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Keywords:

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Classifying businesses

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Abstract

Both in business-to-business (B2B) and business-to-consumer (B2C) marketing, marketing resources can be more efficiently targeted if an organisation has access to 'external' as well as internally sourced information on customers and prospects. But the range and detail of external information accessible to B2C marketers have for many years been considerably greater than that available to B2B marketers. As a result B2C marketers have had access to a wider range of more sophisticated value-added segmentation services than their B2B counterparts. This is somewhat ironic when one considers that in most markets the variability of business potential between different businesses far exceeds variability in potential between customers.¹ This paper explains how recent developments in business credit risk management are now making available new sources of external data on businesses; how this information, when combined with existing business data sources, has been used by Experian to create a multivariate classification of businesses; and the extent to which this new classification is likely to redress the current information imbalance between B2B and B2C marketers.

Targeting using internal and external data: Commonalities between B2C and B2B

'Targeting' of sales and marketing resources is recognised by virtually all organisations as a critical requirement for business success. This is true whether their products or services are bought by consumers or by other businesses, and whether they meet the needs of private sector or public sector customers. Effective organisations use targeting throughout the customer life cycle: to focus marketing and sales activity at those prospects most likely to generate significant long-term flows of profitable sales; to qualify new customers according to potential; to determine the needs profile and hence servicing style suited to existing customers; to identify mature customers to whom cross-sell and upsell initiatives would be most appropriate; and to become alert to customers at greatest risk of defection.

To achieve these targeting objectives businesses ideally make use of both 'internal' and 'external' data. The internal data they use will include information generated during the process of establishing or attempting to establish a customer relationship, and will consist largely of details about the customer captured when an account is first set up. Depending on the length and depth of the subsequent relationship these data items will be further supplemented by information resulting from individual transactions.

While internal information is likely to be very effective for the targeting of resources in certain contexts, for example when a business satisfies only a narrow set of needs, where a customer relationship is well established and where the nature of the market is not one in which an individual customer purchases simultaneously from multiple competitors,² most business need to supplement their internal information with external information. This information is likely to be sourced from one or more information vendors who specialise in collecting as much information as possible about the universe of prospects with whom an organisation might wish to do business.³ Such vendors are active in both the consumer and B2B markets, and in some cases in both. The key roles that external information plays in the targeting process are threefold. First, it provides a useful tool for qualifying or ranking Prospecting potential customers in terms of their appropriateness for prospect recruitment, ie for consumers or businesses for whom no internally sourced data are currently available. Secondly, once a prospect has become a customer, it provides a useful indication of the extent to which the new customer is likely to offer high lifetime potential, particularly in contexts such as where the customer is a recent one and where the Lifetime value customer is likely to be purchasing from direct competitors. The third benefit of external data is that they can be used to determine the manner in which the relationship is maintained. This might include deciding which person or team should be tasked with managing the relationship, the channels that should be used for communication, the channels through which the customer may undertake transactions and the terms of the agreement whereby sales are paid for. Channel While internal and external data have strengths and weaknesses in management different contexts, greatest benefits accrue to organisations that successfully integrate the two. Once an organisation can identify which external characteristics of a prospect are predictive of high response rates to sales and marketing initiatives, and which characteristics are associated with low servicing costs, with high rates of customer retention, with high levels of sales and low levels of bad debt, then it becomes possible to **Prioritisation of** target resources throughout the sales cycle at those prospects who most communications resemble existing high-value customers as well as at existing customers who are already spending most.

Contextual differences: B2C and B2B markets

Notwithstanding the apparent similarities between the needs of B2B and B2C marketers for targeting systems, the market for external data to support B2C marketing is significantly more advanced than the corresponding market for B2B data. This has led many marketers, particularly those working as analysts in business sectors such as banks and telecoms that sell to both markets, to question why they cannot access in a B2B environment services equivalent to those they successfully use in B2C.

It is worth considering the differences between the two sectors in terms of both market structure and data availability.

On a number of important attributes the two sectors are quite different.

