



# The determinants of online loan applications from small businesses

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## Abstract

**Purpose** – The purpose of this paper is to examine both the characteristics of the business customers and the types of venture which make use of online loan applications. Despite the growth in the use of technology in banking and the advent of online banking, little research has been conducted on the factors underlying online loan application behaviour amongst business banking customers.

**Design/methodology/approach** – A multivariate analysis is conducted on a USA dataset to empirically test the hypotheses derived in this paper. The empirical evidence is drawn from the US Survey of Small Business Finances, which contains 3,561 sample ventures, representing 5.3 million small businesses in the USA.

**Findings** – The paper finds that online loan behaviour is largely determined by the characteristics of the entrepreneur, rather than that of the venture. It is also found that factors that trust, evident in the length of the relationship between the applicants and their primary lender, is important. Moderating these effects is further evidence that suggests the number of lenders and distance between lenders and applicants has a marked effect on online loan behaviour.

**Originality/value** – This paper identifies the factors determining small business online loan application behaviour. This is important because the nature of online loan behaviour is changing the existing relationships between banks and customers. Whilst online loan applications afford banks the opportunity to substantially reduce costs, the danger is that long term relationships with customers are harder to cement.

**Keywords** Virtual banking, Loans, Small enterprises, United States of America, Behaviour

**Paper type** Research paper

## Introduction

The development and application of advanced information technologies is fundamentally altering the banking industry (Sanders, 2000). So far, much of the available research has followed two paths. First, it has looked at the impacts of these profound technological changes on the banking industry, either in terms of the perceptions of banking executives (Aladwani, 2001), threats to existing market structures (Hensmans *et al.*, 2001) or the relative importance of “bricks” (existing branch network) and “clicks” (degree of technological sophistication) (Corrocher, 2006). Second, it has sought to examine the way that the banking industry is seeking ways to reconfigure relational bonds with customers (Petersen and Rajan, 2002). Pivotal to this has been a general conceptual awareness of the importance of trust (Tapscott *et al.*, 2000), given that this is both a barrier to electronic commerce (Gefen, 2000) and “a significant antecedent of customers” willingness to engage in a transaction with web merchants (Yousafzai *et al.*, 2003, p. 847). Hence, there has been a concentration upon



the nature of the good/service (Hsieh *et al.*, 2005), bank reputational effects (Beck, 2001) and technological competence (Lee and Turban, 2001).

In this paper, we examine the online loan application behaviour of small business customers. We examine three aspects not fully covered in the prior research. First, we seek to provide empirical evidence of how online banking applications are mediated by the nature of existing relational bonds between applicants and banks, geographic distance and the type of existing financial institution providing loans. Our second concern is to examine the individual characteristics of the applicant. More generic research on trust and networks has emphasised not only the importance of existing relational bonds (Uzzi, 1999), but also the importance of the human capital (e.g. education, ethnicity and age) in explaining why individuals develop particular forms of trust (Granovetter, 1985). The importance of these factors is under-researched in this area. Finally, a third important moderating influence is likely to be the characteristics of the venture. Prior research has indicated that the size and structure of the banking industry has a strong impact on technology adoption and diffusion (e.g. Saloner and Shepard, 1995; Courchane *et al.*, 2002; Corrocher, 2006). Here we investigate if the size and structure of the individual venture also has an impact on online loan applications.

The paper is structured as follows. In the next part, we develop hypotheses to explore our three contributions. We then present the methodology and the results. We conclude by exploring what the implications are of this study.

### Hypotheses development

Advanced information technologies have been developed significantly over the last decades allowing banks to develop electronic lending and credit decision making systems and, thereby, fundamentally lower the costs of lending (Allen *et al.*, 2002). Berger (2003) has also shown that banks and their customers benefit from the improved technologies and overall productivity growth in terms of improved quality and variety of banking services to the extent that the large banking organizations have increased their share of small business loans by 8.4 per cent on average, or \$4 billion per institution (Frame *et al.*, 2001).

