MARKETING DIGITAL MAP DATA

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ABSTRACT

Suppliers of topographic information will only stay in business if they meet the needs of their users. For centuries the map has been the obvious way in which to present the information, but with the advent of computers users are asking for it in other forms. Nevertheless, basic marketing concepts still apply and the paper will discuss them.

INTRODUCTION

Computers are now firmly established as part of the fabric of modern society; they support such diverse functions of everyday life as financial transactions, academic research, and controlling the temperature in a greenhouse. The public at large is increasingly exposed to new technology and, particularly amongst the business community, this demands the re-appraisal if not of corporate objectives, at least of the means by which they are achieved, and opens doors to exciting and challenging new opportunities.

Collectors and suppliers of topographic information are as involved with these developments as anyone, and there is no doubt that Information Technology will radically affect the services we can offer in the future. For centuries the printed map has been the medium by which the information has been presented, and we can be confident that it will retain such a role for years to come. But alternative forms are being demanded by those users who are introducing computer-based systems to their organisations. To survive, the supplier must identify the means of satisfying economically these emerging and developing requirements. This is the fundamental law of marketing as relevant in the world of digital mapping as of digital watches.

MARKETING

This need to be user-aware is described by John Frain in his "Introduction to Marketing":

"A business organisation should face outwards towards the wants and needs of users and not inwards towards what it likes doing or is experienced in doing." (1)

Philip Kotler in his study of marketing for non-profit organisations talks of "de-marketing or the cutting back of unneeded services" as being "just as important in a comprehensive marketing programme because the ultimate goal is improved efficiency". (2)

INFORMATION TECHNOLOGY

It is comforting to realise that sophisticated as they are, computer systems are unable to do some of the things we humans can achieve, frequently without conscious effort. For example, they are not good at making deductions and need much more data than we would find necessary. Their contribution to greater efficiency and better informed decision-making stems from their ability to store vast quantities of data in a compact form, to retrieve and manipulate it very quickly, to transfer it almost instantaneously over long distances, to display it in a variety of formats, and to do all of these with the minimum of manual intervention, tirelessly.

DIGITAL MAP DATA

There is a need to emphasise the title of this section and to make the point that it is more than 'Digital Mapping'. There are some producers who see digital technology merely as a means of automating map production rather than as the solution to some of the problems inherent in the map as a means of communication, and as the opportunity to provide new services. The first steps along the digital road were taken by conventional map producers and it is hardly surprising that 20 years ago none of us could have seen the full scope to be provided by technology for combining sets of information previously difficult to relate, and thus the role of the digitised map as a base for other spatially related data. That inability to foretell the effect of new technology was not due to a lack of awareness at the time and the accelerating rate of development in this field is going to make it no easier to get it right in the future. However, steps can be taken to minimize the effect of technological change.

This is a paper about marketing so instead of talking about the suppliers we should have started with the users. How are they being affected by digital technology? Most of them were at home with maps, had developed their own means of using them for their particular purpose and, when using series mapping, accepted it as a reasonably complete picture of their world which would need updating every now and then.

I am not aware of a single customer who had the foresight to demand his map in computer readable form before such products existed. In other words, the supplier created the market, but now that digital map data is available, it seems to many to be a product which fits naturally into the computer-based business environment they are building themselves.

The principal attraction to investing in new technology is the promise of greater efficiency, and implicit in this is the ability to create a system which suits the customer's very own requirements. In the market for topographic information, there are as many applications as there are feature codes - our customers are more varied than those in some other markets in which systems capable of providing ALL the answers really are feasible.

It is at this stage that the customer begins to develop ideas about altering the standard product to fit his particular system and requirements. Given the freedom to select less than the whole product, many customers will want to do this. Not surprisingly, they expect their constraint to be reflected in the price they pay although in the days of the standard map, they paid the asking price even when much of its content was of little interest to them.

In a world of one-offs, twins are king - at least in the eyes of the supplier who seeks multiple use for his product and who would rather identify the highest common factor in order to provide a standard product as a best mean fit for the generality of users. Few users have totally abandoned the map and it is difficult with our poor perception of the future to envisage a world of no graphics. However, increasingly to the collector of topographic data there are advantages in retaining it in the digital form in which it arrives - from the instrumental survey, the photogrammetric plotter, or remotely sensed data. It is the conversion for graphic use which reduces its accuracy, increases its bulk, and causes the loss of some of its flexibility. But, for the moment at least, digital map data must be capable of being manipulated and plotted to produce a conventional map.

With the flexibility provided by the tailor-made system, users are demanding a much more personal service than when they had to accept a standard package. They want to do more with their own data than to lay it over the topographic base, but each requires his own personal model of the world. Printed maps are by their nature always out of date and this is frequently a source of frustration and uncertainty. Now updates will be demanded by users to justify their investment, and possibly in a form which provides only the change; not a new map but an input of additions and deletions.

