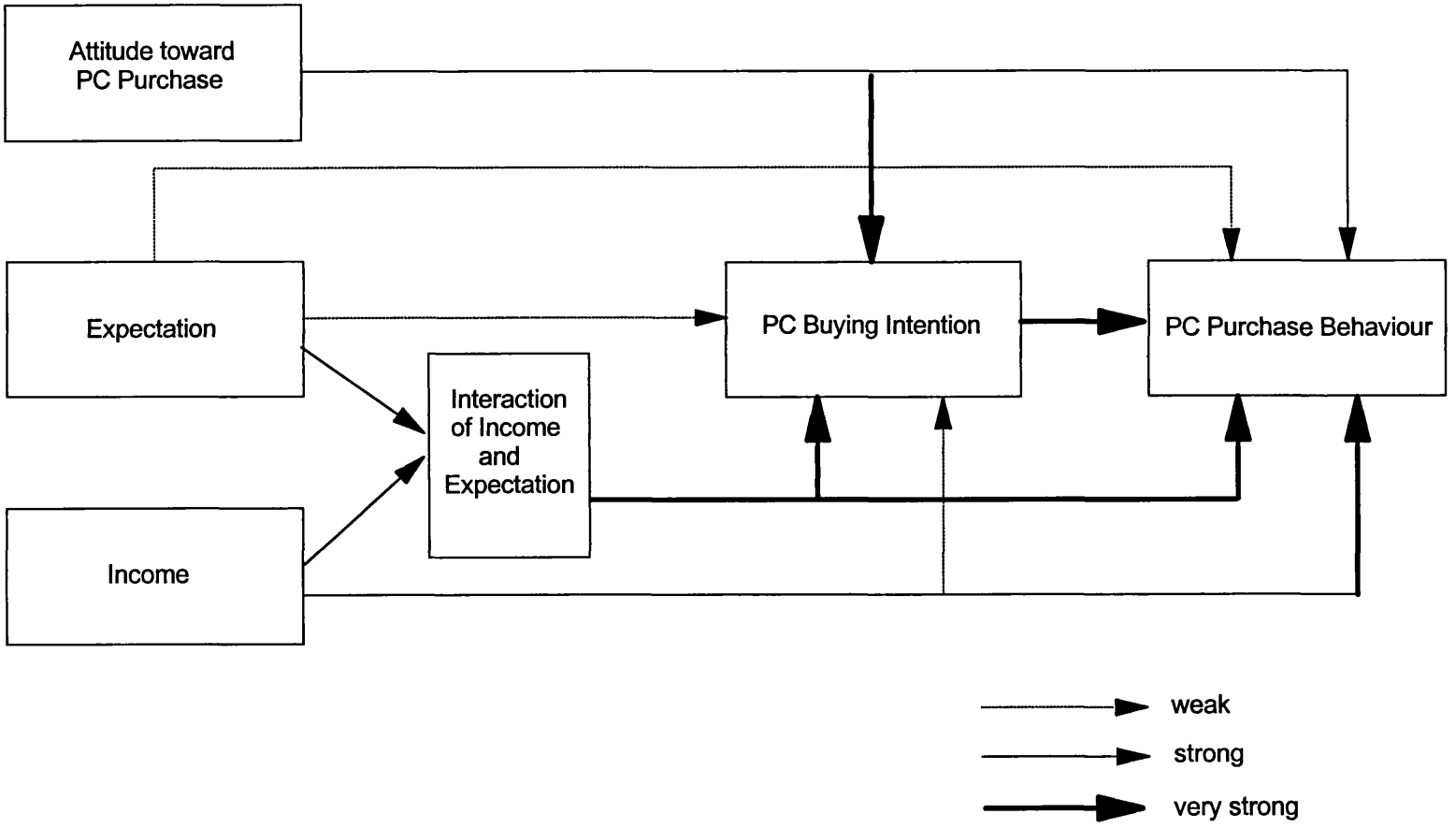


Fig. 7.1: Oladejo's Model of Personal Computer Purchase.

Although attitudes performed better than income in the intention model, income was stronger than attitude in influencing actual PC purchase. Contrary to the theory's claim, these effects were generally not mediated by intention (See Sections 5.2 & 5.4, Appendices 7A & 7B, and Fig. 7.1 above).

Overall, we have been able to demonstrate in this study the applicability of the theory of reasoned action – with some improvements – to personal computer purchase. In line with our stated objectives, we have succeeded in building *logit* models of individual PC buying intention and behaviour using the **GLIM** package (See Chapter 5). We have also succeeded in demonstrating the power of the **STAMP** package in combining time series with regression by building a dynamic structural time series regression model of aggregate PC purchase (See Chapter 6). Evidence shows that these models are better than the theory of reasoned action (See Apendices 7C, 7E, 8C and 8D) . In particular, the *geometric distributed lag* model constructed offers us not just a descriptive model like Fishbein and Ajzen's but also a predictive model.

Although the objectives, unit of analyses, analytical frameworks, and statistical packages used in Chapter 6 are different to those of Chapter 5, there is a concept that runs through both chapters, which is the idea of

"discrimination". Chapter 5 discriminates between planners and non-planners while Chapter 6 discriminates between intenders and non-intenders.

By allocating different weights of influence to the groups of planners and non-planners, some appreciable improvements were achieved. The alternative logit model of individual PC purchase consisting of intention, attitude, and income was found to perform better than the Fishbein-Ajzen's model. The influence of non-planners were down-weighted in the analyses by 25% on the understanding that the two groups were not the same (See Section 5.3).

Consolidating on the improvement achieved in our logit modelling through a differential weighting of planners and non-planners, we built *separate* time series models of aggregate PC purchase for the groups of intenders and non-intenders which were later combined to form a bivariate model. This model was also found to be superior to the theory of reasoned action (See Sections 6.4 and 6.5).

The time series model constructed provides, on a monthly basis, useful forecasts of aggregate PC purchase for the next six months. As a dynamic model, it has a built-in mechanism for continuous periodic review of

forecasts. These forecasts provide wholesalers and retailers with useful insights into the PC market. Essentially, the model serves practical purposes in marketing planning rather than production planning (Section 6.6).

7.2: Conclusions

Based on conceptual and theoretical developments of consumer behaviour and the findings of this study, we make the following conclusions:

1. There are various factors such as income, attitude, tastes and preferences that impinge on consumer behaviour. The way these variables operate varies from one individual, consumer group, geographic region, or society to another. Unless there is evidence of multicollinearity among the explanatory variables, the combined interaction effect of the variables on consumer behaviour may be of greater importance than any of the variables considered singly. This view was expressed in Section 2.12 of our qualitative analysis and later supported by our findings in the logit analysis of Section 5.2.

2. Consumer behaviour is contingent upon time and situation. Like time and situation which are not fixed, it is constantly changing. It is also culture-dependent (See Section 2.11). The economic principles of

choice rationality and utility maximisation are common to all typical consumers but societal differences in culture suggest that variations may exist in the consumption patterns of the different peoples of the world. The interplay of culture with other important variables significantly shapes consumers' choice behaviour. As a corollary, we note that multinational companies will be better placed in the international business arena in terms of competitive advantage if they align their advertising and overall marketing and production strategies with the dynamic characteristics of choice and cultural diversity of consumers of their range of products.

3. Various models and theories exist that attempt to describe, explain and predict consumer behaviour but so far, no single theory can be considered comprehensive enough as to fully capture the complex multi-dimensional nature of the whole phenomenon (See Section 3.7). This has some unfavourable implication for Fishbein and Ajzen's claim that their theory of reasoned action is a generally applicable theory (Section 3.6.1).

4. In view of the relative strength of income as well as the interaction effect between income and expectation, we conclude that there is a breakdown of the reasoned action theory's principle of sufficiency of attitude and social norm (See Sections 5.2 and 5.4).