Although there are seeming benefits to electronic banking, prior research has tended to consider the bank-business consumer nexus from the perspective of the supplier of finance. A number of prior features emerge from these studies. In essence, the evidence points to the importance of relationship lending in improving both the availability of finance and reducing its cost (Petersen and Rajan, 1994; Berger and Udell, 1995). This is because relationship lending alleviates the problems of moral hazard and adverse selection since banks are surer of the quality and behaviour of loan applicants. This means they can potentially increase the availability and quantity of loans to their business customers (Degryse and Ongena, 2005) since the collection of information is easier and cheaper (Ang, 1991).

It may, however, be anticipated that the development of online loan applications, particularly for smaller business customers, will alter this relationship. This may be of positive benefit. Some customers, for example, who have strong relationship bonds with their bank developed over a period of time may welcome online applications as it reduces transportation costs and searching costs. Indeed, Degryse and Ongena (2005) found that spatial price discrimination is caused by transportation costs and as a result loan rates decrease with the distance between the venture and the lending bank.

Equally, online loan applications may be more likely to be conducted if the lender itself is seen as having reputational capital to mitigate against security concerns of the applicant. Indeed, a discernable difference is evident with depository financial institutions being more likely to be used and valued than non-depository financial or non financial institutions (Bitler *et al.*, 2001).

Whilst these factors may increase the trust and, thereby the likelihood of applications, trust may be inhibited if applicants are used to dealing in a personal way with key contacts in their locality. Another feature of the relationship between supplier and consumer is that the Internet allows for the development of what Uzzi (1997) terms "arms length" relationships where market transactions are mediated by both the cost of search and the actual cost of goods/services. Uzzi (1999) and Uzzi and Lancaster (2003) suggest that there is ample evidence that these arm length relationship are not necessarily valued in the bank-consumer nexus but, still, given superior knowledge of online financial services, online loan applications may be affected by the changing technology dynamic in banking.

Given these potentially contradictory impacts, there is no clear unequivocal evidence. Nonetheless, the sense is that closer relationships between customers and suppliers of finance should impact favourably on online loan applications:

*H1.* Online loan applications are more likely when there is a closer bank-consumer nexus.

Whilst the nature of transactional or relationship based ties may impact on online behaviour, a more under-researched aspect is how the human capital of the individual business consumer impacts on online behaviour. In the cognate field of bank lending research, particular features emerge which may guide the likelihood of online loan applications. First, the approval and pricing of loans are found to be highly related to the observable signals (Berger and Udell, 1990). This particularly pertains in relation to smaller business consumers since they are often dominated by single or small numbers of individuals, suggesting that patterns of financial services mimic those of these principal individuals. Similarly, Carow and Staten (1999) have found that there is a strong link between the human capital of individuals (e.g. age, sex, education) and the use of payments technologies like debit cards and electronic bill payment. For example, they suggest that debit card usage is negatively related to age and positively related to being middle-income, having more education, being married, owning a home, and holding more credit cards. Mantel (2000) also finds that the use of electronic bill payment services is positively related to age, income, homeownership, holding a credit card, and being female (see also Mantel and McHugh, 2001).

If applied to online loan applications it may be that individuals with greater human capital that is observable to the finance supplier will be more willing to countenance the use of such technology. This is because such individuals are less informationally opaque. Furthermore, the availability of formal information (e.g. tax forms and bank statements) implies greater transparency to outsiders, hence reducing the search and monitoring costs. In general, therefore, it may be anticipated that the following will hold:

*H2.* Online loan applications are more likely when the individual business consumer has evident human capital attributes.