Finally, this spirit of individual freedom is calling for supporting software, advice and other forms of after-sales service. To all suppliers brought up as map-makers (apart perhaps from the Hydrographic Office for whom change and its supply is a way of life), this is a commitment difficult to accept. And yet it is reasonable for the customer to expect these types of support to be available, if not directly from the data producer, then from software houses, consultants and maintenance engineers. Before the advent of computers the customer could solve problems with ingenuity and practical common sense. The hi-tech solution frequently leaves no such remedy - it's all or nothing, and hiccoughs cannot be tolerated.

So the suppliers and users together are attempting to take account of future changes in technology and unforeseen uses of the data, but can the suppliers accommodate the changes deemed necessary, and still produce the data economically and quickly enough?

THE DEVELOPMENT OF NEW PRODUCTS

Everyone has an interest in the relationship between features on the ground at some scale or another, from the Land Registry concerned in property boundaries to the salesman planning his visits. For some of these interests the map serves very well, but for other more demanding enquiries, something more comprehensive in the data and the way it links together will be essential. Developments in other fields of technology are creating the potential for still more complex applications; for example, the increase in accuracy, and reduction in cost and size of position-fixing systems open the door to practical vehicle navigation systems which need to be related to topography if they are to be useful.

Other developments in both hardware and software are making it easier for users to create information systems. For these the topographic information needs to be collected and stored so as to allow it to be an entry point to the system. Ordnance Survey large scale digital data currently allows only a non-automatic combination of topographically and culturally linked information - a human eye is needed to infer the property 10 High Street (particularly if "8" and "12" appear on the map but "10" does not, and if the boundary is incomplete), and to cross reference it with lists containing its rateable value, the name of its occupier, or the telephone number, even though all of these sources may be computer-based.

In the areas discussed, there is much work being done to identify the form in which data will be required, and these studies need to be carried out by both parties; the

suppliers providing the guidance on what is technically feasible, and the users analysing their current and future requirements. However, there are at least two guiding principles. There is the natural inclination of the convert to new technology to include everything from his current system without sufficient critical assessment of whether all aspects are appropriate to conversion and, even more importantly, whether some parts should not be changed before conversion because they are inefficient; there is no justification in automating what should be abandoned.

There is also the subject of tailoring which we have touched on already. Certainly for a national supplier it is frankly unrealistic to imagine that he can supply the perfect solution for every user. We have agreed that the digital data has to be collected, stored and supplied in a way that reflects as much of the topographic and cultural background as will be needed, rather than a single representation of that background which in its simplest form is a printed paper map. In the same way that the user of a general topographic map had to create a system for effectively applying the information it contained to his own needs, even more now he may have to change, reorganise or add to the data with which he is provided in order to make it compatible with his own system and applications. So, the aim of the supplier must be to create a system which concentrates upon collecting and storing the required data in a form which allows the individual to access it. The customer must be left to create his own information and link it to the digital map data in his own database.

THE EFFECT ON DATA TO BE COLLECTED

Potentially more data can be brought together and viewed simultaneously when in digital form, but that does not mean that any one agency has to increase the amount of information it collects. On the contrary, it is important to define separate tasks so as to avoid duplication.

How data is classified may very well be affected; it may become more important to identify a linear feature as a boundary between two particular properties than as a hedge. Perhaps both these attributes will need to be recorded.

We talked earlier about the limited ability of the computer to deduce. However, given enough information it can produce solutions akin to the human's deductions. For example, if every link making up the length of a road is tagged with its route number, then it is possible to undertake effective automatic route-finding.

For the user to access and to link data, entry points and tags need to be provided. Just as it is essential that many of the material things in our daily lives are standardised, so it will be necessary to create a standard way in which this tagging is done. It must be made possible to attach data to any entity, be it node, link or polygon.

STANDARDS

This is not the place to do more than emphasise the importance of standards. Indeed we have done so already in talking about the supplier trying to avoid the "one off" and the desirability of creating only one type of connection between the topographic information and the user's. Suppliers can impose standards, but the best ones are introduced by consent between them and their customers. When stall holders and shoppers agree, the manufacturers (in this case those who build the hardware and create the software) will follow. In this scenario everyone benefits by lower costs, greater consistency, reliability, and scope for transferring and accessing data. Without these latter capabilities and the scope they introduce for coordination and cost sharing, many potential customers may never enter the market.

MODELS & STRUCTURES

It is necessary to define these terms.

"A DATA MODEL is an abstraction of the real world which incorporates only those properties thought to be relevant to the applications at hand. It is independent of a computer system and its associated DATA STRUCTURES. A map is one example of an (analogue) data model." (3)

"A DATA STRUCTURE is the defined logical arrangement of data as used by a system for data management. It is a representation of a DATA MODEL in computer form. (4)

Experience to date with the Ordnance Survey large scale mapping archive illustrates a great range of user's requirements for digital map data; everything from a background map to structured data suitable for input to a Geographic Information System. Some find that the model currently provided is not ideal. It is either too complex, or it does not provide all the "sockets" required into which to plug their own data. I cannot believe this situation is unique and so it raises issues which will occur elsewhere.