5. In conformity with the original theory, it was established that intention is the best single predictor of actual personal computer purchase. However, in spite of the superior predictive capacity of intention, we could not find strong empirical support for the theory's claim that intention mediates the influence of all explanatory variables on behaviour. We conclude that explanatory variables influence behaviour not just on account of their influence on intention (See Sections 5.2, 5.3, and 5.4).

6. The theory of reasoned action was inadequate to address both the nature of our data set and the dynamic features of the purchase process over time. These were not only captured by the distributed lag structure of our alternative model but a geometric specification for the structure also took care of the model's complex outlook and potential multicollinearity which could have resulted in serious parameter estimation problems. This is yet another justification for the superiority of our model to the original model (See Section 6.3).

7.3: Recommendations

The following are our recommendations for further studies:

1. In this study, rather than rejecting the reasoned action theory as some scholars have suggested (See Section 3.6.3), we have sought ways of

improving it and we recommend that the theory be given a fair chance of being tested out and improved upon in other product fields and behavioural domains.

2. Although our alternative models are better than Fishbein and Ajzen's model, there is still more room for further improvement. We recommend that the improved logit alternative to the original model be used as a working model for future non-linear modelling of individual personal computer buying intention and behaviour (See Section 5.5).

3. With regard to the groups of planners and non-planners, future studies may also want to investigate patterns of intention fulfilment by doing log-linear analyses of the two groups in relation to income distribution, expected income change, educational attainment, age group, gender, marital status, family size and number of children.

4. Although our dynamic model does not incorporate a separate intervention variable, we note that it is possible to do this within the structural time series framework. A separate intervention variable was not created because there were no reports of significant intervening events during the time period covered by the model. We rely on the

stochastic level (Section 6.2) to cater for the possible effects of extraneous factors. However, we recommend that other studies which are based on a longer time series data may consider and assess intervention as a separate variable as this poses a potential source of systematic change in the response variable (See Section 6.6).

APPENDIX 1

SAMPLE DESIGN AND RELEVANT SURVEY QUESTIONS[12]

Sample Design

The monthly *Survey of Consumers* is a nationally representative survey of private households in the United States except those in Alaska and Hawaii. Monthly samples incorporate a rotating panel design. For each monthly survey, an independent cross-section sample of households is drawn. The respondents chosen in this drawing are then re-interviewed six months later.

Over the history of these surveys, the sample design and survey methodology has included both personal interviews (using multistage area probability methods to select a random cross-section of private households) and telephone interviews (using samples selected from all private households with telephones, based on random-digit-dialing technique). The sample designs for telephone surveys differ from those for personal interview surveys in that selection probabilities are assigned on the basis of the population represented by different area codes and the prefix exchange codes rather than on population totals for geographic areas such as counties, cities, and blocks. Since 1976, random-digit-dialed telephone samples have been the dominant form of data collection. The selection of the sample households, under both designs,

[12] Curtin (1982)/*Surveys of Consumers*, Survey Research Centre of the University of Michigan, USA.

is performed after stratification by geography and the level of population density.

The sample of U.S. telephone households is stratified by region, state, area code, and the telephone exchange code. Stratification by these criteria assures the appropriate sample representation of different regions, states, and metropolitan size categories. A list of all working area codes and telephone exchange codes is updated regularly from information provided by AT&T. The last four digits of the phone number is randomly generated to complete the 10-digit phone number. The sample is drawn so that every phone number in the coterminous United States has an equal chance of being selected. Under the Survey Research Centre's two-stage sampling design, households with telephones are selected at random and with equal probability. The random-digit-dialing design provides for an equal probability sample of all telephone households. Within each household, equal probability methods are also used to select one adult as the designated respondent.

Relevant Survey Questions

Q.1: Do you (or anyone in your family living there) own a personal computer for use at home?

Q:2: Generally speaking, do you think the next 12 months or so will be a good or a bad time to buy a personal computer?

Q.3: What do you think are the chances that you (or anyone in your family living there) will purchase a personal computer for home use during the next 12 months or so.....?

Q.4: In what month and year do you think the personal computer will be purchased?

Q.5: In what month and year was the personal computer purchased?

Q.6: In a home like yours, would you say that a personal computer is of no use, nice to have, or hard to live without?

Q.7: To get a picture of people's financial situation we need to know the general range of income of all people we interview. Now, thinking about (your/your family's) total income from all sources (including your job), how much did (you/your family) receive ...?

Q.8: Now looking ahead – do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?

Q.9: Now turning to business conditions in the country as a whole – do you think that during the next 12 months we'll have good times financially, or bad times, or what?

Q.10: Looking ahead, which would you say is more likely – that in the country as a whole we'll have continuous good times during the next 5 years or so, or that we will have periods of widespread unemployment or depression, or what?

APPENDIX 2A

CONSUMERS' PERSONAL CHARACTERISTICS RELATED TO INNOVATIVENESS

		Number of Empirical Findings Indicating Relation to Innovativeness (%)					*Total Number of Published Findings*
		Positive	*None*	*Negative*	*Conditional*	*Total*	
Attitudinal:							
1.	Knowledge ability	78.8	16.7	1.5	3.0	100	66
2.	Attitude toward change	73.6	14.5	8.2	3.8	100	159
3.	Achievement motivation	64.7	23.5	0.0	11.8	100	17
4.	Aspirations for children	82.6	8.7	4.3	4.3	100	23
5.	Business orientation	60.0	20.0	20.0	0.0	100	5
6.	Empathy	75.0	0.0	25.0	0.0	100	4
Sociodemographic:							
7.	Education	74.6	16.1	5.2	4.1	100	193
8.	Literacy	70.4	22.2	3.7	3.7	100	27
9.	Income	80.3	10.7	6.3	2.7	100	112
10.	Level of living	82.5	10.0	2.5	5.0	100	40

Source: Extracted from J.F. Engel, et al. (1968, p.563), Table 25-1. See also, E.M. Rogers & J.D. Stanfield (1966), Tables 4 and 5.

APPENDIX 2B

ILLUSTRATION OF PERSONALITY AND PRODUCT/BRAND CHOICE

	Product/Brand	*Traits*	*Results*
1.	Car Types	Activeness, vigour, impulsiveness, dominance, stability, sociability, reflectiveness.	No personality differences between Ford and Chevrolet owners.
2.	Magazines	Sex, dominance, achievement, assistance.	Less than 13% of purchase behaviour variance explicable in terms of personality.
3.	Cigarettes	Dominance, aggression, change, autonomy.	Less than 13% of purchase behaviour variance explicable in terms of personality.
4.	Toilet Tissue	Forty-five (45) traits	Personality of no value in prediction of brand loyalty, quantity purchased or colour of tissue.
5.	Private Brands	Enthusiasm, sensitivity, submissiveness.	Less than 5% of purchase variance explained by these three (3) traits; other traits of no value.

Source: Extracted from G.R. Foxall (1980, p.61), Table 4.2.
Summary derived from F.B. Evans (1959); R. Westfall (1962); A. Koponen (1960); Advertising Research Foundation; and J.G. Myers (1967).