If one considers the two markets in terms of the financial value of relationships, it is evident that the B2C market is characterised in general by a small number of large vendors selling to a large number of small purchasers. Though many of the vendors know their purchasers by name, the nature of the relationship is much more routinised, with sales being processed according to set rules and at set prices, often with minimal discretion permitted in the sales outlet and none at all in the call centre. The large number of small purchasers means that, in the absence of local discretion, the supplier can only apply segmentation strategies that are based on external data and on previous transactions. In so far as it is worth segmenting customers, this is best done in quite a coarse way using a small number of segments containing large numbers of purchasers.

By contrast the B2B market is characterised by a smaller number of higher-value deals. These tend to be subject to personal negotiation between parties who are personally well known to each other and where the needs of individual purchasers are precisely articulated to the vendor, who will then aim to respond with as highly personalised a proposition as is possible. Here a high level of segmentation is often applied without recourse to either internal or external data. But without the use of some form of segmentation it can be difficult for the vendor to recognise which segments of the market it is performing in effectively or ineffectively, in which segments business is growing fastest and in which segments it is achieving highest margins taking customisation costs into account.

A second key difference is that the needs of B2C customers tend to be more similar to each other and more broadly based than those of B2B customers. The majority of B2C customers will spend substantial and similar proportions of their disposable income on food, on housing, on travel, on furniture, on clothing and on utilities. Although some have more disposable income than others and all have their own brand preferences, the pattern of spend by market sector is more broadly based. Goods offered to a purchaser in this sector are therefore likely to have a value to most consumers. By contrast, in the B2B sector while there are some business sectors in which all or most businesses will make purchases — for example telecommunications, computers, stationery variability in spend between sectors is very much greater and their spend in very specialist sectors is very much higher. British Airways and easyJet will spend much money purchasing aeroplanes; the National Health Service will purchase radiographic equipment. Patterns of purchasing are much more differentiated between one standard industrial classification and another.

For these reasons it is probably fair to characterise the B2B sector as one where targeting of marketing and sales is a fundamental aspect of the business and where most businesses, by virtue of being in the market that they are in, have a good understanding of which businesses by name are good prospects for their products and which of these businesses are likely to be the best prospects in terms of value.

But this does not mean that targeting systems are not of value to business which are themselves large (such as banks), whose products are relevant to a large number of small purchasers (such as hairdressers and

context

B2B and B2C:

differences in

Fewer higher-value prospects

Higher variability in potential

farmers), whose products and services have value to businesses across a wider variety of market sectors (such as printing) or which are sold via channels which do not admit to negotiation (supplies ordered via the internet). The characteristics which make these situations suitable for targeting are that the average unit value of sales is low, the repeat sales cycle is short and the benefit of the product is relevant across many different market sectors.

Another key difference between the B2B and B2C markets is in terms of the internal organisation of customers. While mothers may continue to be influenced by what brands of cereal their children like to eat, the purchaser of products in the domestic sector is seldom far removed from the final consumer of the product, with the household being the primary purchasing unit. Although the address of the household may change and its members may separate, the primary purchaser is likely to remain a prospect of the brand across most of his or her remaining lifetime. By contrast, in the commercial sector complex business ownership patterns result in the need for information both about establishments and the points from which they trade, and about the business entity (the firm) by which an establishment is owned. A business may trade from one or many establishments and under one or many company names. Clearly the structure of the purchasing process is very much more complex in such an organisation and an ability to recognise and understand this structure is a key skill which differentiates a successful salesforce from an unsuccessful one. Having to know what services are bought by Marks & Spencer's head office in Baker Street, London, which by its financial division based in Chester and which by its local branch managers makes it a complex business to target.

Conventional B2B data sources

The principal source of public data on companies is Companies House. All companies are required to file annual reports with Companies House. This information contains a number of usable items of information about each company.

Such information includes financial information such as sales, profits, capitalisation and debt. With this information being published on an annual basis, this source enables trend information to be generated to show, for example, levels of growth in sales and profitability.

The information also includes information on the number of employees and on the level of remuneration of the highest-paid employees. This information is useful for calculating indicators such as sales per employee, which vary considerably between an industry such as steel and another such as footwear.

The information also includes information about the type of company, whether a plc or a limited company, and about the ages and home addresses and postcodes of its directors.

A number of information vendors have used information on the home addresses of directors to make inferences about their level of affluence, for example by analysing the geodemographic categories which best characterise the postcodes where they live.

