VALUING OUR CUSTOMERS

by

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Contents

Acknowledgements

1. Introduction

Customers are the life blood of our business, yet the actuarial profession only has well developed tools to value policies. We should analyse and understand the customer relationship risks better.

The paper proposes and illustrates a customer focused business model to enable customer valuation. Methods of measuring and monitoring customers' potential value to the company and how it is realised are explored.

1.1 We firmly believe the future success of our industry depends on a customer focused approach to all aspects of the business, including financial management.

1.2 The title of our paper can be taken two ways. This appeals to us. Although here we will be concentrating on a meaning of "numerical measurement", we would like our readers to recognise the importance of the other meaning, which is to treat our customers as important to us. Indeed, a key justification for the approach we advocate is that how we deal with our customers can make a difference.

1.3 For reasons which we hope will become apparent throughout this paper, the principles we put forward apply whatever methods of distribution you employ, be it direct, tied salesforce, independent advisers, or whatever.

1.4 Since we first started looking into this subject in 1995, we have become increasingly excited and intrigued by it. Looked at holistically, it permeates all aspects of the way we do business. From business acquisition through to servicing and claims. From data capture to data uses. From customer proposition (not product!) design and pricing to valuation methods. From adviser recruitment through to reward design.

1.5 We have decided to restrict the focus for this paper almost entirely to one of the specialist domains of the actuary - business modelling and valuation. But we are eager that readers familiarise themselves with other aspects which have traditionally been seen as the domain of the marketer or statistician. In order for there to be a successful application of our customer valuation techniques, customer information will need to be collected, analysed and categorised.

1.6 We recognise that our enthusiasm will not necessarily be immediately shared by others. Some scepticism is almost inevitable with anything in any way new nor untried. By suggesting that our proposals are neither fundamentally new nor untried, we hope to convince many readers of the merit of a customer value approach, using information about customers previously unavailable or ignored.

1.7 In what follows we:

- Summarise the shift of power over time in the provider / distributor / customer relationship and the need for providers to align their fortunes with those of their customers.
- Give a brief history of valuation methods and the logic for a customer valuation.
- Set out some Key Concepts that underpin all that is in this paper
- Postulate a Customer Value Business Model.
- Provide an illustration of how the approach might be applied in managing insurance businesses, and
- Leave readers with some things to think about that have hit us as a result of undertaking the research leading to this paper.

1.8 If you are in essential disagreement with our comments, then read on closely. If you are on our side then you can perhaps afford to be more selective.

2. The Provider/Distributor/Customer Relationship

2.1 Traditionally, life assurance companies have focused on their relationship with the intermediaries who sell their Product. The mathematical/ actuarial consequences of this can be quickly summarised by reference to Game Theory.

2.2 Game Theory originated in 1944 as a method to use mathematics to describe the structure of games and how people play them. In this context economic behaviour can be analysed as if it were a sophisticated game.

2.3 Conventional modern actuarial mathematics effectively has its origin in a branch of Game Theory. The model on which all product design, pricing and profit objectives were based, together with remuneration systems for agents and, in particular, early surrender values to policyholders, viewed the game as follows.

2.4 There were three players in the game:

- the insurance company wishing to make a profit from providing the products,
- the distributor wishing to make a profitable living by selling them, and
- the customer wishing to address his insurance and savings needs by buying them.

2.5 In a three player game of this kind, Game Theory predicts that the two strongest players will work together, effectively to the detriment of the weakest player. This is indeed what happened. Products were not priced to meet customer requirements. They were priced on a 'cost plus basis'.

2.6 Basically the argument went something like the following:

- The distributor can influence the customer to buy much more effectively than the company can. So the company needs to keep the distributor happy.
- How much does the distributor need to live on?
- How many sales can he make each month?
- What is the average size case that he will write?
- Therefore, from this information how much income does he need to make from each sale?

2.7 From this information then work out the pricing of the contract such that these costs are recouped together with the costs the insurance company will incur. Add a further margin to deliver the required company profit. Minimise the risk to the insurance company by a combination of tough early surrender values and commission either

paid on the drip or, if on indemnity terms, then reclaimable in the event of an early termination. For the agent, earn his commission as quickly as possible so that the period during which he is vulnerable to early lapse is cut to the bare minimum. The end result is the lion's share of the risk involved in the transaction not working out to everyone's satisfaction fell on the customer, the agent was probably the next most affected and the insurance company the least affected.

2.8 The UK went through a Utopian period until the abolition of life assurance premium relief (LAPR) in 1984. Most of the business was actually transacted in the environment of a four player game - with the fourth player being the Inland Revenue. The perceived subsidy that the Revenue gave through LAPR allowed the company and the distributor to take their slice and still give attractive returns to the customer - the Inland Revenue was footing the bill. Such days do not last for ever!

2.9 Markets evolve and customers' knowledge and negotiating power can change over time. The customer has a strong relatively new ally in the regulator - in various shapes and forms such as under the auspices of the Financial Services Act but also through the Office of Fair Trading. The negotiating power of the players in the game is changing. For some of the companies in the market place there is a very even balance. In yet others, the three player game has subtly changed with the disappearance of a separate distributor.

2.10 Well run companies need to achieve the right balance between shareholder return, good value to customers, and well looked after, appropriately incentivised and motivated employees and agents. If they are all to be satisfied with the relationship such companies need to be very efficient and effective in the way they operate. Working harder does not sustain a business for ever; working smarter is what can make the real difference. By being more efficient and effective, companies can share the value created amongst its principal stakeholders - its shareholders, its employees, its distributors and its customers. In Game Theory language, we are aligning the financial fortunes of the company more closely with those of the customer.

2.11 We believe that those companies that adopt a customer focus in all that they do will be those that will be successful. Actuaries have an important role to play as we demonstrate in this paper.

3. A Short History of Valuation Methods

3.1 It is natural to want to know what your business is worth. It is also natural for others to want to know the same thing. The technique used to derive a quantification of value should be as relevant as possible. It should, ideally, work from the key business drivers. The confidence with which it can be applied must also be of the utmost importance.

3.2 Market Value and related concepts

3.2.1 Prior to the 1970's, the value the market placed on a company was largely driven by looking at declared profits and dividends and making some assumption about potential growth in dividend payments in future years. The industry was seen as very stable and therefore future earnings could be predicted with some confidence. But this approach only applied to proprietary companies and then only those that had a listing on a stock exchange. The management of a mutual looked solely on a solvency valuation with all the margins for conservatism that entailed. The only purpose of valuing the company was to ensure that there was enough money to meet its contractual liabilities together with some reasonable expectation that future bonuses to with profit policyholders could be maintained.

3.2.2 Some people simply looked at what was known as 'free asset ratios' as an indicator of the strength of the insurance company and its ability to continue to pay attractive bonuses. It is probable that few people really understood what free asset ratios were relevant to. It is certainly true that a number of commentators failed to distinguish between with-profit and non-profit or unit linked businesses, where the desirable size of the ratio is radically different.

3.2.3 Companies published accounts showing shareholder funds. The difference between the market value and 'shareholder funds' was deemed to be the goodwill value of the company.

3.2.4 *This approach was basically a 'top down' method using high level summary information on the company.*

3.3 Embedded Value

3.3.1 A major development was the introduction of profit testing techniques which would show the cash flows likely on a *policy*. Thus, the owners of the business were able to ascertain whether the writing of various contract lines would be likely to provide the rate of return on the investment in that business (commonly known as the new business strain) that made writing that business worthwhile.

3.3.2 This development lead naturally on to the concept of embedded value. The embedded value in a financial services operation is the value placed on existing business because of the profit margins expected to arise on that block of business in the future. Embedded value takes into account what is likely to happen in the future on all the policies on the books of the company. The intention is that sensibly realistic assumptions are made about future experience with regard to persistency, claims rates, expenses and investment performance. The impact of new business is entirely ignored.

3.33 The change in embedded value, after adding back distributions to shareholders, has been widely adopted as the financial measure of the performance of a life insurance company.

3.34 *The identifying features of this approach were that it was primarily 'bottom up', using more detailed business data, and applied to existing policies only.*

3.4 Appraisal Value

3.4.1 By the 1980s, there was a growing need for a method to derive the equivalent of a market value for unquoted companies. Embedded value was insufficient in that it only considered business already written. Thus, the concept of appraisal value was born. However, the techniques applied to determine an appraisal value - which was intended to include an allowance for the value to be derived from writing future profitable new business - were not as robust or rigorous as the techniques that had been developed for determining the embedded value. Techniques were not sophisticated, largely applying a multiplier to the profit or the production achieved by the distribution capability in recent years. Analysts applied a 'feel' factor. Basically this was applying a judgement to the quality of the distribution capability and its robustness in different market conditions.

3.4.2 For example, there was a perceived wisdom that a distribution capability entirely dependent on independent intermediaries was going to be less stable than a controlled direct sales force. Thus, values of companies put more weight on the direct sales force capability. The feeling was the company had greater control over this distribution outlet. Analysts would also differentiate based on their perception of the quality of the company within the particular chosen distribution channel. But nevertheless the final outcome was a judgmental multiplier applied to some measure of recent performance. Instinctively, valuers were trying to factor in the quality of the operation, the relevance of its propositions and the control it had over its relationships, most notably its distribution capability.

3.4.3 One of the ironies has been that despite the very sound arguments about control of distribution that were used in determining appraisal values, generally speaking companies strong in the independent intermediary markets have seen a more stable distribution capability than the direct sales force orientated companies.

3.4.4 At first sight this is a real paradox. But if we probe deeper, we see very quickly that the supposed control that companies had over their distribution capability was in many cases illusory. In fact, the jealously guarded relationship that the sales person had with the customer if anything created a schism between the customer and the insurance company and the strength of the customer/company relationship was no stronger than that which existed when an independent intermediary was involved in the sale. This is an important point to bear in mind in constructing a customer focused approach to your business.