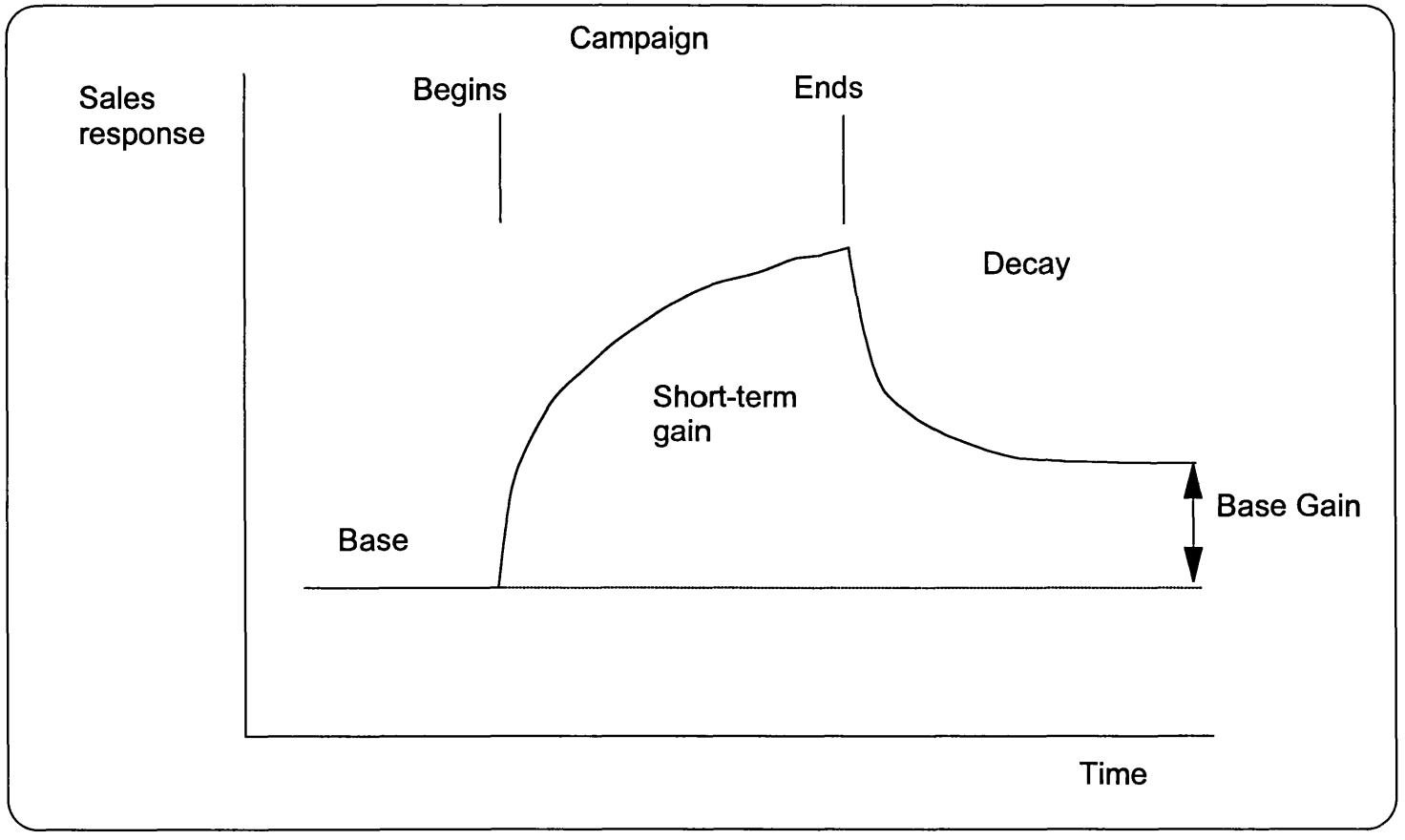
APPENDIX 2C

RESPONSES OF NEW YORK SUBCULTURES TO CONVENIENCE FOODS

	Jewish	*Puerto Rican*	*Black*	*Italian*
Frozen Dinners	Dislike taste and price; no large-scale acceptance; last in order of preference	Lead all groups in consumption rates because working housewives desire convenience	Resist on traditional grounds; wide usage but small quantities	Prefer fresh meat and vegetables; lowest consumption rates of all groups
Frozen Red Meat	Dietary laws militate against use, especially in case of pork; also dislike taste and price	Need for convenience overules distaste for this product; highest usage rate	Prefer fresh and fatty cuts; lack refrigeration	Rank second to Puerto Ricans
Frozen Fruit Pie	Prefer sweets to be home-baked or made in local speciality bakeries	Crave sweets and this overcomes price and taste resistance	Lowest level of consumption for traditional reasons	Rank last in *per capita* consumption due to dislike of flavour
Instant Coffee	Favourable response but prefer tea to coffee	Do not drink much coffee	Diet favours instant coffee but economic position militates against its adoption. Rank last in purchase rates	Prefer own special blends
Cake Mixes	Do not use much – reasons as for pie	Lead other groups in usage	Do not use much but use more than Jewish group	Do not use much but use more than Jewish group
Dehydrated Soups	Do not use	Use in large quantities	Use in limited amounts	Low consumption though high in usage versus non-usage

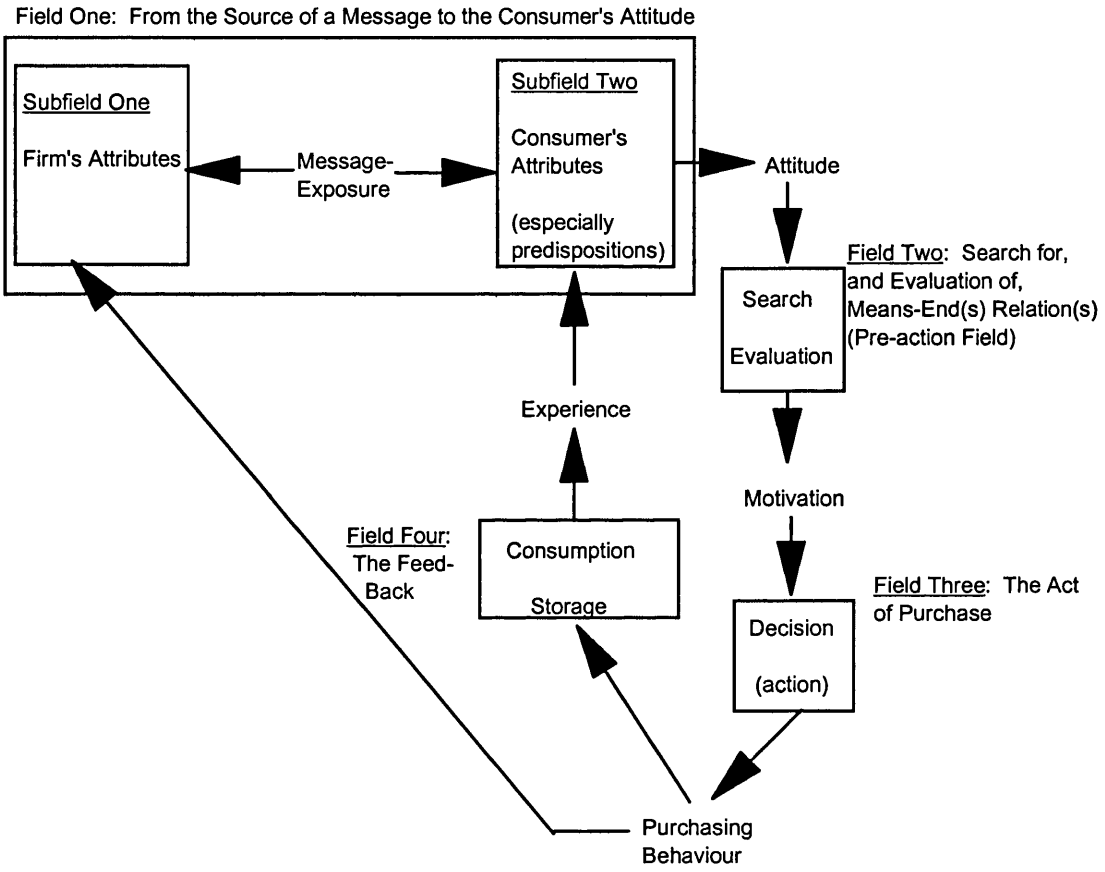
Source: G.R. Foxall (1980, p.169), Table 9.3. Original Table derived from M. Alexander (1959), "The Significance of Ethnic Groups in Marketing New-Type Packaged Foods in Greater New York", Proc. American Marketing Association.