Movements of buyers within client organisations

No clear indentity of purchaser

Companies House as a source of B2B data

	The location of the registered office is also potentially of value. This allows the business to be coded by standard region. Business postcodes can be analysed to establish whether they constitute a 'large user' postcode, ie one which is dedicated to the business, or whether they share a postcode with other mail recipients as would be the case with hairdressers or companies of convenience.
D	Applying the principle of geodemographics, that 'birds of a feather
Business geodemographics	flock together', businesses have also been grouped according to the characteristics of their immediate neighbours, for instance whether they are located in a town-centre office location, a modern out-of-town office park, a large industrial estate or an area of declining manufacturing industry that one might find in many inner areas of traditional industrial towns.
	The date of incorporation of the business can also be a useful indicator, as, for insurance purposes, is the month of incorporation, since this is often the anniversary at which insurance policies come up for renewal.
SIC data	In addition to information that can be sourced from Companies House it is also possible to obtain from trade directories such as Yell's the standard industrial classification of establishments within the ownership structure of limited companies and public limited companies. Trade directories are also a useful source of information on non-limited companies which, while not necessarily employing large proportions of the workforce, nevertheless represent a very significant proportion of the prospects for which salesforces require external data.
Compiled databases	Information on non-limited companies can also be supplemented with information collected by specialist compilers of qualified business lists such as Business Locations. These compilers often use telemarketers to research individual named companies to establish the products that they purchase, the names and positions of their purchasing managers and, within selected markets, whether they are empowered to make purchases of specific products such as vending machine services, cars, computers and so on.
	A final source of information on companies is the commercial credit bureaux such as Dun and Bradstreet and Experian on which B2B operators rely for information on the creditworthiness of their customers. The databases these bureaux maintain for these purposes rely in part on information obtained from Companies House, but also on subsequent bad
	 debt information such as commercial county court judgments and bankruptcies. An additional source of information used in commercial credit assessment relates to the creditworthiness of the company directors and in particular on their record in terms of previous county court judgments and association with previously failed companies. A significant advance in commercial credit risk assessment in recent years has been the application in the commercial sector of a practice
'Payment Profile'	previously developed in the consumer credit management business known
information	as 'credit account information sharing'. Under this scheme a number of large 'lenders', which in the consumer credit business equates to credit grantors but which in the commercial credit business equates to suppliers, pool information on the payment status of their account portfolio, this

	being maintained and updated by a registered credit reference agency such as Equifax or Experian. By pooling the payment status of their accounts, the 6,000 contributing members of the club are able to identify existing customers according to their payment status across multiple accounts and thereby differentiate customers who just happen to be one- time late payers from those who have a persistent problem with payments or who are in arrears with their payments across multiple creditors or suppliers. These pools are known as 'payment profiles'. The relevance of this information to the segmentation of commercial enterprises is not so much that it improves the assessment of the financial health of business but that, by linking the standard industrial classification of businesses with the identity of each of the companies from which they make purchases, it provides important information on the sector mix of products and services purchased by organisations.
	Building a multivariate B2B classification
Multivariate classification	Permutation design With the establishment of the 'payment profiles' service Experian concluded that by combining the information held on the payment profile database with business information held on its other databases it might be in a position to develop an effective multivariate segmentation of
	marketers for a B2B equivalent of geodemographic classifications such as its own 'Mosaic' classification and CACI's 'Acorn'. The method adopted by Experian was the one previously developed in
Permutations modelling	order to build 'financial strategy segments' ⁴ and 'touchpoint segments', two segmentation systems which had been constructed for the B2C sector and which grouped people who have registered on the electoral roll according to their similarities across personal, household and postcode- level attributes. This method, being both innovative and recent, has yet to be given a statistical name. It involves a two-stage process: first grouping a set of records (in the B2C instance consumers, in this case businesses) into a large number of permutations according to their categorisation on a
	small number of attributes (in the B2C case electoral roll attributes, postal address types, shareholding levels, being or not being a company director); then calculating the average value of each permutation on a number of other attributes (in the B2C case financial behaviour, attitudes towards media, channels and promotions); and finally using the values of these other attributes to group the permutations into a small but meaningful set of clusters, each of which is as uniform as possible in
Multistage design	The reason for using the two-stage approach rather than a one-stage approach is the difficulty one confronts when attempting to apply grouping techniques such as cluster analysis in situations where most of the available information is held in the form of categorical values rather than continuous distributions. Cluster analysis is ideally suited to grouping postcodes or Census output areas because the attributes held on such files consist mostly of variables such as the percentage of households that are owner occupiers, which generate pleasantly continuous