3.4.5 *The identifying features of this approach are that it is primarily a 'top down' method overlaid onto the embedded value 'bottom up' calculations applied to the existing policies.*

3.5 Customer Value

3.5.1 As we approach the Millennium, companies are making a concerted effort to learn more about their customers and how to do business with them. A customer value model and a customer based approach to valuation is needed to support this approach to business. To build such an approach is the logical extension to what actuaries have been doing in the past. The ability to analyse and process more and more relevant data, together with the computing power to support sophisticated, large models, makes all this possible now.

3.5.2 An existing or new customer treated properly is, one would think, an example of a potential source of future profitable new business. If a genuine relationship has been established and developed between your organisation and your customers it seems inevitable that it can lead to a number of future sales. It then becomes fundamentally important to recognise the value of the customer beyond the first product sale.

3.5.3 A Customer Value Business Model, as described in Chapter 5, will enable a more scientific assessment of a company's potential future profits from existing and future customers and hence its total value as a going concern. In time, it should become the method that replaces appraisal value.

3.5.4 *The identifying features of a customer value approach are that, unlike appraisal value, it is primarily 'bottom up', using more detailed business data, and applied to customers, unlike embedded value which only addresses existing policies. It permeates into all aspects of the business and affects all aspects of financial management.*

3.5.5 We believe the arguments for this approach are compelling.

4. Key Concepts

4.1   Game Theory

4.1.1   We have already referred to Game Theory in our introductory remarks. We start with it in this section because it is crucial to determining your approach to business. You need to decide which Game you will want to play, what its structure is likely to be and what that means for your economic propositions to customers and distributors.

4.1.2   There is very little about Game Theory in actuarial literature. Given our enthusiasm for it as the first plank for any strategic thinking, this is both disappointing and a little surprising. A simple model structure, as described in Chapter 2, was developed and has been used unquestioningly ever since its introduction over 30 years ago. Implicitly, it was assumed that the high level rules of the game would be the same - as defined by this three player model.

4.2   Data Mining

4.2.1   We like to think in terms of the image created by the word "mining". When mining in the physical sense, we are looking to find something valuable - for example gold, diamonds, coal, iron ore etc. When mining data, we are searching for valuable information. Information that will be worthwhile to our organisation and its customers. A whole range of modern technologies and computing power generally have made the potential for benefits derivable from data mining to be quite significant. We can mine for factual data, behavioural information and even for customer opinions and attitudes. These latter items are often described as soft data.

4.2.2   We suspect many people will be sceptical about our suggestion that we can mine for behavioural information and customer opinions and attitudes. We hope the following anecdote will encourage the sceptics to reappraise their thinking.

4.2.3   In France, mail order specialist Trois Suisse has developed a system that marries mail order customers' complaint letters with their transaction records. Normally customer letters get filed - and lost - while each transaction record provides precise details on purchases. By scanning the letters and adding them to the database, the grumblers who buy little can easily be separated from the high spenders that seldom complain. Make too much fuss, and you'll start to miss out on those special offers! The system identifies key words by subject and frequency and then cross references this to related topics, cross analyses the context and finds those that are relevant.

4.2.4 Effective data mining will enable us to build more and more useful and reliable Customer Profiles, profiles that are reliant on behavioural and attitudinal information as well as demographic.

4.3 Customer Profiles

4.3.1 Profiling can be thought of as classification of individuals by common attributes. This could be a one-off process, but is better served through a dynamic process of updating attribute information, indeed adding further attribute classification as new information allows. In the context of our paper, we envisage applying profiling techniques to classify, dynamically, our customer base, actual and potential, in ways which help us manage our business relationship with them better.

4.3.2 Actuaries have profiled their customer base for years, they just never called it that. The C.M.I. Reports contain experience data where customers have effectively been profiled by, amongst others, age, sex, smoking habit, product type, medical evidence obtained and occupation. Another example from a number of years ago involved one of the authors profiling customers and their relationship with their intermediary by reference to persistency risk.

4.3.3 However, profiling has been almost exclusively limited to attributes that we might describe as traditional insurance ones. In addition, we genuinely have been constrained by the limited knowledge we acquired about our customers and the limited processing power available to us to interpret any information we did have.

4.3.4 Nowadays there is a wealth of information available from outside commercial sources. Furthermore, the insurance industry is now beginning to recognise the potential of capturing information about their relationship with customers. For example, in 1995, the PIA in its Consumer Panel Report recognised the importance of distinguishing between what they described as 'hands-off' and 'hands-on' investors.

4.4 Customer Perceptions

4.4.1 We believe these should be included in the Customer Profiles one builds. Historically it has been difficult for companies to ascertain how their customers perceived their relationship with the company. This was because there was little meaningful contact with the customer. Information on any contact that was made was generally unavailable for every day business use. Mechanisms are now available to enable companies to better understand the perceptions their customers have of them and their products.

4.4.2 As an example, some interesting research has been conducted by Munich Re, Mintel and others into understanding customer product awareness.

4.4.3 A customer's perceptions are their reality. We maintain, therefore, that it is important to devote time and effort to understanding their perceptions and how company action can influence them. Simple models can help. As an example, we put forward a set of diagrams to illustrate a particularly important area of customer perception in Appendix 1.

4.5 Clustering

4.5.1 A technique for grouping together individuals with similar enough profiles. In the context of our paper, we are naturally enough talking about clustering customers. Sound statistical methods are applied to the data in order to derive the clusters and members of each cluster. Modelling can then describe the business by using profile model points based on the characteristics of the derived clusters. We envisage clustering being complemented and informed by a range of other statistical methods.

4.5.2 Clustering is another technical area where actuarial literature is sparse. The authors' research into this area has had to be entirely outside actuarial literature. We have had considerable success in applying clustering techniques to populations of intermediaries. This has strengthened our confidence in the assertion that the application of clustering techniques to customer relationship management will deliver significant financial benefits to companies.

4.6 Propensity Modelling

4.6.1 In order to scientifically derive the potential value of a relationship with the various clusters of customers, we need to make some assumptions about their likely future economic behaviour. This is what is known as Propensity Modelling. In a real practical way Propensity Models will form part of our definition of each cluster. Initially, the derivation of assumptions will involve a significant element of subjective judgement. However, one of the benefits of developing the appropriate model structure is that one's assumptions can be improved as more information becomes available. If you like, the model structure informs the nature of the information that needs to be collected and analysed.

4.6.2 It is reasonable to state that goodwill in a set of financial accounts represents the value of the propensities of current and potential future customers to do business with you. Historically methods of determining this have tended to be top down and therefore rather broad brush in approach. A bottom up approach, using customer attributes and predicted propensities will indicate where the company should be endeavouring to realise customer value.

4.7 Model Design

4.7.1 An appropriate working model design is crucial to a proper understanding and planning for the future of your business. Our preferred model structure encompasses not only key financial outcomes but also the key activities that will generate those outcomes. A good model will help manage future risks and provide a business map for your company's future.

4.7.2 Modelling has always been at the heart of actuarial science. Early model designs were driven by the limited processing power available to the actuary. Improved computing power has enabled actuaries to run more detailed and sophisticated models. It has enabled actuaries to run a number of "What if?" scenarios around the same model structure, thus enriching the understanding of the issues being modelled. These statements are illustrated by the evolution from commutation functions, through cash flow techniques to stochastic models.

4.7.3 Model design should take into account the uses to which the model will be put and the audience that the model is aiming at. We firmly believe that any model aimed at enhancing customer management should recognise how marketing and service departments will want to use the information it provides. Given the interest and understanding already developed around profiling and segmentation, we think it is natural to develop a "model points" based customer model. We do not think that a stochastic approach will help the actuaries communicate with marketing and administration. However, the model points must adequately describe the business and sound statistical techniques - primarily clustering - should be used to derive those model points.

4.7.4 Existing methods of valuation effectively use a model points approach. Taking into account extra customer data will simply enable deeper understanding of the customer relationship and of customer potential.
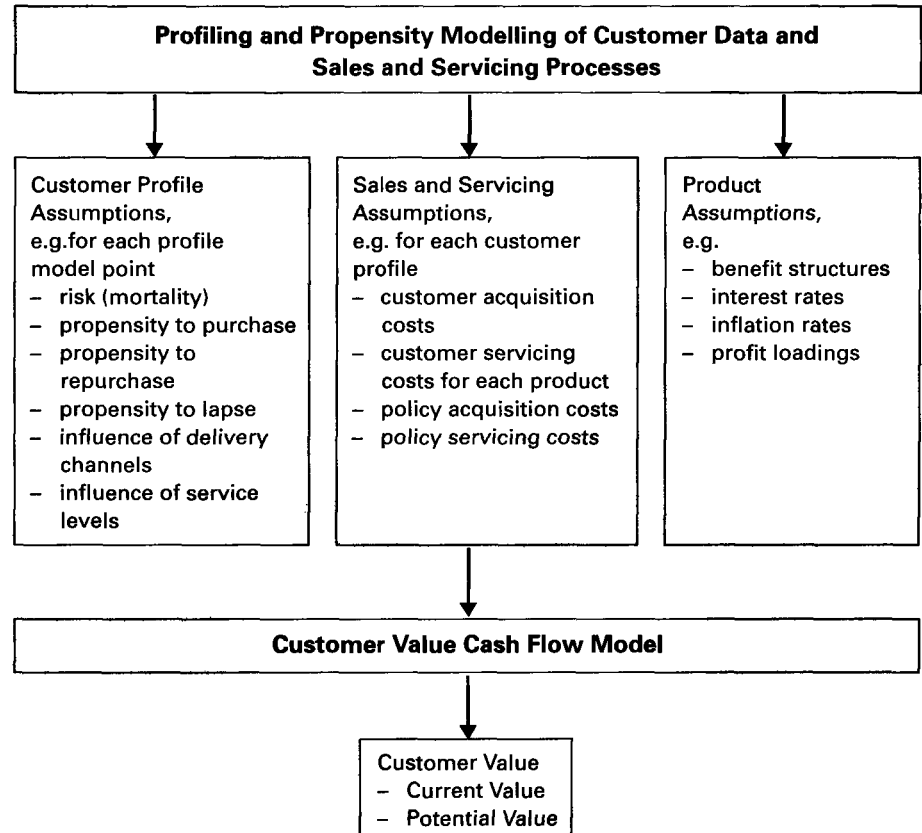
5. A Customer Value Business Model

A customer value business model can provide a powerful insight into the dynamics of your business. In understanding the potential value that each of your customers can deliver, and why, a customer strategy can be developed to maximise this potential for both existing and new customers.