APPENDIX 3A



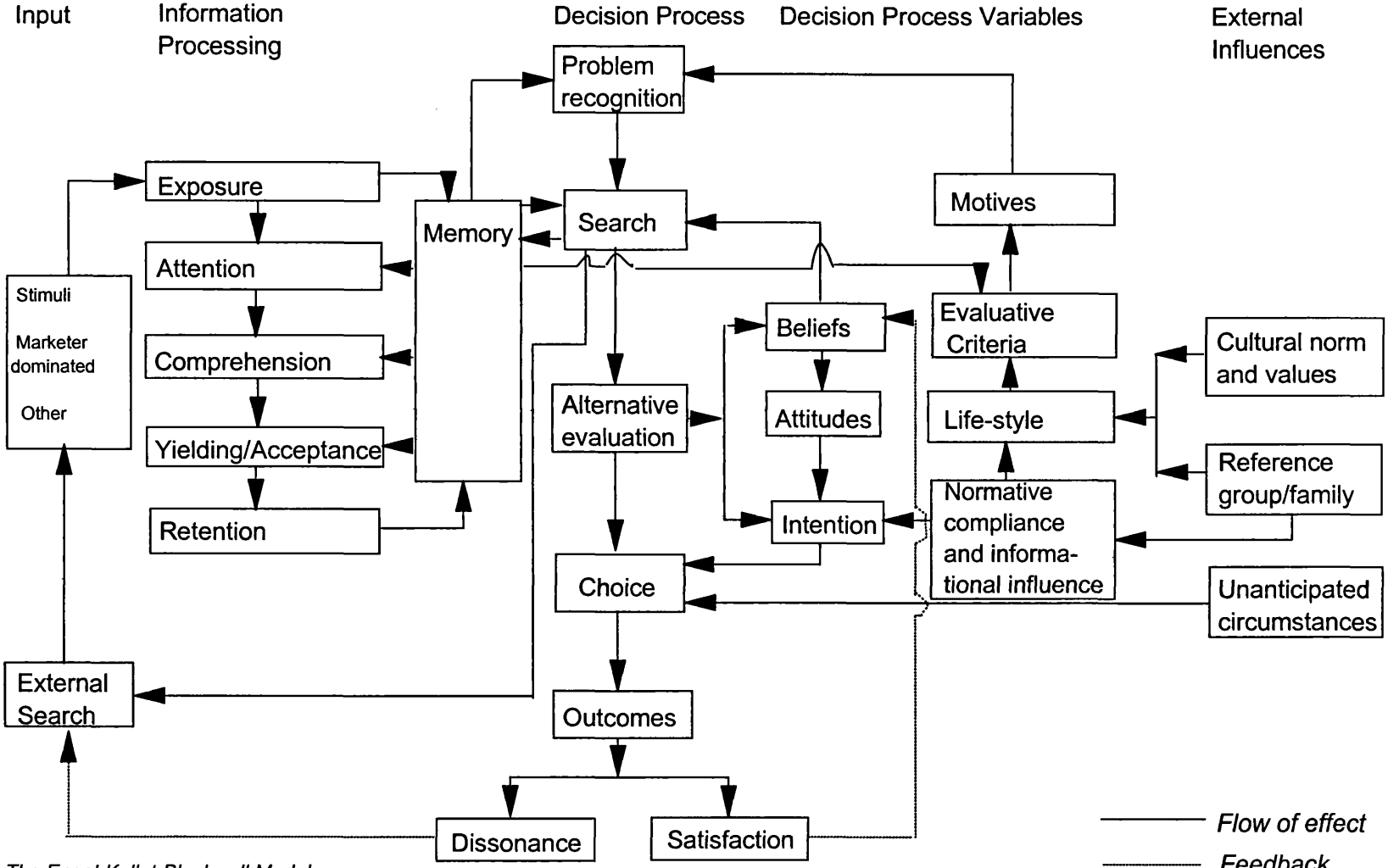
Effects of Advertising
Source: East, R. (1990). Changing Consumer Behaviour. London: Cassell, p.199.

APPENDIX 3B



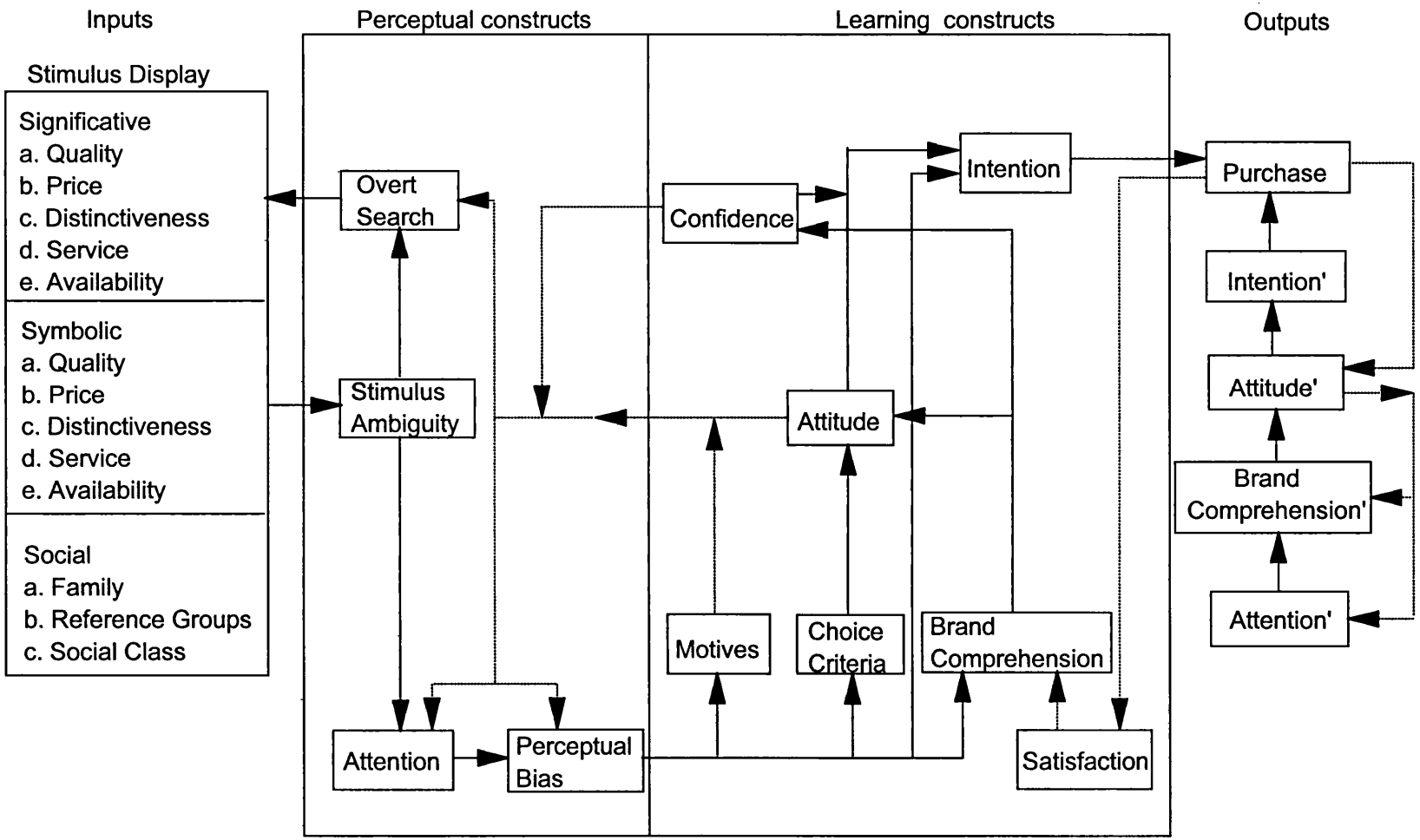
The Nicosia Model

Source: Nicosia, F.M. (1966). "Consumer Decision Processes: Marketing and Advertising Implications". Englewood Cliffs: Prentice-Hall, p.156.



The Engel-Kollat-Blackwell Model
Source: Engel, J.F. & Blackwell, R.D. (1982). "Consumer Behaviour". Hinsdale: Dryden.