distributions from 0 per cent to 100 per cent. By contrast it is difficult to measure similarities using variables such as the standard region in which a business is located (a categorical variable), or to establish whether a business which is in the standard industrial classification 'retail' is more similar to one in the classification 'hospitality and entertainment' than it is to one in the classification 'metal processing'.

The classification took as its starting point approximately 2.7 million business entities. This represented the set of businesses recorded either by Companies House or by Thomson and *Yellow Pages*, or for which information was made available through the payment profiles service. The 2.7 million businesses include therefore not just large companies but also most unlimited companies, partnerships and sole traders.

The first step in the classification process was to assemble for each business its position on the following variables, if known: its standard industrial classification — its business type (limited, non-limited, sole trader etc) — the standard region of its head office — its sales per employee (11 bands) — the number of employees (five bands) — whether the postcode of its head office is a large-user postcode or not — whether, on the payment profiles database, it appears as a large or a small purchaser across 38 different categories of contributor — an example of a category of contributor would be a supplier of telecommunications services. Given the number of different values that a business might have on 177,000 each of these seven characteristics, it was therefore theoretically possible permutations that it might fall into one of 177,320 permutations. Thus on average there would be 13 businesses per permutation. In practice most of the permutations had no businesses belonging to them. Only 39,768 permutations had one or more entries, as a result of which the actual number of businesses per non-zero permutation was over 40. Data sources for grouping The second step in the building of the typology was to create a database for each of the 2.7 million businesses containing another set of attributes. Unlike the first set of attributes, many of these attributes were continuous rather than categorical variables. Some, however, were binary variables (eg yes/no). The variables were as follows: Criteria for number of directors measuring similarity — average age of directors (limited companies only) — whether part of a group — number of county court judgments against business - number of years since formation of business — percentage of population with a degree in (1991) Census enumeration districts where directors live — level of affluence in (1991) Census enumeration districts where

2.7 million business entities

Separate strategies for non-limited businesses

Weighting businesses by number of employees

Separate segments cover limited and non-limited businesses directors live based on Experian 'factor scores'

- level of 'rurality' of (1991) Census enumeration districts where directors live based on Experian factor scores
- whether or not 'soho' business
- level of spend on 25 of the 38 payment profile segments.

It is evident that not all of these variables are known for companies that are not limited companies.

Where appropriate therefore the average value of each of these variables was summarised for each of the 40,000 permutations of limited businesses. For permutations of the businesses which belonged to the category 'non-limited business', a default was applied equal to the average value for the limited businesses.

In calculating the average values, the appropriate statistics for each business were weighted on the basis of number of employees in the business so that the values for larger businesses were more influential in creating the permutation averages than the values of smaller businesses. To avoid the effect of very high levels of skew, values on six of the payment profiles variables were capped within an upper limit.

The purpose of calculating the average values for each permutation is to enable the permutations to be grouped in a sensible way so that permutations which are broadly similar across the ten criteria listed above are grouped together into similar market segments.

Grouping process

For the grouping process to produce sensible and meaningful results it is necessary to make some assumptions about the relative importance that should be accorded to different input variables when measuring similarity. Is the average number of years since the businesses (in a particular permutation) were formed as important a criterion when calculating the similarity of two permutations as is the average age of their directors? No formal method can be adopted for setting these relative weights. Instead the developers took their own view based on the extent to which they felt each of the classifying criteria would be relevant to potential users.

When the weights were set the developers recognised that by giving the variable 'company type' an extremely high weight, in fact a weight higher by a factor of ten than the aggregate weight of all the other variables combined, the cluster analysis program could be 'fooled' into creating entirely separate sets of clusters for permutations containing limited companies and permutations containing non-limited companies. Given that the variables available for non-limited companies were fewer than for limited companies, this made it possible for the cluster system to create two typologies in a single run, one set containing limited companies and the other set non-limited companies.