5.1 Customer Value

5.1.1 Customers, existing and new, will be the source of a company's value. But not all customers are equal. They had different reasons for buying from you in the first place, their circumstances will be different and their experiences with you, however well you manage your customer relationships, are bound to differ. Within your customer base there will be those that only bought because of some price proposition as they perceived it. They do not see themselves as having a relationship with you or any other organisation. At the other end of the spectrum there will be customers that would be delighted to have an ongoing dialogue and continuing relationship with your company. In other words, your customers do behave differently and will respond differently to your attempts to develop a meaningful ongoing relationship with them. You cannot afford to provide a high level of service to customers who do not actually want it. You cannot afford not to provide such a level of service to those customers that want it and will manifestly demonstrate how much they want it through doing further business with you.

5.1.2 So, each existing customer has what we will define a 'potential value' over and above the value of the contracts already issued. This potential value will arise from further sales opportunities and referrals, these being influenced by the expectations your customers have of their relationship with you. This concept of potential value can equally be applied to future new customers who are attracted by the brand or a specific marketing initiative.

5.1.3 Once potential value is recognised, it is natural to think of your customers as an asset. It is natural to think in terms of optimising the customer asset. It is natural to manage your business from the perspective of managing your customer asset.

5.1.4 Targeted marketing of your sales and services will weigh the cost of provision against the as yet unrealised customer value, thus ensuring that the customer asset is optimised.

5.2 A Customer Value Model

5.2.1 To efficiently manage the customer asset by evaluating the impact of various management strategies on the total customer value, it becomes necessary to determine what each individual customer's asset value is and how it may be influenced. To achieve this we propose a customer value model. The diagram illustrated below gives an overview of the main features of such a model.

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│         Profiling and Propensity Modelling of Customer Data and   │
│                  Sales and Servicing Processes                    │
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        │                        │                        │
        ▼                        ▼                        ▼
┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐
│ Customer Profile │  │ Sales and        │  │ Product          │
│ Assumptions,     │  │ Servicing        │  │ Assumptions,     │
│ e.g.for each     │  │ Assumptions,     │  │ e.g.             │
│ profile          │  │ e.g. for each    │  │ – benefit        │
│ model point      │  │ customer         │  │   structures     │
│ – risk           │  │ profile          │  │ – interest rates │
│   (mortality)    │  │ – customer       │  │ – inflation rates│
│ – propensity to  │  │   acquisition    │  │ – profit loadings│
│   purchase       │  │   costs          │  │                  │
│ – propensity to  │  │ – customer       │  │                  │
│   repurchase     │  │   servicing      │  │                  │
│ – propensity to  │  │   costs for each │  │                  │
│   lapse          │  │   product        │  │                  │
│ – influence of   │  │ – policy         │  │                  │
│   delivery       │  │   acquisition    │  │                  │
│   channels       │  │   costs          │  │                  │
│ – influence of   │  │ – policy         │  │                  │
│   service        │  │   servicing costs│  │                  │
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│                 Customer Value Cash Flow Model                    │
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                  │ Customer Value        │
                  │ – Current Value       │
                  │ – Potential Value     │
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5.2.2 This is similar to a traditional actuarial cashflow model office but with an emphasis on customer specific assumptions. It is the customer specific assumptions, and their derivation, that allows the customer value model to encompass the broader aspects of sales and customer management, and thus evaluate how management actions impact the total customer asset.

5.2.3 The core of the model is a customer cash flow model, which requires as its inputs a range of assumptions related to customers, services and products. The customer cash flow model then generates an individual customer cash flow, the net present value of which is a measure of customer value.

5.3 Profiling and Propensity Modelling – Developing Assumptions

5.3.1 The starting point to successful management of customer value is an in- depth understanding of your customers. This will require looking beyond commonly held demographic data to specifically identifying customer behaviours in response to the services you offer. The need is to identify how customers react to a particular service or product proposition, be it a sales channel, a benefit structure, or a level of ongoing support and advice. Although the assumptions are illustrated under 3 groupings, we must recognise that they interact.

5.3.2 It is in the establishment of customer profile model points, representing groups of customers with common behaviour patterns, and the subsequent development of propensity models for these profiles, where the new effort lies. This becomes clear when you take a closer look at two of the key assumptions, the potential for future purchases and persistency.

5.3.3 Future purchases would be influenced by a range of customer attributes and attitudes which could include:

- lifestage
- wealth
- acceptance of need and acknowledgement of product value
- loyalty to provider / distributor
- reaction to various formats of selling and servicing

5.3.4 Persistency will be influenced by all the points listed in 5.3.3. But of specific interest would be the impact of various services, pro-active or re-active, that aim to manage lapse and surrender.

5.3.5 Expenses, and how they are analysed, is a major feature of the model assumptions. Expenses should be an accurate reflection of acquisition and servicing costs for customers and products separately – the model should recognise fixed and variable costs. Once this is done, a number of business issues can be properly evaluated. For example, the financial benefits of selling to the existing customer base can be accurately assessed.

5.3.6 Product assumptions drive the income to the business. In addition, benefit structure and design can play a role in the development of customer assumptions. Some product features will prove to be more attractive to certain customer profiles than they will be to others.

5.4   Customer Cash Flow Model – Calculating Customer Value

5.4.1   We define customer value as -

an estimate of the profit a company will earn from a customer over the remainder of the customer's lifetime.

This definition extends the value of a customer beyond the existing relationship. It looks forward to include the potential value that may be derived from the lifetime relationship.

5.4.2   In attributing a customer value to an individual customer, it will be necessary to estimate the value of future cash flows resulting from:

1. the customer's past purchases, 'Embedded Value' being the current customer value, and
2. the customer's future purchases, 'Goodwill Value' being part of the potential customer value

Further, the interpretation of customer value can be extended to include not only the direct future value of the customer but also the value of:

3. additional customers referred to the company by the customer, 'Referral Value' making up the remainder of the potential customer value

5.4.3   Policy embedded value is now a well accepted industry accounting method. Assumptions for risk, persistency, investment returns and expenses are made to derive a projection of the future cash flow to the company that will result from a policy. The cash flow is discounted at the shareholders' required rate of return and the resulting present value is the policy's embedded value. At any time during the policy term, a policy embedded value can be derived from the remaining cash flow, given the relevant assumptions.

5.4.4   The logical next step is to define a customer's Embedded Value to be the sum of the embedded values of all the customer's policies in force at the valuation date. However, we propose that the increasing volume and quality of customer data now becoming available should significantly influence the assumptions used to estimate the customers embedded value.

5.4.5   Goodwill Value derives from the values of policies yet to be purchased. Consequently, it is contingent upon whether or not a customer purchases the policies. In addition to the assumptions required to calculate embedded values, assumptions are required for the likelihood of policy purchases, their timing and the access channel used. These assumptions will also be based upon customer specific data.

5.4.6 Referral Value is similar to Goodwill Value but is derived from the embedded values of policies which might be purchased by other potential customers, should an existing customer refer them to the company in the future. In addition to the assumptions required to calculate embedded values and probabilities of purchasing, assumptions for the likelihood of referral by the customer are required to calculate Referral Values.

5.4.7 The output from the customer cash flow model will be the total customer value of the operation. This will be made up of current (embedded) and potential (goodwill and referral) customer value measured now and at various points in the future. This will be the financial measure of the customer asset.

5.5 The Customer Control Cycle

5.5.1 It will be crucial to monitor the performance of the customer value model in conjunction with the success of any customer management initiatives undertaken.

5.5.2 The general concept of the control cycle is a familiar one in financial services. The basic model involves an initial set of assumptions based on available past experience supported by relevant collateral data. Business projections are then prepared on the basis of these assumptions. At a later date the actual performance of the business is compared with that expected had the assumptions been realised. The symptom 'actual performance has not been as expected' must then be analysed in order to shed light on the underlying causes. This is done by breaking down overall performance into its component parts and analysing the deviation of each element from expected performance (the term 'analysis of surplus' is used in life insurance). The insights gained here are then used to refine the parameters employed resulting in increasingly robust projections of performance.

5.5.3 We firmly believe in the control cycle concept as a management tool but feel that only a fraction of the system's true potential is realised at present. The reason is that the scope of the system, as currently applied, is too narrow (it is only applied to policies) and the whole process is internally focused. Consequently, the risks and influences associated with the customer interactive aspects of the organisation (the marketing, sales and customer management processes) are outside the model.

5.5.4 The control cycle tells us how many policies have been sold but gives few clues as to why and it gives no information whatsoever about failed approaches. It tells us how many policies have lapsed but it would be useful if we knew if the lapses were avoidable or not (some may be accidents others may be avoidable by simple changes to premium/cover)

- were the customers satisfied with our products and service - would they buy from us again in the future? It would be even more useful if we were able to identify dissatisfaction and address it before lapses occurred. The current control cycle model provides very few insights into the reasons behind many of the key business outcomes.