APPENDIX 3D

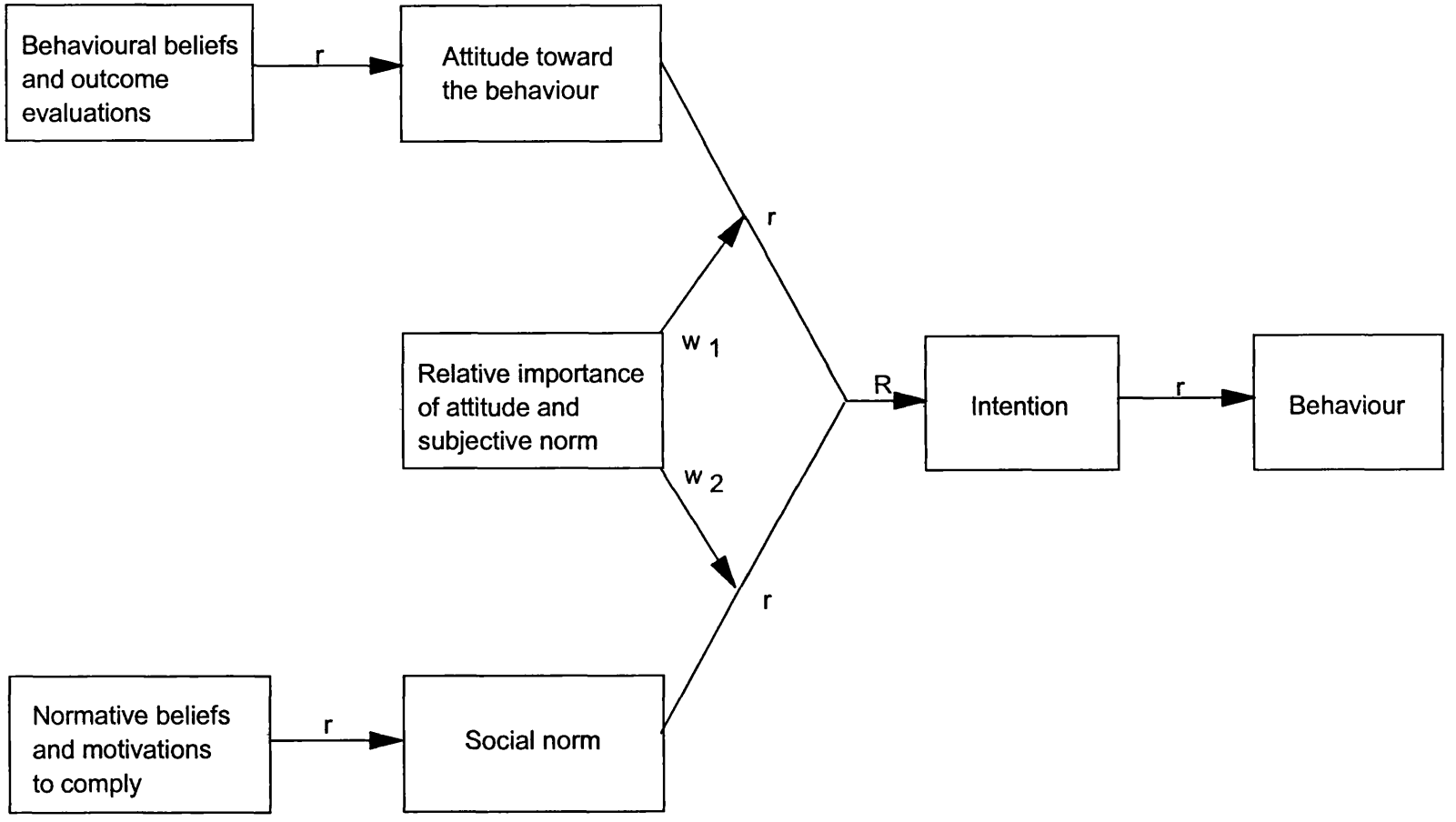


Solid lines indicate flow of information; dashed lines, feedback effects

The Howard-Sheth Model

Source: Howard, J.A. & Sheth, J.N. (1969). "The Theory of Buyer Behaviour". New York: John Wiley, p.30

APPENDIX 3E



Relations among beliefs, attitude, social norm, intention, and behaviour.
Source: Fishbein, M. & Ajzen, I. (1980). " Understanding Attitudes and Predicting Social behavior". Englewood Cliffs: Prentice-Hall, p.100.

APPENDIX 4

DESCRIPTION OF VARIABLES

In order to enable us fit the original and alternative models, attempt was made to re-code the data to suit our purpose. Having re-coded the data using **SPSS**, the variables of interest are as described below:

- *Purchase Intention (PINT)*

The variable name is PINT and is operationalized with two levels, viz:

1. "Intend PC purchase within six months".
0. "Do not intend PC purchase within the next six months".

For the case where purchase intention is used as an independent variable, we re-code PINT from 0-1 into another variable labelled PINTX with factor levels 1 and 2. This makes it conform with GLIM guideline for categorical independent variables.

- *Purchase Behaviour (NEWPC)*

NEWPC is the variable name adopted here; it is also defined with two levels as shown below:

1. "Did purchase PC since first interview".
0. "Did not".

- *Attitude toward the Behaviour (AB)*

Attitude toward the Behaviour (AB) is a factor with three levels classified as:

1. Favourable attitude toward buying a PC.
2. Liberal attitude toward buying a PC.
3. Unfavourable attitude toward buying a PC.

The computation is given by:

AB = 0.4 (RMKTPC) + 0.6 (RUTLTYHM)

Where RMKTPC and RUTLTYHM, as re-coded, are obtained from the following questions:

RMKTPC: "Generally speaking, do you think the next 12 months or so will be a good or a bad time to buy a personal computer?"

1. "Good"
2. "Pro-Con"
3. "Bad"

RUTLTYHM: "In a home like yours, would you say that a personal computer is of no use, nice to have, or hard to live without?"

1. "Hard to live without"
2. "Nice to have"
3. "No use"

- *Social Norm (SN)*

During the data collection stage for this work at the Survey Research Centre of the Institute for Social Research, University of Michigan, our major worry had to do with the fact that respondents were not asked questions bordering directly on social norm – one of the variables to be tested. Operationalizing this variable as defined by Fishbein and Ajzen in their theory thus posed one of the biggest challenges. The best and practically useful way out, as suggested by Richard Curtin, Director of the Surveys of Consumers, is to operationalize social norm with a cognate variable called "exposure to social norm". We recall here that social norm is simply a person's beliefs about what he thinks his wife or her husband, child(ren), peer groups and significant others expect him to do concerning the behaviour under study. That is, whether to take a particular course of action or not – in this case, buying or not buying a personal computer.

It is worth noting that the foundation of an individual having a social norm arising from his/her spouse is built on his marital status. One cannot talk, for instance, of a consumer being subjectively influenced in his choice behaviour by his wife if, in the first place, he is not married. Similarly, social norm attributable to children is dependent on whether s(he) has a child at all. Furthermore, an individual's educational attainment, to a large extent, determines which social class he belongs to

and so can be an indicator of how his social norm is influenced by his reference group. It is therefore very reasonable to use "exposure to social norm" as a proxy for "social norm". The variable is computed as follows:

$$SN = (EDBKT + MARR1 + KIDS1)/3$$

Where EDBKT, MARR1, and KIDS1 are obtained from the questionnaire and re-classified as below:

EDBKT: "What is the highest grade of school or year of college you completed?"

1. "Grade 17 with college degree"

   "Grades 13-16 with college degree"

2. "Grades 13-17 with no college degree"

3. "Grades 0-12 with high school diploma"

   "Grades 0-12 and no high school diploma"

This translates to:

1. Higher education 2. Intermediate education 3. Lower education

MARR1: Marital Status - 1. "Married"

3. "Not currently married"

KIDS1: "Number of household members who are 17 years of age or younger"

1. "One or more 17 or under"
3. "None"

The new variable SN has three factor levels, viz:

1. High exposure to social norm.
2. Moderate exposure to social norm.
3. Low exposure to social norm.

The logic behind defining "social norm" this way is that respondents who are married, for instance, are prone to some normative behaviour attributable to their spouse while those who are not married have no basis for this kind of behaviour. The task is to find out whether or not this variable systematically leads to formation of intention to buy a personal computer.