Just as the creation of the average values for each permutation involved weighting the values of each business according to the number of employees, the cluster analysis program used to create the business clusters was required to weight each input permutation on the basis of the total number of employees. This weighting facility leads to a solution in

Segments have equal numbers of employees

'Iterative relocation' algorithm

50 cluster segments

which the resulting clusters are broadly similar in terms of the number of employees they contain. Clusters which are characterised by large businesses tend, as a result, to contain a small number of larger businesses, while clusters which are characterised by small businesses tend to contain more businesses than the average cluster but ones which tend to employ proportionally fewer staff.

This weighting is quite important, since without using it the cluster program would tend to produce too many clusters of very small businesses while lumping all the larger ones into a single market segment.

Likewise, as a result of the weighting process a permutation containing a very large number of businesses will have disproportionately more effect on the final segmentation than a permutation contain only one or two businesses.

The cluster analysis system that is used is one which uses an 'iterative relocation' algorithm, cluster seeds having been initially selected on a weighted random basis, the weighting being numbers of employees. A Euclidian distance 'k' means statistic is used to calculate for each input record, in this case permutation, its distance to the nearest cluster seed or centroid.

Once the iterative relocation algorithm reaches an optimum classification, the resulting clusters are further grouped making use of a stepwise fusion algorithm in such a way as to produce a further higherorder classification. The original cluster numbers are then rearranged into an order such that similar clusters will have consecutive numbers.

Various runs are undertaken to try to gauge the most appropriate number of segments that could be supported by the data and which could be adequately understood by potential users. The most attractive of the various solutions in this respect was one which generated 50 cluster segments which were subsequently ordered into 13 principal groupings. Fifty is a rather larger number of segments than have been created by previous business segmentation exercises. With the use of the payment profiles information, however, these categories do seem sufficiently differentiated to be recognisable by B2B marketers.

Once the 50-cluster solution was agreed upon, around 6,500 businesses for which incomplete data were available were assigned to the best-fit cluster based on similarities across those data items that were known for them. Figure 1 summarises the various stages in the classification process.

Results

Table 1 lists the 13 groups and 50 types of business created by the classification. At the group level it is noticeable that the businesses are best differentiated in terms of age and business structure, as well as by what inputs they purchase and to whom they supply. Two groups only, retailers and hotels and restaurants, are identifiable primarily in terms of standard industrial classification.

Within that overall structure it is evident from the descriptions at the type levels that while some of the clusters are best described in terms of their standard industrial classification, there are others which are better



Figure 1: Stages in the classification process

described in terms of the nature of the products they supply and to which types of end user.

Appendix 1 provides an example of how one of these types, E17 'stable backbone', can be brought alive from the use not just of data used to build the system but also interview responses from market research surveys commonly used in the consumer world.

Clearly, notwithstanding the similarities of business within each cluster, any taxonomy is bound to lose a certain level of detail from the original information from which it is built. The critical issue is whether this loss of detail is made up for by the advantages of a multivariate classification over separate one-dimensional discriminators.

Currently the product is awaiting the verdict of test users and the effectiveness of the results will vary according to the application — for example whether the system is used to profile existing customers or to target new ones. Initial reports show that using Commercial Mosaic in a mail-to-prospect environment can increase response rates from less than 1 per cent to over 5 per cent. Additionally, testers of the new system using cross-selling techniques to their existing portfolio report the following: 'Two particular groups were tested against randomly selected control cells. These were "independent entrepreneurs" and "local solid rocks". The results showed a considerable and consistent uplift between cells.'

This particular advocate of the new system has now moved on to test other types within their portfolio.

Figure 2 provides good evidence that when it comes to profiling an existing customer file a multivariate classification is likely to outperform significantly any individual one-dimensional B2B classification system.