5.5.5 We advocate a far broader customer based control cycle. The entry point to this system would be the first contact with a potential customer (rather than the sale of a policy). The system would recognise the types of customers being attracted by the company's marketing messages, the attributes and preferences of these contacts which impact the products and services to be offered and the way their relationship with the company should be managed. The system will enable the company to monitor its success in turning contacts into customers and beyond this into loyal customers and ultimately into advocates of the organisation - in short, extracting the lifetime value of customers.

5.5.6 A diagrammatic description of how such a system might appear is shown below:
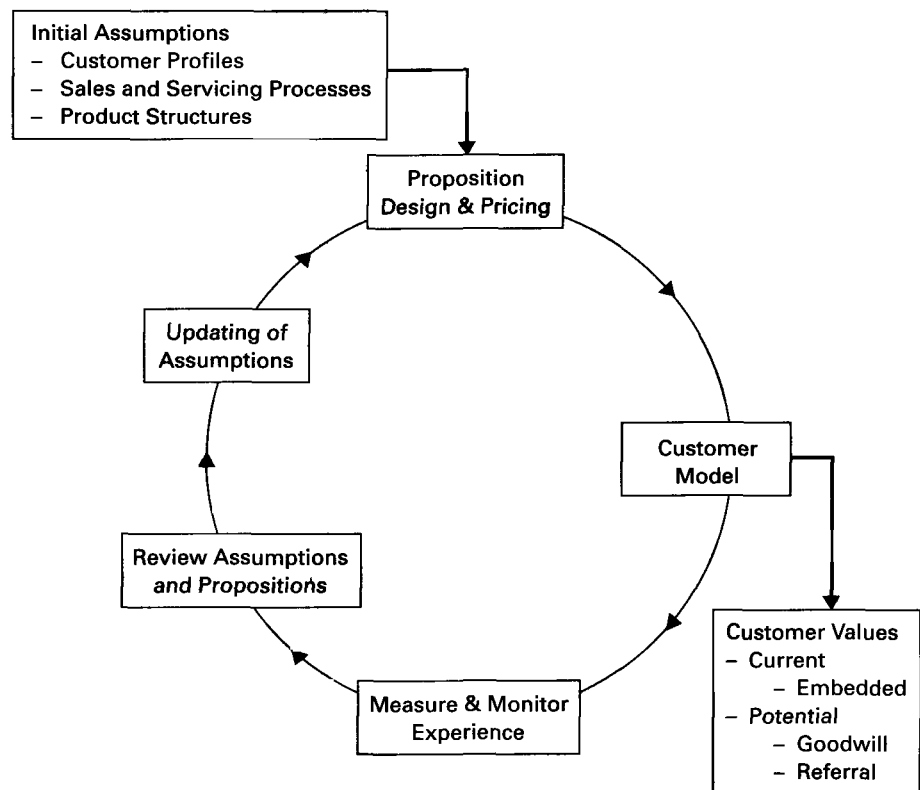
5.5.7 Appendix 2 briefly discusses how the emergence of value can, in practice, be monitored. The financial monitoring of a company, comparing actual results with expected, simply needs extending to include the potential to earn profits on future business conducted with its existing and prospective new customers.

5.6 The Sort of Questions a Customer Value Model Should Help Answer

5.6.1 How to evaluate the impact of introducing a new access channel for customers, perhaps a call centre. Customer profiling will indicate the preferences for access amongst potential customers both in terms of sales and service. This can be compared with the mix of profiles of current customers and those that have recently purchased. Customer value modelling would be used to give an indication of the potential value of new customers acquired through the new access channel, as well as the change in potential value of the existing customer base (from improvements in persistency and repurchase rates). This, when combined with the costs of introducing the new access channel and provision of the ongoing servicing, would provide financial input to the decision to introduce the channel and the strategy for how to market it.

5.6.2 How to evaluate the impact of a customer loyalty program. Different program designs will appeal to different customer profiles. Customer value modelling should be able to assist in designing a program which optimises the cost : benefit relationship.

5.6.3 How to determine the financial controls for the customer management process. Customer profiling will identify the customers we are likely to appeal to. Customer value modelling should determine how likely we are to attract each of the customer profiles and the potential value of these profiles given the servicing options available. This information can then be used to determine the optimal allocation of the customer acquisition budget between different customer profiles. It will also allow the development of financial rules that can be applied to individual customers e.g. cease attempts to acquire contact Harry Smith if acquisition spend to date exceeds 50% of his potential value.

5.7 Some Encouragement

5.7.1 What we are advocating is the development of a customer value business model that shifts the emphasis from managing by considering product profitability to managing by considering customer profitability. Such a business model will be reliant on a complex web of behavioural and attitudinal assumptions that at present have apparently little supporting data.
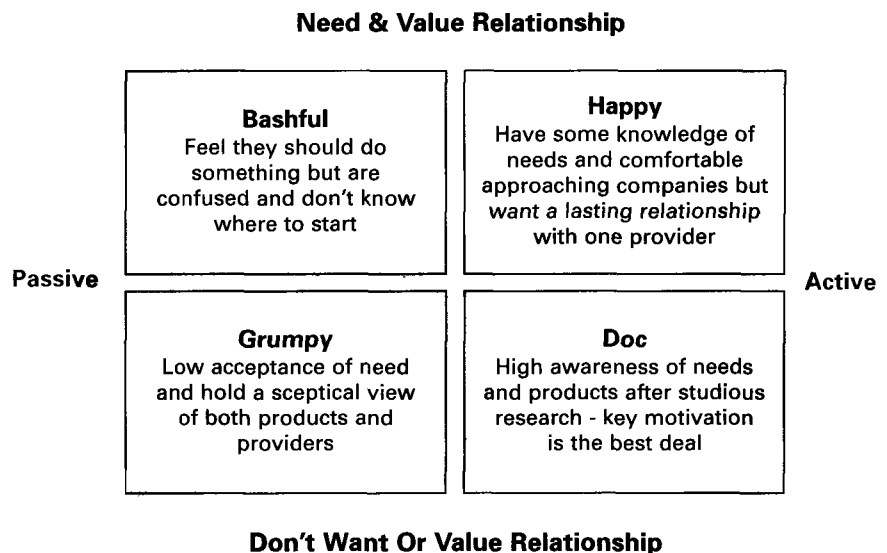
5.7.2 The process of model development will bring the data requirements into sharp focus and enable a clear data collection strategy to be developed such that over time the required stock of data will be amassed. Although this doesn't solve the problem of what data to use now, lack of data can be addressed using proven methods by which well reasoned assumptions can be employed to determine the initial parameters for the model. These initial estimated values can then be gradually replaced as the actual experience builds up.

5.7.3 Any company wishing to profitably develop its understanding of its customer relationships in this way must be clear that this is not a quick or easy task. But with careful consideration and planning, it is possible. It should always be remembered that the model need be no more complicated than is required to enable an evaluation of the key issues. We are already seeing many companies using various profiling techniques to segment their customer base for targeting of direct marketing campaigns, and it is in this area that quick hits can be achieved. But this is realising only a fraction of the potential.

5.7.4 We do not believe there is only one away to tackle the issue. We do believe that our approach represents a meaningful way forward. We also believe that there is more information out there than most of us have realised. We have been pleasantly surprised at what we have been able to discover and use in our modelling. We fervently believe that successful companies will develop effective systems to capture and use information unique to their relationship with their customers and thus further enhance the effectiveness of their customer management and valuation systems.

5.7.5 In the next chapter we have set out to bring some of the above concepts to life. By applying a series of customer valuations to a hypothetical life insurer, we aim to show how informed management of the business mix through targeted servicing and new product offerings can positively impact financial performance.

6. Snow White Life – An Example

6.1 The following illustrations have been prepared using a proven distribution modelling system together with a traditional cash flow profit testing system. The flexible structures of these systems enabled us to cater for some of the elements we felt were important in developing a customer model, whilst establishing a platform for development.

6.2 Initial Assumptions

6.2.1 Our first step was to establish a set of customer profiles based on how customers want to do business with a financial services provider.
The table below illustrates the profiles used (the names being based on well known Disney characters - the company is, of course, Snow White):

Need & Value Relationship

Bashful Feel they should do something but are confused and don't know where to start	**Happy** Have some knowledge of needs and comfortable approaching companies but want a lasting relationship with one provider
Grumpy Low acceptance of need and hold a sceptical view of both products and providers	**Doc** High awareness of needs and products after studious research - key motivation is the best deal

Passive ← → Active

Don't Want Or Value Relationship

6.2.2 Some implications for the customer management process from this simple classification are:

6.2.3 Bashful - the company must adopt a proactive approach to both establishing initial contact and then maintaining the relationship. Patience, empathy and clarity in all contact will be critical to success. The result may well be higher customer acquisition and servicing costs than for some other types. However, properly managed these could be your most loyal and ultimately profitable customers.

6.2.4 Happy - the company must provide excellent service to maintain the relationship. Important features are likely to be respect for the customer's knowledge, regular provision of information on current holdings, new opportunities and general financial issues and recognition of the customer's value.

6.2.5 Grumpy - these customers may ultimately be acquired but the costs of bringing them round will be high. Excellent relationship maintenance may improve their persistency but again at what cost. Ultimately, most of these customers will be loss makers and the company should identify and avoid them.

6.2.6 Doc - there will be little the company can do to influence the acquisition of these customers (other than offer the best financial deal and ensure that customers are aware of the availability of the company's products). The servicing approach must be efficient and professional whilst recognising that no amount of carefully considered management is likely to build loyalty.

6.2.7 Differences in some of the key attributes we might expect include:

- The more active customers would be expected to have a higher propensity to buy financial services products. However, once contact is established, the company might experience better relative conversion of the passive types - they are less likely to consider alternative providers.
- More active customers should buy earlier in their lifetimes.
- Those who value a relationship with their provider are more likely to exhibit better persistency.
- Repurchase rates should be higher for those who value a relationship.
- The potential to improve repurchase rates will be much greater for customers who value their relationship with the provider.