- *Income (INCBKT)*

Family income group, denoted by INCBKT, consists of five levels as shown below:

1. "$75,000 or more"
2. "$50,000 - $74,999"
3. "$35,000 - $49,999"
4. "$20,000 - $34,999"
5. "Under $20,000"

- *Expectation (EXPECTN)*

This variable, which we abbreviate as EXPECTN, is similar to the Index of Consumer Expectations (ICE) prepared annually by the Survey Research Centre's *Surveys of Consumers:*

ICE = [(RPEXP + RBUS12 + RBUS5)/4.1134 + 2.0]

The denominator on the right hand side of the above equation, i.e. 4.1134, represents the 1966 base period total while 2.0 is a constant to correct for sample design changes from the 1950s. This is so because the centre has conducted series of surveys since 1946.

EXPECTN is made up of five levels and is calculated as follows:

EXPECTN = 0.5 (RPEXP) + 0.3 (RBUS12) + 0.2 (RBUS5)

where the three variables on the RHS of the equation are based on the following questionnaire items:

RPEXP: "Now looking ahead – do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?"

1. "Will be better off"
3. "Same"
5. "Will be worse off"

RBUS12: "Now turning to business conditions in the country as a whole – do you think that during the next 12 months we'll have good times financially, or bad times, or what?"

1. "Good times"
2. "Good with qualifications"
3. "Pro-Con"
4. "Bad with qualifications"
5. "Bad times"

RBUS5: "Looking ahead, which would you say is more likely – that in the country as a whole we'll have continuous good times during the next 5 years or so, or that we will have periods of widespread unemployment or depression, or what?"

1. "(Continuous) good times; boom; prosperity; no recession"
2. "Good times, qualified (not bad); pretty good, no unemployment, no depression"
3. "Pro-Con; some recession, some unemployment, periods of unemployment"
4. "Bad times, qualified (not good); recession; bad at some times but not most of the time; periods of widespread unemployment; some depression; unemployment"
5. "Bad times, depression; widespread unemployment"

We consider RPEXP, RBUS12, and RBUS5 respectively as personal financial expectation, short-term economic expectation, and medium-term economic expectation and use them to compute EXPECTN as earlier stated, with the resulting levels of the factor given by:

1. High expectation
2. Fairly high expectation
3. Even expectation
4. Fairly low expectation
5. Low expectation

- *PC Usage at Work (RPCUSAGE)*

This is an occupational variable, denoted by RPCUSAGE, with two levels. Whether a respondent has access to a personal computer in the office or not will depend on the nature of his job. The relevant question is as re-coded below:

"Do you personally use a PC at your place of employment, does your job not involve the use of a personal computer, or do you not work outside of your home?"

1. "Yes, use PC at work"

   "Yes, but only use PC in home-based business"

2. "No, do not use PC at work"

   "Not working outside the home"

APPENDIX 5

GLIM PROGRAM TO TEST THE REASONED ACTION THEORY

FILENAME: 'H:\MODEL1.JOU'

```
$SUBFILE SF1 $
$PAGE ON $
$TRANSCRIPT (STYLE = -1) ORDINARY $
$ACCURACY 0 1 $
$FORMAT (43F8.0) $
$UNITS 602 $
$DATA CASEID YYMM RYYMM PEXP BUS12 BUS5 RATES INCEXP INCHNG MKTPC
      RPEXP RBUS12 RBUS5 RRATES RINCEXP RINCHNG RMKTPC PINT OWN
      OWN2 ROWN ROWN2 NEWPC INCOPEN INCBKT SEX AGEBKT EDBKT
      KIDS1 MARR1 PINTP GDTIME1 GDTIME2 INTUSAG INTREST PCUSAGE
      RINTUSAG RINTREST RGDTIME1 RGDTIME2 UTLTYHM RPCUSAGE
      RUTLTYHM $
$DINPUT 'H:\INTEL4_1.DAT' $
$RETURN $
!
$SUBFILE SF2 $
$TIDY CASEID YYMM RYYMM PEXP BUS12 BUS5 RATES INCEXP INCHNG MKTPC
      RRATES RINCEXP RINCHNG OWN OWN2 ROWN ROWN2 INCOPEN SEX
      AGEBKT PINTP GDTIME1 GDTIME2 INTUSAG INTREST PCUSAGE
      RINTUSAG RINTREST RGDTIME1 RGDTIME2 UTLTYHM $
$RETURN $
!
$SUBFILE SF3 $
$CALC I = %IF(RMKTPC = = 99 ? RUTLTYHM = = 99 ? EDBKT = = 99 ?
      INCBKT = = 99 ? RPEXP = = 99 ? RBUS12 = = 99 ? RBUS5 = = 99
      ? RPCUSAGE = = 99, 0, 1) $
$PICK RMKTPC, RUTLTYHM, EDBKT, KIDS1, MARR1, INCBKT, RPEXP, RBUS12,
      RBUS5, RPCUSAGE, NEWPC, PINT  I $
$CALC AB = %TR (0.4*RMKTPC + 0.6*RUTLTYHM) $
   : SN = %TR ((EDBKT + KIDS1 + MARR1)/3) $
   : EXPECTN = %TR (0.5*RPEXP + 0.3*RBUS12 + 0.2*RBUS5) $
$RETURN $
!
$SUBFILE SF4 $
$ACCURACY 4 3 $
$YVAR PINT $    ! The yvariate is NEWPC when purchase behaviour is chosen as the
                ! dependent variable
!
$FAC AB 3 SN 3 INCBKT 5 EXPECTN 5 RPCUSAGE 2 $
$ERROR B N $LINK G $
$SCALE 0.0 CHISQUARED $
$RETURN $
!
$SUBFILE SF5 $
$FIT (AB + SN + INCBKT + EXPECTN + RPCUSAGE) $
$NUMBER DV0 = %DV : DF0 = %DF : PV0 $
```

```
$CALC PV0 = 1 - %CHP (DV0, DF0) $
$PRINT' DEVIANCE FOR THE MODEL (AB + SN + INCBKT + EXPECTN +
      RPCUSAGE) =' DV0' ON' DF0' DEGREE(S) OF FREEDOM WITH
      CORRESPONDING P-VALUE =' PV0 $
!
$FIT - RPCUSAGE $
$NUMBER DV1 = %DV : DF1 = %DF : PV1 : DV_RPCUS : DF_RPCUS : PV_RPCUS
$
$CALC DV_RPCUS = DV1 - DV0 : DF_RPCUS = DF1 - DF0 $
      : PV_RPCUS = 1 - %CHP (DV_RPCUS, DF_RPCUS) $
$PRINT' DEVIANCE ATTRIBUTABLE TO RPCUSAGE =' DV_RPCUS' ON'
      DF_RPCUS' DEGREE(S) OF FREEDOM WITH CORRESPONDING P-VALUE
      =' PV_RPCUS $
!
$FIT - EXPECTN $
$DISPLAY D E $
$NUMBER DV2 = %DV : DF2 = %DF : PV2 : DV_EXP : DF_EXP : PV_EXP $
$CALC DV_EXP = DV2 - DV1 : DF_EXP = DF2 - DF1 $
   : PV2 = 1 - %CHP (DV2, DF2) $
   : PV_EXP = 1 - %CHP (DV_EXP, DF_EXP) $
$PRINT' DEVIANCE ATTRIBUTABLE TO EXPECTN =' DV_EXP' ON' DF_EXP'
      DEGREE(S) OF FREEDOM WITH CORRESPONDING P-VALUE ='
      PV_EXP $
!
    :' DEVIANCE FOR THE MODEL (AB + SN + INCBKT) =' DV2' ON' DF2'
      DEGREE(S) OF FREEDOM WITH CORRESPONDING P-VALUE =' PV2 $
!
$FIT - INCBKT $
$DISPLAY D E R $
$NUMBER DV3 = %DV : DF3 = %DF : PV3 : DV_INCOM : DF_INCOM $
    : PV_INCOM $
$CALC DV_INCOM = DV3 - DV2 : DF_INCOM = DF3 - DF2 $
   : PV3 = 1 - %CHP (DV3, DF3) $
   : PV_INCOM = 1 - %CHP (DV_INCOM, DF_INCOM) $
$PRINT' DEVIANCE ATTRIBUTABLE TO INCBKT =' DV_INCOM' ON' DF_INCOM'
      DEGREE(S) OF FREEDOM WITH CORRESPONDING P-VALUE ='
      PV_INCOM $
!
    :' DEVIANCE FOR THE MODEL (AB + SN) =' DV3' ON' DF3'
      DEGREE(S) OF FREEDOM WITH CORRESPONDING P-VALUE =' PV3 $
!
$FIT - SN $
$NUMBER DV4 = %DV : DF4 = %DF : PV4 : DV_SN : DF_SN : PV_SN $
$CALC DV_SN = DV4 - DV3 : DF_SN = DF4 - DF3 $
     : PV_SN = 1 - %CHP (DV_SN, DF_SN) $
$PRINT' DEVIANCE ATTRIBUTABLE TO SN =' DV_SN' ON' DF_SN' DEGREE(S)
      OF FREEDOM WITH CORRESPONDING P-VALUE =' PV_SN $
!
$FIT - AB $ !
$NUMBER DV5 = %DV : DF5 = %DF : PV5 : DV_AB : DF_AB : PV_AB $
$CALC DV_AB = DV5 - DV4 : DF_AB = DF5 - DF4 $
      : PV_AB = 1 - %CHP (DV_AB, DF_AB) $
```

```
$PRINT' DEVIANCE ATTRIBUTABLE TO AB=' DV_AB' ON' DF_AB' DEGREE(S)
      OF FREEDOM WITH CORRESPONDING P-VALUE =' PV_AB $
$RETURN $
!
$COMMENT  The procedure and syntax for fitting the other models are similar to those
of SF5 above $
!
$FINISH $
```