There is a body of opinion which says "if you have not the resources to provide us with the model we really want, give us an interim solution which is cheap and quick to produce".

This could perhaps be justified if the interim is a step towards the final destination and providing that taking two steps will not add considerably to the effort involved in getting there with a single stride. The economics of alternative "two steps" are being investigated and there is little point in discussing the options in any detail. The most attractive because of its potential for reducing the tedium of data capture is to raster scan and provide a background map for those who require no more, with subsequent vectorisation and coding by interactive means to achieve an acceptable model for everyone else. Alternatives are a vectorised product containing a minimum of coding, to be followed by an enhanced version in due course, or the establishment of a linked database containing cartographic information by which to carry out the separate business of map making. All that is certain is that it is impossible to satisfy all of the users all of the time, but this is ground we have covered already.

SELLING

"The aim of marketing is to make selling superfluous" (2) The customer must be convinced that he not only needs the product, but that its price offers good value for money. Suppliers must provide evidence to the potential user and this, in all its forms, is expensive. They must produce proper documentation, participate in trials, run demonstrations, discuss applications, formulate standards, and generally act as consultants in the field. The "selling points" for using digital map data are discussed elsewhere in this paper, but there are others which help to explain to the potential customer its apparently high price. Development costs are enormous because of the level of sophistication demanded, and the variety of application that needs to be catered for. Maps represent one of the densest sources of information available so that a customer is getting a lot for his money, but it helps to explain why the processing of spatial data consumes a lot of computer effort.

The cost of data is seen by many potential users as the principal deterrent to entering the field. It is worth pointing out to them that the data is likely to have greater longevity than the hardware and software by which it is manipulated; the decision on whether or not to proceed should be based on a comparison of these costs with the perceived "added value" to the data by having it in its new form.

The customer must be persuaded to compare prices on the same basis; there is a tendency to underestimate internal costs through a failure to fully absorb all overheads - to count only the marginal costs involved in taking on additional work when considering alternatives to buying the service

from outside. On the other side of the coin, it is important not to concentrate only on the initiation costs and to overlook those involved in continuing maintenance.

One of the many areas still to be developed in this field is an acceptable pricing policy for data. In the Ordnance Survey, prices reflect cost recovery targets set for it by Government, but there is still a large element of faith involved; current sales of digital data do not approach the level they will need to if the supply of data is to continue, and we have to believe that given more data in the right form - a critical mass - demand will increase dramatically. The proper level and method of charging for updates is even less clear because of uncertainty over the effect digital updates will have on revenue from conventional mapping, and whether traditional methods of charging copyright can persist when the protected data is being put to these more sophisticated uses. It is likely that technology will play a part in this field too because whatever system of charging is introduced, it has not only to be acknowledged as fair but be simple to administer; perhaps it will become technically possible to raise invoices automatically related to actual usage irrespective of how access to the data is achieved.

DISTRIBUTION

Fundamental to a service is the means by which it is provided. With the trend in retailing and access to information by remote means such as mail order, Ceefax, Oracle and Prestel, it is advantageous to its suppliers that digital data is already in an ideal form for transmission. In Great Britain digital networks are being established which will increase the speed and reliability of data transmission. Given such networks and the necessary common transfer standards a central data source becomes feasible, with the choice on form of access being determined by individual user needs; everything from 24 hours a day instantaneous on-line access for the emergency services, through overnight transfers for Local Government, to postal delivery of mail-ordered updates for small firms.

CONCLUSIONS

Digital mapping has several advantages over mapping produced conventionally, particularly because of the freedom it provides from sheet edges, and the facility to change scale and select features. In addition, a recent video produced by British Gas comments that "with digital mapping nothing wears out, nothing has to be redrawn". But customers want more than this and maps are increasingly becoming a by-product of a digitising process which can provide information about topographic data impossible to show in a purely

graphic form; information about how and when it was surveyed, its accuracy, and whether it reflects planned or as-built change. But more important even than that, the information can be modelled in such a way that it allows the user to recreate the world in which he is interested in a more tangible form than a mere map ever can.

Customers want to get more from their data than they can at the moment, to be able to add to the system as their requirements and confidence develop, and to have the assurance that the investment is 'sensible'. Suppliers of systems and information alike must respond to this market by providing the maximum of flexibility for technical development and the emergence of new applications. At this stage there is probably no scope for practising what we defined as de-marketing on page 2 of this Paper. The future is too uncertain to allow us to cut back on any of our current conventional products and services: the two types of technology will continue to co-exist for some time.

Major users are already making the transition from the analysis of maps to the computer analysis of data. Without the concentrated efforts of suppliers this initiative will wither, an important market will fail to develop, and the efficiencies which it could provide for the benefit of the community will not be realised.

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