6.2.8 For the purpose of illustration, our modelling is based on 12 different customer profile model points - basically 1 each of Bashful, Happy, Grumpy & Doc taken at three possible ages at initial contact. This could easily be expanded further to allow for variation in marital and family status, income levels etc. but our purpose here is a simple illustration.

6.2.9 Snow White Life - headline model details :

- Customers are assumed to be males in Social Class II.
- A simplified portfolio of three products is considered namely, a conventional term assurance for protection, a unit linked endowment for mortgage repayment and a unit linked pension for retirement provision at age 60.
- Premium / sum assured varies by age reflecting both need and ability to pay (see Appendix 3 for details).

- A probability distribution of the propensity to buy each product at each age is assessed for each customer type. The overall level of probability depends on the customer type, but the shape, by age, is largely determined by need and hence the product (see Appendix 4 for details).
- Intrinsic defection rates are high for Doc and Grumpy - 13% p.a. but much lower for Bashful and Happy - 7% p.a.
- The contracts are priced for around 200% of LAUTRO commission for initial expenses and a profit margin of 20% of LAUTRO commission at 12% p.a. net discount.
- Loadings on unit linked contracts consist of a level deduction from premiums invested and an annual management charge on funds under management.
- 30% of customers are taken to be age 20 when they first have contact with the company, 50% age 35 and the final 20% age 50 at first contact.
- The initial mix of customer contacts is 25% of each of Bashful, Doc, Grumpy and Happy.
- We consider cohorts of 5,000 customer contacts per month.
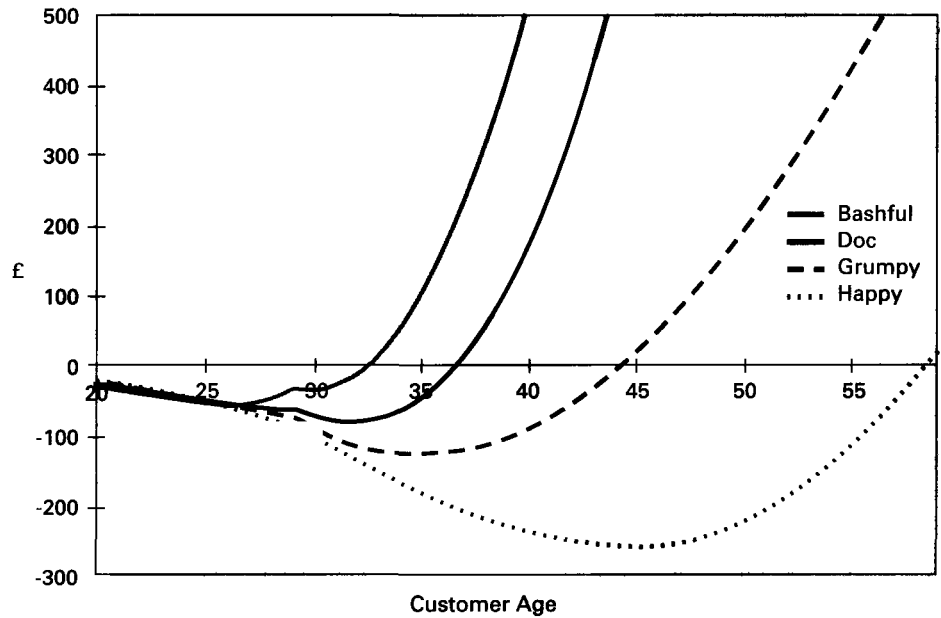
6.3 Baseline

6.3.1 Snow White Life is a competent current player in the life and pensions market but is unable to distinguish between its customer types in any meaningful way. Hence, it is unable to tailor its services closely to meet customer requirements. The inability to separate profitable and unprofitable customers means that there are significant inefficiencies in the targeting of the company's marketing and customer servicing spend.

6.3.2 Considering the totality of Snow White Life's customer relationships in perpetuity, we determine the total customer lifetime value of the company to be £35M in today's terms. We call this the company's customer equity.

6.4 Active Customer Management

6.4.1 Snow White Life now adopts a robust customer management strategy including customer profiling, modelling and monitoring.

6.4.2 The next chart illustrates the cumulative net profit (before any interest) which has emerged by each year for each customer type contacted at age 20.

500
400
300
200
100
0
-100
-200
-300

£

Customer Age

— Bashful
— Doc
- - Grumpy
.... Happy

25   30   35   40   45   50   55

6.4.3 Similar profit profiles can be created for the customers contacted at the later ages.

6.4.4 The following table sets out the estimated lifetime values of our range of customers. The figures are calculated as the present value, at initial contact, of each customer type's expected future net profit.

Customer Lifetime Values @ 12% p.a.

	Bashful	Doc	Grumpy	Happy
Contact at age 20	£95	-£35	-£75	£180
Contact at age 35	£105	-£55	-130	£285
Contact at age 50	£10	-£20	-£50	£85

6.4.5 The figures above include the company's current allocation of customer acquisition and servicing spend. By customer servicing here we mean efforts beyond the purely functional processes of administering policies. The absence of any previous customer profiling and valuation facility has resulted in customer acquisition spend being equally spread across the customer types whilst customer servicing spend is in direct proportion to the number of polices bought by each customer type.

6.4.6 At present, Happy is our most valuable customer type by far with Bashful also reasonably profitable. Both Doc and Grumpy are significant loss-makers.

6.4.7 To get a clearer picture of relative customer potential the company considers lifetime values which exclude customer acquisition and servicing costs. These are set out below:

Customer Lifetime Values @ 12% p.a.

	Bashful	Doc	Grumpy	Happy
Contact at age 20	£205	£70	£25	£305
Contact at age 35	£285	£115	£35	£475
Contact at age 50	£75	£45	£10	£155

6.5 Impact Of Customer Management – Retention

6.5.1 The company now has an indication of the different types of customers it attracts and in particular how profitable they are. The company sees that all customer types might be profitable if suitable propositions could be designed within the available margins. The company's first reaction is to leave its overall customer servicing spend unchanged but allocate a higher proportion to the most profitable customers - Happy and Bashful. The company realises that any spend on Doc and Grumpy, above the level needed to provide a basic professional service, is wasted and reduces its spend accordingly.

6.5.2 Happy and Bashful value the company relationship and respond positively to the more efficient and personalised servicing they are now receiving - defection rates fall to 3% p.a. Doc and Grumpy are relationship insensitive and only require a basic professional service. The service change therefore has no impact on behaviour - defection rates remain at 13% p.a.

6.5.3 The value of the company's customer equity rises to £90M - an increase of 150% over the Baseline value.

6.6 Impact Of Customer Management – Target Marketing

6.6.1 The information on relative customer values is now used to reallocate a proportion of the company's customer acquisition spend towards the more profitable customer types. Of the money spent acquiring customers we assume a proportion (25%) is spent before we have identified the basic customer types. Thus, only the balance of the spend can be re-targeted towards marketing to the more valuable customer types. In addition, reduced defection rates result in longer term relationships with the most profitable customers and the company is therefore able to obtain more information on their preferences and buying habits. The result is increasingly well focused and effective marketing and re-marketing.

6.6.2 Customers are now increasingly comfortable with the relationship and as a result propensities to purchase and repurchase rise for Happy and Bashful. There is no positive impact for Doc and Grumpy as the company relationship is not an important parameter in their purchasing decisions. A further benefit (not modelled) is that customers now find the company's approaches with new sales ideas coincide much more with when their own thoughts are turning to the need for these services. The result is that customers now repurchase a little earlier in their relationship with the company.

6.6.3 Revised customer lifetime values are illustrated below :

	Customer Lifetime Values @ 12% p.a.			
	Bashful	Doc	Grumpy	Happy
Contact at age 20	£395	£0	-£25	£325
Contact at age 35	£475	-£15	-£60	£445
Contact at age 50	£80	-£15	-£30	£90

6.6.4 The increased spend on both customer acquisition and servicing allocated to Happy and Bashful has been more than repaid with substantial improvements being seen in customer lifetime value. Much of the inefficient spend on Doc and Grumpy has been removed and the company must now consider if it can further restructure its propositions to these customers to make them viable.

6.6.5 Looking at the company view, the customer equity has increased to £140M - an increase of 300% from the Baseline value.

6.7   Impact Of Customer Management – Customer Acquisition

6.7.1 The company is now able to analyse how its marketing messages affect the mix of customer types it attracts. As a result, the company modifies its marketing strategy to provide a greater chance of attracting Happy and Bashful - the most profitable customer types.

6.7.2 Happy and Bashful find the company's marketing increasingly relevant to their values, motivation and requirements. The mix of customer types attracted by Snow White Life therefore changes to 30% each for Happy and Bashful and 20% each for Doc and Grumpy.

6.7.3 The company's customer equity increases still further to £175M - an increase of 400% on the Baseline value.

6.8 Impact Of Customer Management – Remarketing and Active Servicing

6.8.1 A further source of enhancement to the customer value lies in increment policies sold to reflect changing customer needs beyond the point of initial sale. For example, for term cover when children arrive, for the endowment when customers move to higher value properties and for pensions when earnings rise. Our modelling does not factor in any incremental policies for the term and endowment products and so the customer values we calculate will be understated to a degree. For pensions, we bring in future contribution increases though as the chart in Appendix 3 shows there may be scope to go further with some customers.

6.9 Summary

6.9.1 Overall, this simplified illustration demonstrates:

1) What we feel is an opportunity for actuaries to apply their techniques and business knowledge to the estimation of customer value and thus to increase our ability to add value to our employers.

2) The potential of a robust customer management programme underpinned by the customer control cycle.

7. Let's Think About...

7.1   One of the most satisfying results of our work has been the gamut of other interesting issues it has raised. If we had tried to cover them in our paper, we would never have got it published in time.