APPENDIX 6

GLIM PROGRAM TO IMPROVE THE ORIGINAL MODEL USING PURCHASE INTENTION AS AN EXPLANATORY VARIABLE AND A DIFFERENTIAL WEIGHTING SCHEME

FILENAME: 'H:\MODEL2.JOU'

```
$INPUT 'H:\MODEL1.JOU' SF1 SF2 SF3 $
$CALC W = %IF(PINT==0 & NEWPC==1 ? PINT==1 & NEWPC==0, 0.75, 1) $
$WEIGHT W $
!
$CALC PINTX = %IF(PINT == 0, 1, 2) $
$LOOK PINTX $
!
$ACCURACY 4 3 $
$YVAR NEWPC $
$FAC PINTX 2 AB 3 SN 3 INCBKT 5 EXPECTN 5 RPCUSAGE 2 $
$ERROR B N $LINK G $
$CALC N = 1 $
!
$COMMENT The same incremental modelling procedure used in the previous
         analysis is also employed here for model fitting and to assess the
         influence of the predictor variables $
!
$FINISH $
```

APPENDIX 7A

LOGIT MODEL SUMMARY BY VARIABLE TYPE

	PURCHASE INTENTION AS THE DEPENDENT VARIABLE		PURCHASE BEHAVIOUR AS THE DEPENDENT VARIABLE	
	Scaled Deviance	P-Value	Scaled Deviance	P-Value
1. PC Usage at Work (RPCUSAGE)	0.2192	0.6397	1.608	0.2048
2. Consumer Expectation (EXPECTN)	8.466	0.0759	4.884	0.2994
3. Income Group (INCBKT)	8.845	0.0651	23.43	0.0009
4. Social Norm (SN)	0.4939	0.7812	6.338	0.0420
5. Attitude towards PC purchase (AB)	26.73	0.0008	19.11	0.0009
6. AB.INCBKT.EXPECTN	11.7	0.9870	9.423	0.8030
7. INCBKT.EXPECTN	25.39	0.0632	18.92	0.2728
8. AB.EXPECTN	7.575	0.3716	4.977	0.6627
9. AB.INCBKT	10.58	0.2266	12.45	0.1322

NB: Extreme p-values can sometimes occur due to the fact that the scaled deviance is only asymptotically distributed as chi-square. More emphasis is therefore placed on the value of the scaled deviance than the p-value in making assessments.

APPENDIX 7B

LOGIT MODEL SUMMARY BY VARIABLE TYPE: MISSING OBSERVATIONS EXCLUDED

	PURCHASE INTENTION AS THE DEPENDENT VARIABLE		PURCHASE BEHAVIOUR AS THE DEPENDENT VARIABLE	
	Scaled Deviance	P-Value	Scaled Deviance	P-Value
1. PC Usage at Work (RPCUSAGE)	0.9576	0.3278	1.591	0.2072
2. Consumer Expectation (EXPECTN)	7.667	0.1046	5.225	0.2649
3. Income Group (INCBKT)	8.78	0.0668	27.98	0.0008
4. Social Norm (SN)	0.6588	0.7194	5.402	0.0671
5. Attitude towards PC purchase (AB)	19.09	0.0009	10.66	0.0049
6. AB.INCBKT.EXPECTN	6.5	0.9800	9.103	0.6124
7. INCBKT.EXPECTN	23.07	0.0826	21.06	0.1351
8. AB.EXPECTN	1.768	0.9716	2.475	0.929
9. AB.INCBKT	5.473	0.6024	5.53	0.5955

APPENDIX 7C

LOGIT MODEL SUMMARY BY LINEAR STRUCTURE

	SCALED DEVIANCE: PURCHASE INTENTION AS THE DEPENDENT VARIABLE		SCALED DEVIANCE: PURCHASE BEHAVIOUR AS THE DEPENDENT VARIABLE	
	Missing Observations Estimated	Missing Observations Excluded	Missing Observations Estimated	Missing Observations Excluded
1. AB+SN	448.3	351.7	446.3	355.4
2. AB+SN+AB.SN	438.6	347.2	431.7	342.9
3. AB+SN+INCBKT+ +EXPECTN+RPCUSAGE	430.8	334.3	416.4	320.6
4. AB+INCBKT	442.0	346.9	423.4	327.6
5. AB+SN+INCBKT	439.4	344	422.9	327.4
6. AB+INCBKT+EXPECTN	433.8	338.4	418.6	322.4
7. AB+INCBKT+EXPECTN+ +AB.INCBKT+ +AB.EXPECTN+ +INCBKT.EXPECTN+ +AB.INCBKT.EXPECTN	390.2	308	372.8	284.3
8. AB+INCBKT+ +INCBKT.EXPECTN	418.0	319.6	401.8	303.5

APPENDIX 7D

LOGIT MODEL SUMMARY BY VARIABLE TYPE: PURCHASE INTENTION AS AN EXPLANATORY VARIABLE

	MISSING OBSERVATIONS ESTIMATED		MISSING OBSERVATIONS EXCLUDED	
	Scaled Deviance	P-Value	Scaled Deviance	P-Value
1. PC Usage at Work (RPCUSAGE)	1.711	0.1908	1.17	0.2794
2. Consumer Expectation (EXPECTN)	4.902	0.2975	5.38	0.2505
3. Income Group (INCBKT)	16.86	0.0021	23.57	0.0009
4. Social Norm (SN)	8.566	0.0138	5.566	0.0618
5. Attitude towards PC purchase (AB)	9.084	0.0107	6.65	0.036
6. Purchase Intention (PINTX)	54.58	0.0008	30.75	0.0008