It is believed that an additional strength of the new system is the easy visualisation of the target audience, its culture and business drivers. This

Verdict awaited

Table 1:	List of company clusters	;
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	. ,
Α	Major retail
	1 Major retail
В	Industrial blue chip
	2 Consolidating combines
6	3 New-born subsidiaries
C	National service
	4 Fliers and fixers
	5 Small subsidiary specialists
	7 Diversifying services
D	Floots and finances
D	8 Mini money movers
	9 Major money movers
	10 Couriers and carriers
	11 Motors and mobiles
	12 Motors and movers
	13 Vehicles and veg
E	Monumental monoliths
	14 Primary extractors
	15 Broad-brush base
	16 Far-sighted high fliers
_	17 Stable backbone
F	Specialist suppliers
	18 Wholesale heavies
	19 High-tech highlights
	20 Metal manipulators 21 Machine makers
	21 Machine makers 22 Expert engineers
	22 Chemistry class
	24 Research and development
	25 Printers and publishers
G	Local solid rocks
	26 Small-scale suppliers
	27 Repair and recreation
	28 Loaves and fishes
	29 Small-town stalwarts
	30 Painters and players
н	Hotels and catering
	22 Inns and eats
1	Health and social work
•	33 Carers and careers
	34 Nurses and nannies
	35 Doctors and therapists
J	Property portfolio
-	36 Big-boy builders
	37 Municipal melting pot
	38 Bricks and mortar
	39 Landlords and ladders
К	Independent entrepreneurs
	40 First-year survivors
	41 Business boosters
	42 Developing dynamos
	4.5 Fledgling nign filers
	Fnorgetic enterprises
L	45 Professional professors
	46 Supply-chain sophisticates
	47 Growers and garages
	48 Support supremos
	49 New kick-offs
Μ	Cottage industry
	50 Cottage industry



Figure 2: PIXEL and traditonal profiling lift versus random selection

enables more appropriate creative work to be designed with a specific audience in mind, ensuring the right message, incentive and response mechanism are used.

Conclusion

For many B2B marketing organisations there has been a reliance on both internal and external data. While the supply of internal data is only likely to increase, the ability to make decisions based upon it will diminish. Further, over time, there are issues relating to the continued supply of key external data. The Companies Act 1985 (Accounts of Small and Mediumsized Enterprises and Audit Exemption) Regulations 2004 allow for unaudited data to be provided to Companies House and over time it is reasonable to assume that the flow of data from this valuable source will be reduced further.

Faced with this shift of paradigm the use of multivariate techniques to provide a proxy for large amounts of external data is inevitable, and from early adopters one has seen encouraging results, as detailed above. The trends towards B2C levels of targeting will increase over time, so the creation of the first B2B multivariate is the first meaningful step in the right direction.

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Appendix 1: Description of one of the clusters of company Type E17 — Stable backbone

This small type employs 2.01 per cent of the total workforce, and comprises very large companies, with 85 per cent employing more than 100 staff. These staff are likely to be skilled and very productive.

These businesses are engaged in food manufacture and production of tobacco and petroleum products. They are utility companies and insurance companies, and provide recreational activities and other services. The majority of their turnover comes from commercial sales.

As their name suggests this is one of the least likely types to experience business failure. Their average risk indicator is over twice as positive as the UK general population and over 58 per cent of them are in the very lowest risk category — indeed, they are second in this particular league table. Conversely, less than 5 per cent fall into the very highest risk band compared to the UK average of 25 per cent.

They are high users of work-wear, rubber tyres, electrical components and freight and packaging services, as well as machine tools and cleaning equipment.

Mature businesses, these are part of corporate hierarchies with large boards of directors, a third of whom will be under 30. They are the least well-educated of the group, reasonably wealthy and show a high propensity towards rural life. Male directors outnumber females by eight to one.

Displaying the national average of nine directorships each, these directors nevertheless show a wide diversity, with 26 per cent having only one directorship, half the national average, compared to 22 per cent with over ten directorships, over twice the UK average.

Based countrywide, especially in Scotland, East Anglia, Yorkshire and the north-west, these businesses are under-represented in the south-east. They do not trade from residential areas, but are likely to trade from multiple sites, the average company in this type having seven sites.

Consequently directors in this type show the highest propensity in the group for frequent business trips by air, with overnight hotel accommodation also featuring heavily — they are nearly twice as likely than the average director to stay overnight in excess of 21 nights per year.

Holidays are taken in summer, often as many as three trips abroad, and weekend breaks are also popular with these directors. Any second property which is owned will not be overseas, nor will be held as investment, but will be a holiday home in the UK.