7.2   Dynamic Solvency Testing and Risk Management

7.2.1   We cannot help but feel that a move to a customer valuation approach will become important to the rationale behind dynamic solvency testing. In time, as we get to know more about the behavioural risk profile of our customers, this will inform our sensitivity assumptions regarding persistency and new business.

7.2.2   The life insurance industry has concentrated for years on designing out risk and pooling risk. There has been relatively little full risk transfer in modern product design in the UK. This has led to too little experience of managing risks. It has led to an inadequate understanding of the whole range of risks involved in a customer relationship. To maximise the value we extract from our customers we are going to have to get better at taking on and managing a wider range of customer related risks.

7.3   Customer Focus

7.3.1   As part of our research, we have taken a look at some Needs Analysis Systems. They generally still compartmentalise coverages by traditional product areas. No real attempt is made to recognise product overlap - see our comments under that heading below.

7.3.2   We could have written a whole paper on customer based pricing. There are a number of issues to address as soon as one decides to consider this route, for example, how you align company profits with value delivered to customers.

7.3.3   This in turn raises the question of how you go about rewarding customers, intermediaries and the company itself for the value created in the relationship. For example, our industry has on the whole shied away from rewarding the intermediary on the basis of the value the intermediary delivers to the customer. We need to re-align rewards if we are to be truly customer focused. As an example of a customer focused reward system for intermediaries, look at how the Car Phone Warehouse organisation rewards sales staff.

7.4 Product Issues

7.4.1 When taking a customer focused approach, it is natural to examine any product overlap. As soon as you do, you realise the limitations of current needs analysis methods. You realise that current product designs are not always appropriate. You start to think in terms of dynamic products - ones that can change to meet changes in customers' circumstances. You start to delve deeper into how well some products meet current and future customer needs and how well they align themselves to your principles of (fairly) sharing in value.

7.4.2 Having looked into level term insurance, we really do wonder whether yearly renewable term is actually more appropriate for the majority of customers.

7.4.3 Some companies have attempted to ensure that customers' contributions to pension plans maintain their buying power in real terms by applying automatic indexation. Even if indexation is linked to average earnings rather than prices, and allowance is made to increase contribution percentages as age increases, the resulting contributions are unlikely to serve a customer's circumstances. A better approach would to use age related earning indices (which are available), but this is just a (much) better approximation to what a customer needs, which will depend on their individual circumstances, not an average.

7.5 Data Protection

7.5.1 We believe that improved profiling and handling of customer information can deliver superior results to the company, its intermediaries and its customers. We are worried, however, that well meaning legislation - such as the 1998 UK data protection Act - will, if we are not careful, inhibit the ability of companies to deliver the potential benefits. In developing your strategy for delivering customer value, you must factor in compliance with legislation into your planning.

7.5.2 Companies should explore the potential to use this legislation to good effect by developing constructive dialogue with customers.

8. Conclusion

8.1   Financial services companies are already exploring customer lifetime value and related concepts. Our aim has been to raise awareness amongst actuaries of the benefits of adopting a more customer focused approach to all aspects of the business, including financial management.

8.2   We believe it is vitally important that actuaries buy into this concept, since the profession can have an important role to play. Actuaries are well placed to develop customer value business models, key elements in successfully implementing and monitoring a customer focused strategy built upon a sound planning platform.

8.3   Within the preceding chapters and following appendices we hope to have given a glimpse of the potential that awaits those companies and its actuaries that adopt such an approach.

Appendix 1

A1. Customer Perception

A1.1 Product design, pricing structures and selling methods should all take into account the needs and perceptions of customers. The initial aim must be to sell products which meet real needs and remain in force. Thereafter, the aim is to create a relationship based on service, which encourages clients to buy again.

A1.2 This will be achieved by ensuring that the value the customer attaches to the benefits being provided (his perceived value of benefits) does not fall below the financial sacrifice he feels he is making to secure these benefits (his perceived opportunity cost). It is assumed that the client believes he is getting value for money at the outset. The aim must be to strengthen and reinforce this belief over time.

A1.3 In the world of perceptions, value is not seen only in the currency of money. It is more to do with competing demands on money. It is more to do with whether the customer would have preferred to spend his money on something else rather than on your product and service. It is more to do with what economists would call his Utility Function. The diagrams that follow should be studied with this concept of value in mind, not straight arithmetically calculated 'value'.

A1.4 A good product, well sold and serviced will have a profile similar to that shown below. At the outset the client is given reasonable expectations of the benefits being provided and over time, through good service, good investment performance, etc. comes to value the product so much that he is receptive to efforts to sell him another product to meet further needs.
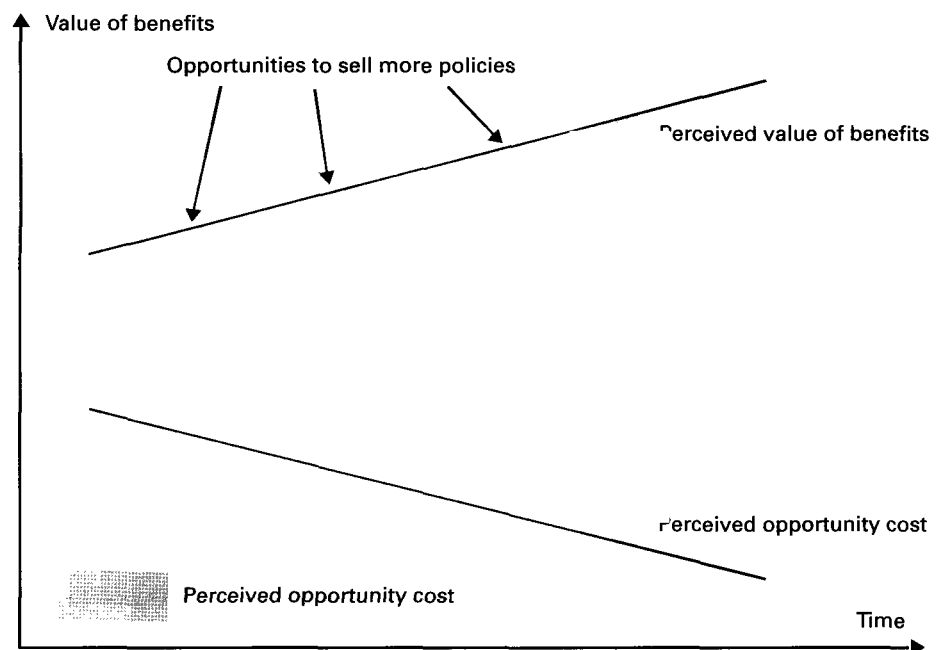
A1.5 An uncompetitive product mis-sold will have a profile akin to that illustrated in the next diagram. At the outset the client is given unreasonably high expectations of what will be provided. Subsequently, he finds that what he has perceived to be the case is not so, e.g:

- the benefits are not as high or as valuable as he initially thought
- the cost is higher than he thought and/or he finds that he could have obtained better value elsewhere
- he gets poor service.

A1.6 Consequently there is every chance that the product will lapse as the client will have lost faith in the advice he had been given and will be unlikely to deal with this insurer, and perhaps any other insurer, in the future. He will be able to think of better ways in which to spend his money.
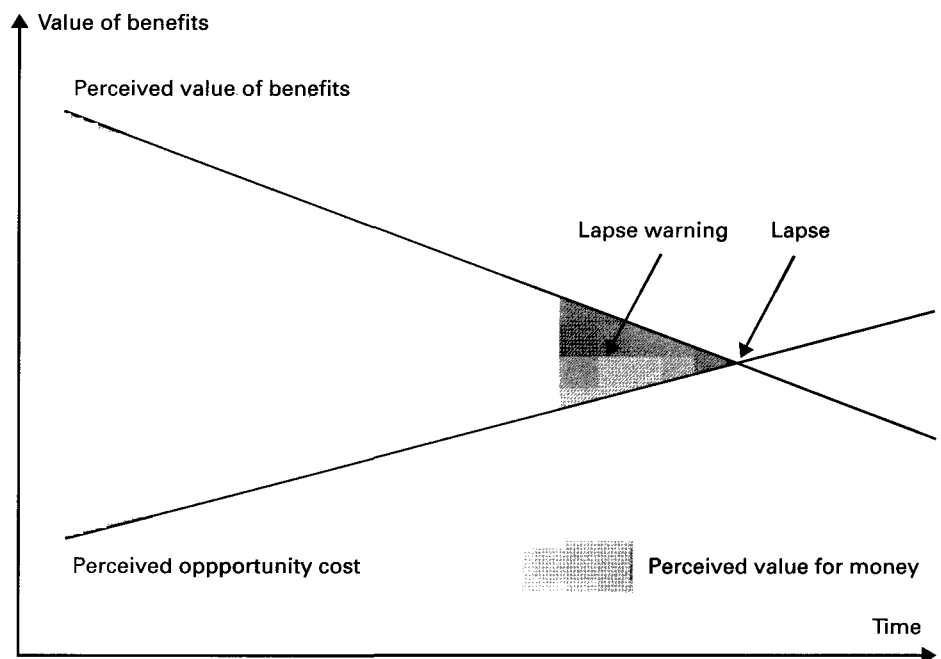
A1.7 Obviously these are two extremes, but we feel it is clear to which the insurer must aspire in designing and pricing its products, training its sales people and setting its service standards. Incorporating the right product options, i.e. the ones the client really needs, or believes that he needs, will reinforce the perceived value of the benefits, especially when they are exercised.

Appendix 2
A2.   Monitoring Algebra

A2.1   Consider the following formula, adapted from a pretty standard actuarial text book equation:

$\{(t)V + P\}x\{1+i\} - C - E - D = (t+1)Vx\{1-q\}$
where:
$(t)V$ and $(t+1)V$ are the policy values at time t and $(t+1)$ respectively
P is premium received
C is claims paid
i is the interest rate credited
E is expenses
D is payments released to (or required from) shareholders
q is the rate of exit

Modified equations of this basic form will drive the monitoring of customer value.