APPENDIX 7E

LOGIT MODEL SUMMARY BY LINEAR STRUCTURE: PURCHASE INTENTION AS AN EXPLANATORY VARIABLE

	SCALED DEVIANCE			
	MISSING OBSERVATIONS ESTIMATED		MISSING OBSERVATIONS EXCLUDED	
	Unweighted Model	Weighted Model	Unweighted Model	Weighted Model
1. AB+SN	446.3	-	355.4	-
2. PINTX + AB + SN	399.6	331.4	328.4	273
3. PINTX+AB+INCBKT	384.3	319.3	305.7	254.2

APPENDIX 8A

DIAGNOSTIC REPORT OF UNIVARIATE MODEL FOR THE GROUP OF "INTENDERS"

Explanatory Variable	Prediction Error Variance	Normality	Hetero-scedasticity	Durbin Watson (DW)	Coefficient of Determination (R^2)	P-Values		
						Stochastic Level	Ypx_{t-1}	Explanatory Variable
Xp70	0.0002552	0.31727	0.018467	2.702	0.98748	0.0005	0.0822	0.0308
Xp71	0.0002536	0.31769	0.018733	2.703	0.98756	0.0005	0.0892	0.0305
Xp72	0.0002530	0.31785	0.018835	2.704	0.98759	0.0006	0.0975	0.0304
Xp73	0.0002534	0.31773	0.018757	2.703	0.98757	0.0006	0.1073	0.0305
Xp74	0.0002551	0.31729	0.018484	2.702	0.98749	0.0006	0.1189	0.0308
Xp75	0.0002580	0.31653	0.018005	2.700	0.98734	0.0006	0.1325	0.0313
Xp76	0.0002624	0.31541	0.017311	2.697	0.98713	0.0007	0.1487	0.0320
Xp77	0.0002684	0.31393	0.016400	2.693	0.98684	0.0007	0.1678	0.0330
Xp78	0.0002761	0.31207	0.015275	2.688	0.98646	0.0008	0.1903	0.0343
Xp79	0.0002859	0.30982	0.013946	2.681	0.98598	0.0009	0.2165	0.0360
Xp80	0.0002979	0.30721	0.012432	2.673	0.98539	0.0010	0.2469	0.0381
Xp81	0.0003125	0.30424	0.010762	2.664	0.98467	0.0011	0.2818	0.0407
Xp82	0.0003300	0.30096	0.008979	2.652	0.98381	0.0013	0.3212	0.0438
Xp83	0.0003509	0.29745	0.007139	2.639	0.98279	0.0015	0.3649	0.0476
Xp84	0.0003757	0.29380	0.005311	2.623	0.98157	0.0019	0.4124	0.0522
Xp85	0.0004050	0.29018	0.003583	2.604	0.98013	0.0023	0.4629	0.0577

APPENDIX 8B

DIAGNOSTIC REPORT OF UNIVARIATE MODEL FOR THE GROUP OF "NON-INTENDERS"

Explanatory Variable	Prediction Error Variance	Normality	Hetero-scedasticity	Durbin Watson (DW)	Coefficient of Determination (R^2)	P-Values		
						Stochastic Level	Ypz_{t-1}	Explanatory Variable
Zp70	0.0005448	0.53073	0.85353	1.312	0.98457	0.0274	0.2615	0.1224
Zp71	0.0004916	0.53103	0.80349	1.273	0.98608	0.0243	0.2525	0.1077
Zp72	0.0004394	0.52838	0.75653	1.235	0.98755	0.0212	0.2414	0.0935
Zp73	0.0003886	0.52266	0.71243	1.198	0.98899	0.0183	0.2278	0.0799
Zp74	0.0003394	0.51381	0.67095	1.161	0.99039	0.0154	0.2117	0.0670
Zp75	0.0002921	0.50184	0.63189	1.126	0.99173	0.0127	0.1929	0.0550
Zp76	0.0002472	0.48693	0.59509	1.091	0.99300	0.0102	0.1714	0.0439
Zp77	0.0002048	0.46933	0.56036	1.059	0.99420	0.0079	0.1476	0.0340
Zp78	0.0001654	0.44946	0.52757	1.028	0.99531	0.0060	0.1218	0.0253
Zp79	0.0001294	0.42785	0.49658	1.000	0.99634	0.0042	0.0951	0.0179
Zp80	0.0000970	0.40514	0.46728	0.973	0.99725	0.0028	0.0689	0.0118

APPENDIX 8C

DIAGNOSTIC REPORT OF BIVARIATE MODEL FOR BOTH GROUPS

Explanatory Variables	Prediction Error Variance	Normality	Hetero-scedasticity	Durbin Watson (DW)	Coefficient of Determination (R^2)	P-Values	
						Stochastic Level	Explanatory Variables
Xp79	0.004479	0.90437	0.12787	0.30922	0.84163	0.0000	0.0013
Zp76	0.010866	0.66851	0.14156	0.19184	0.82292	0.0001	0.0052
Xp79	0.004504	0.89826	0.13584	0.30925	0.84075	0.0000	0.0011
Zp77	0.010745	0.67511	0.15002	0.19476	0.82488	0.0001	0.0043
Xp79	0.004531	0.88965	0.14452	0.30927	0.83979	0.0000	0.0010
Zp78	0.010630	0.67978	0.15920	0.19778	0.82676	0.0001	0.0035
Xp80	0.004385	0.91348	0.12740	0.32258	0.84494	0.0000	0.0017
Zp76	0.010899	0.67215	0.14138	0.19251	0.82238	0.0002	0.0072
Xp80	0.000752	0.28202	0.05395	1.235	0.96309	0.0017	0.0082
Zp77	0.000928	0.42708	0.02550	1.254	0.97371	0.0009	0.0051
Xp80	0.004437	0.89657	0.14383	0.32262	0.84312	0.0000	0.0013
Zp78	0.010656	0.68315	0.15888	0.19872	0.82634	0.0002	0.0050
Xp81	0.004293	0.92074	0.12723	0.33713	0.84822	0.0000	0.0021
Zp76	0.010942	0.67689	0.14145	0.19291	0.82168	0.0003	0.0099
Xp81	0.004317	0.91237	0.13496	0.33721	0.84736	0.0000	0.0019
Zp77	0.010814	0.68332	0.14975	0.19613	0.82376	0.0003	0.0083
Xp81	0.004344	0.90148	0.14342	0.33719	0.84642	0.0000	0.0017
Zp78	0.010691	0.68765	0.15880	0.19944	0.82576	0.0002	0.0069

APPENDIX 8D

DIAGNOSTIC REPORT OF UNIVARIATE MODEL BASED ON THE THEORY OF REASONED ACTION

Explanatory Variable	Prediction Error Variance	Normality	Hetero-scedasticity	Durbin Watson (DW)	Coefficient of Determination (R^2)	P-Values	
						Stochastic Level	Explanatory Variable
Xp75	92.3	0.28384	0.10924	1.314	0.79449	0.9214	0.1325
Xp76	90.6	0.28202	0.12904	1.358	0.79838	0.9669	0.1289
Xp77	89.0	0.28125	0.15190	1.406	0.80199	0.9880	0.1255
Xp78	87.5	0.28194	0.17845	1.455	0.80529	0.9438	0.1225
Xp79	86.2	0.28450	0.20944	1.506	0.80823	0.9010	0.1198
Xp80	85.0	0.28938	0.24592	1.560	0.81080	0.8597	0.1175
Xp81	84.0	0.29701	0.28925	1.614	0.81293	0.8206	0.1156
Xp82	83.3	0.30772	0.34135	1.670	0.81460	0.7838	0.1141
Xp83	82.8	0.32174	0.40495	1.726	0.81576	0.7497	0.1130
Xp84	82.5	0.33912	0.48409	1.782	0.81636	0.7185	0.1125
Xp85	82.5	0.35964	0.58510	1.837	0.81635	0.6904	0.1125

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