A2.2   One way in which to analyse the realisation of value is to think of a Customer Value Account, made up of three elements:

- A Cash Account
- An Embedded Value Account
- A Goodwill Value Account

It is then a matter of comparing the actual experience of these three elements with that expected.

A2.3   Cash Account
Our cash account, in words, reads as follows:

(Cash at start of period) plus (Profit released on existing business) minus (Cash invested in new business) plus (Interest earned) equals (Cash at end of period)

A2.4   Embedded Value Account
Our embedded value account, in words, reads as follows:

(Embedded value at start of period) minus (Profit released on existing business) plus (New embedded value created) plus (Interest on embedded value) equals (Embedded value at end of period)

A2.5   Goodwill Value Account
Our goodwill value account, in words, reads as follows:

(Goodwill value at start of period) minus (Goodwill value written off) plus (Interest on goodwill value) equals (Goodwill value at end of period)

A2.6 The following graph illustrates how a customer value account could develop over a customer lifetime. In this case we are looking at a customer profile model point with a current age of 20. Bearing in mind that many of the individual customers within this group may not yet have made a purchase, initially, the majority of value is goodwill. Over time, the goodwill value is translated into embedded value and eventually positive cashflow.

Elements Of Customer Value
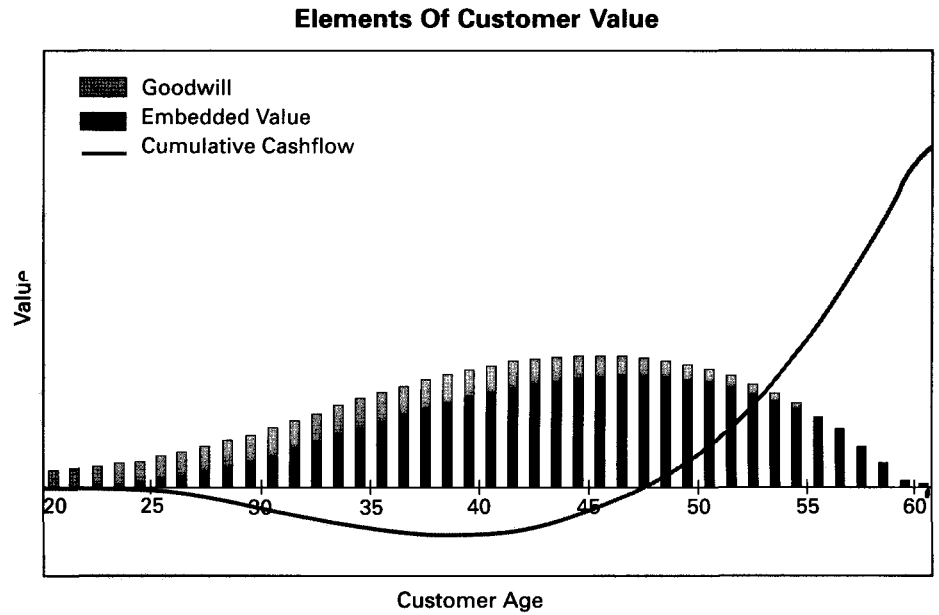
Customer Age

Appendix 3
A3.   Customer Needs By Lifetrack

A3.1   For each product we develop a model of customer needs and hence
       sales potential in terms of income levels and lifetrack i.e. key lifestages
       which have a profound impact on the need for, and ability to fund, a
       variety of life insurance products.

A3.2   For our chosen social class average gross incomes by age are shown in the
       chart below (source DSS based on 1994/95 Family Resources Survey).

**Gross Incomes By Age – Social Class II**
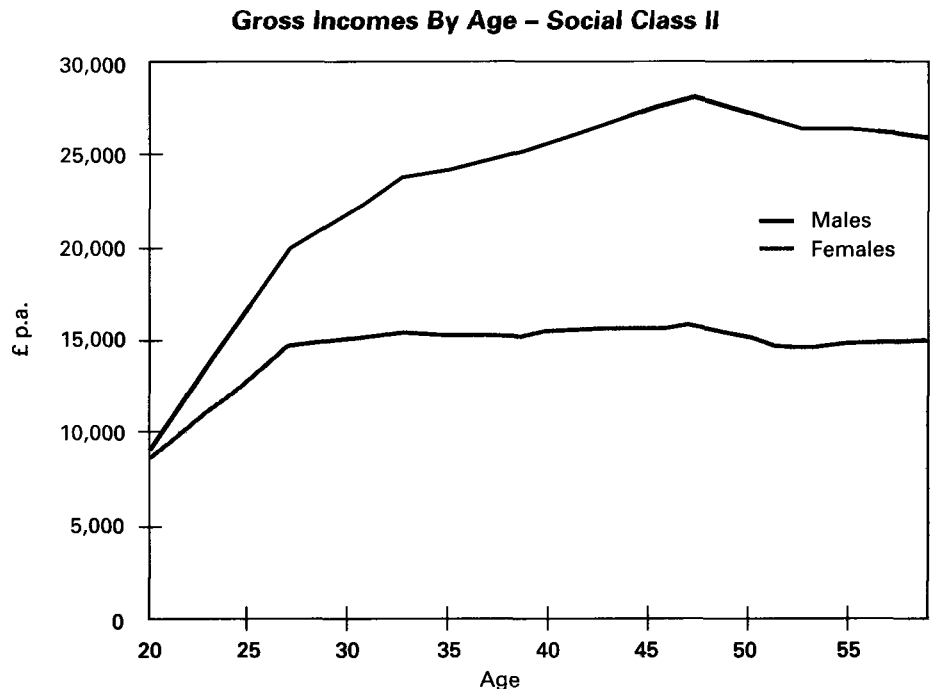
A3.3   For use in the model these figures were brought up-to-date by applying
       indices of national average earnings and finally projected forward
       assuming earnings growth of 5% p.a.

A3.4   As an illustration we have used the following lifetrack:

   • a male, initially single
   • marrying at age 25
   • having children in the early 30s
   • retiring at age 60

A3.5   Clearly, this is only one of many possibilities and in reality a number
       of key lifetracks would be ascertained reflecting significantly different
       behaviours combined with a reasonable chance of exhibiting those
       behaviours.

A3.6 Applying the lifetrack to each of the products we are considering results in a profile of sums assured / premiums by age as follows:
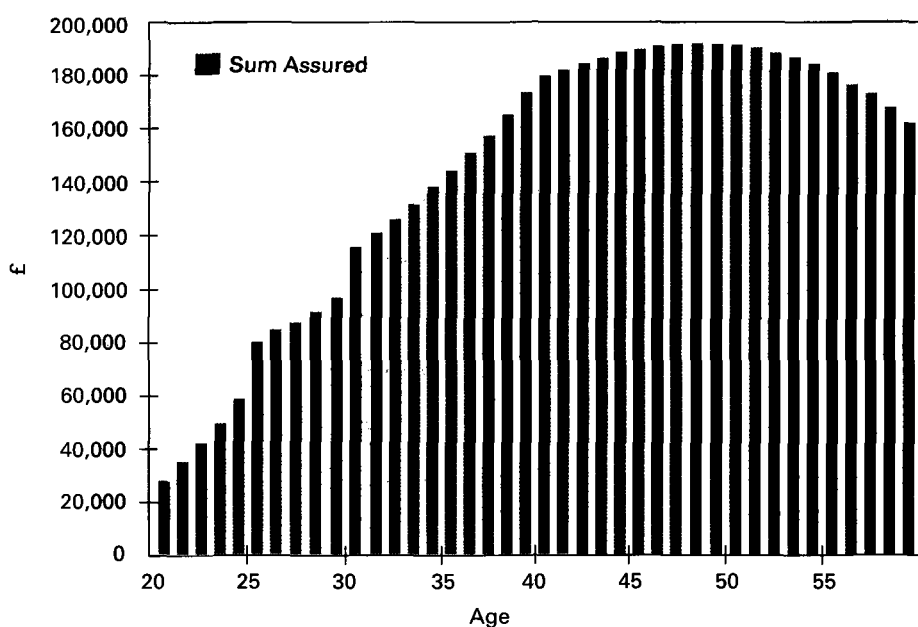
Term Assurance Cover By Age
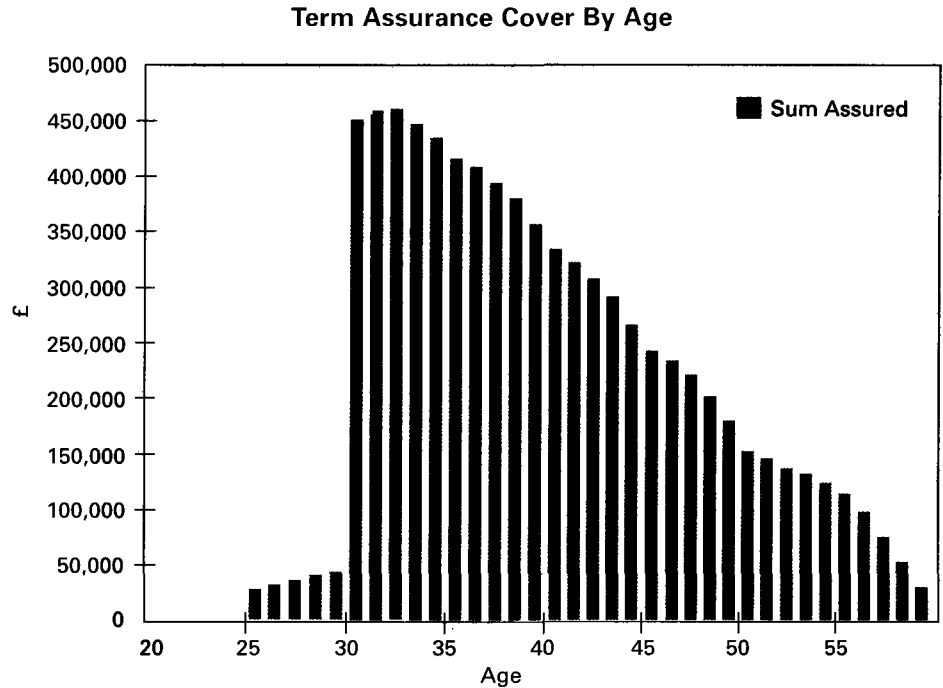
A3.7 The chart shows the sum assured required to meet our customer's needs at each age. The values shown are in nominal terms for a customer currently aged 20.

A3.8 To develop the profile we firstly assumed that any cover needed for mortgage purposes was taken care of elsewhere e.g. under a mortgage endowment. No cover is taken to be needed before marriage and before children only a modest level. Once children arrive we assume full income replacement until the children are school age and thereafter a reducing level as the wife is able to move into part-time and then eventually full-time work. A level of income replacement is maintained to provide for the costs of higher education for the children and at all times to cover the basic desire to avoid any immediate financial hardship upon the husband's death.

A3.9 The above model can be taken as addressing the individual's pre-retirement protection needs. However, this is not the whole story as there is also a need to ensure a minimum level of pension for his wife at retirement. Consequently, an additional sum sufficient to purchase an appropriate level of real deferred income could also be added. Against this sum though could be offset the fund value built up under a personal pension or any benefits available from an occupational pension scheme.

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Endowment Cover By Age

A3.10 The chart once again shows the sum assured required to meet our customer's needs at each age. The values shown are in nominal terms for a customer currently aged 20.

A3.11 This profile is based around property prices in the south-east (excluding Greater London). Prices rise into the future at the rate of 4.5% p.a.

A3.12 Customers in their early 20s purchase flats but then trade up to terraced houses on marriage and later to semi-detached properties when children arrive. Maximum mortgage amounts are based on 3 x main income plus 1 x subsidiary or 2.5 x joint income whichever is greater. Loan to value levels fall with advancing age reflecting accumulated savings and equity built up in earlier properties.

Pension Contributions (£p.m. & % Of Income
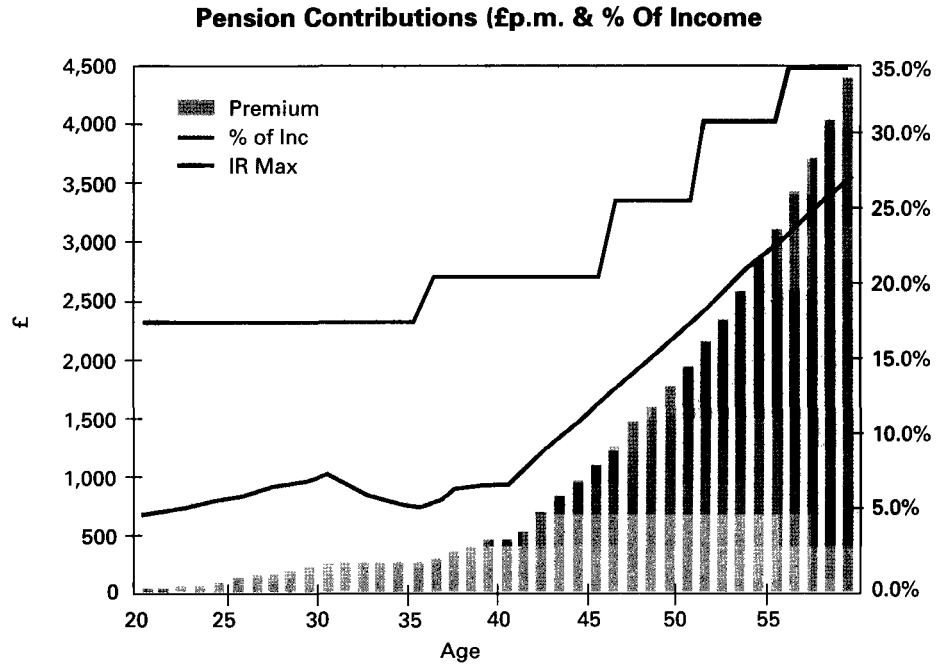
A3.13 The chart above shows the future pattern of pension contributions in nominal terms for a customer aged 20 at present. The chart also expresses the annual pension contribution as a % of the customer's income in each year. The pattern shows a modest rise during the 20s followed by falling levels in the early 30s due to other calls on income as a result of having children and moving home. A steady pattern of growth resumes in the early 40s and continues up to retirement.

A3.14 In order to profile future pension contributions we have used earnings index information. We have taken advantage of the availability of age related indices, which throw up an entirely different pattern to that from the basic index.

Appendix 4
A4. Propensities To Buy

A4.1 This part of the model consists of three elements:

- the probability that the customer buys a particular financial services product at all i.e. from any provider in the market,
- the probability that if the customer buys a particular product it is from our company,
- the distribution of purchase probabilities over the customer's lifetime.

A4.2 The parameters used for these three elements of the model are illustrated below under the Baseline Scenario with reference to a customer contact at age 20.

Customer		Term	Endowment	Pension
Bashful	P(buys)	50%	50%	50%
	P(from us)	36%	36%	36%
Doc	P(buys)	90%	90%	90%
	P(from us)	10%	10%	10%
Grumpy	P(buys)	25%	25%	25%
	P(from us)	15%	15%	15%
Happy	P(buys)	90%	90%	90%
	P(from us)	25%	25%	25%

A4.3 The probabilities of buying the products and those of buying from our company given an initial contact has been made are driven by our customer profiles. The more active seekers of financial services (Doc & Happy) are more likely to buy each product. However, given an initial contact with each customer type the company has a better relative chance of converting the more passive types - they are less likely to consider alternative providers.

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A4.4 The distribution of buying probabilities throughout the customer's lifetime is shown in the chart below and reflects the lifetrack used.

Product Purchase Profiles – Bashful
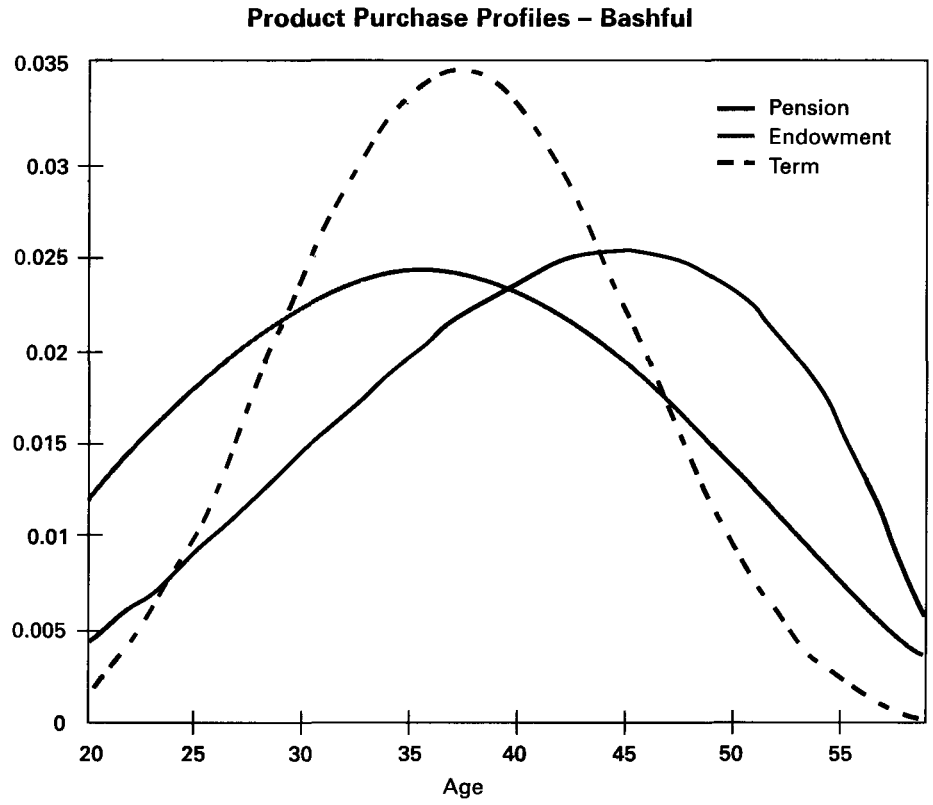
References

The following might be of interest to readers.

Items 1, 2, and 3 cover the mathematics of Game Theory and Clustering.

Items 4, 5, 6 and 7 say some interesting things about customer service, customer perceptions and customer behaviour.

Items 8 and 9 are directly relevant to the subject.

Items 10, 11 and 12 cover concepts and issues which we feel are relevant to the subject of this paper, most particularly who our future customers might be and what needs they might have.

1. von Neumann et al - The Theory of Games and Economic Behaviour (1944)

2. Alt - Exploring Hyperspace: A Non-Mathematical Explanation of Multivariate Analysis (McGraw Hill, 1990)

3. Kaufman and Rousseeuw - Finding Groups in Data, An Introduction to Cluster Analysis (Wiley Inter-Science, 1990)

4. Personal Investment Authority - Consumer Panel Report (November 1995)

5. Swiss Re - Life Through the Looking Glass (1992)

6. Munich Re - Packaged Protection Products (1997)

7. Harvey-Jones - Managing to Survive (Mandarin, 1993)

8. Drury and Young - Client Value (Presentation at the 1997 Life Convention)

9. Swiss Re – Persistency Manual (1995)

10. Brand and Bray - Protection Products in a Changing World (SIAS 1997)

11. Grenham - Demography: The Effects of Changing Population Profiles (SIAS 1995)

12. Jollans - Pensions & The Ageing Population (SIAS 1997)