Banks, however, do not just look at the principals concerned in any venture. Being principally interested in low returns for low risks, they also pay particular attention to the financial vitality of the venture. Research on this area in relation to online loans has been limited, but it is clear that the available research suggests key features. First, what is likely to improve the financial capability of a venture is the breadth of ownership structure given that Petersen and Rajan (2002) argue that those with more dispersed shareholders are more palatable to outside investors. Second, smaller ventures are particularly prone to failure in situations when they are young or under-capitalised. This, though, may not mean that older ventures see advantages in pursuing online loan applications. As with younger individuals, younger ventures may be less used to particular ways on dealing with their funding requirements and, therefore, more open to using new technologies. In other words, because their business has, *ceteris paribus*, weaker relationship bonds with prospective or actual finance suppliers, they may be more prone to considering alternative mechanisms. The suggestion, therefore, is that:

*H3.* Online loan applications are more likely when the venture has weaker relationship bonds with finance suppliers.

### Data

To understand the nature of online loan applications, the empirical evidence is drawn from the US Survey of Small Business Finances (SSBF98) which is a large scale and representative survey of smaller businesses. The dataset contains 3,561 sample ventures, representing 5.3 million small businesses in the USA. These ventures are selected on the basis that they are all for-profit, non-financial, non-farm, non-subsidary businesses with fewer than 500 employees with the view to understanding the opaque but general use of credit by smaller ventures.

### Variables and estimation procedure

Crucially, the survey does consider online loan applications which as the dependent variable is coded as 1 if the sample venture applies for loans or other forms of credit online (credit card, credit line, motor vehicle loan, equipment loan and other loan) (zero otherwise). For the independent variables – and following on from the hypotheses – we group these into three categories: finance supplier; principal characteristics; and venture characteristics. The particular characteristics of the variables and summary statistics for these variables are identified in Table I. Principally, the main interest is in using a logistic estimation procedure for the 2,642 available observations. We control the sample ventures by only looking at those ventures with external finance demands (credit card, credit line, motor vehicle loan, equipment loan and other loan). Not reported (but available upon request) are fifteen control variables including eight industry binary variables based on two-digit SIC code, one dummy of Metropolitan Statistical Area, three dummies representing the region where sample venture headquarters, and two binary variables indicating the market concentration.

### Results

Table II lists the regression results of the logistic model. In terms of *H1*, use is made of six measures to understand the nature of the bank-consumer nexus. These proxies look

Variable	Mean	SD	Median	Min.	Max.
Online loan applicant (0,1)	0.041000	0.198317	0	0	1
Being discouraged from borrowing (0,1)	0.222690	0.416111	0	0	1
Firm age in years	14.44117	12.10922	11	0	104
Incorporated (0,1)	0.535243	0.498826	1	0	1
Family owned (0,1)	0.853131	0.354025	1	0	1
Owner managed (0,1)	0.896377	0.304813	1	0	1
Total employment number	25.52682	54.60014	5	1	482
Business assets in \$ million	1.460187	5.324454	0.09511	0	99.9120
College degree or above (0,1)	0.521764	0.499596	1	0	1
Male owner (0,1)	0.735187	0.441296	1	0	1
Minority owner (0,1)	0.143499	0.350630	0	0	1
Owner's age in years	50.71525	11.26800	50	19	95
Years of experience	19.21286	11.79086	18	0	72
Personal wealth in \$ million	0.931736	3.602030	0.275	0	115
Business credit card user (0,1)	0.399326	0.489829	0	0	1
Tax form record user (0,1)	0.184499	0.387945	0	0	1
Financial statement record user (0,1)	0.121560	0.326863	0	0	1
Bank statement record user (0,1)	0.035664	0.185477	0	0	1
Ownership owned by principal owner (%)	80.36563	27.26183	100	1	100
Number of owners	6.158944	69.77546	1	1	2500
Primary institution is a depository financial institution (0,1)	0.911542	0.284000	1	0	1
Distance to the primary institution in miles	17.13400	132.0292	2	0	3253
Length of relationship with primary institution in months	97.62179	100.0791	60	0	780
Number of sources of financial services	2.300197	1.523790	2	0	8
Primary institution is closer (0,1)	0.534681	0.498866	1	0	1
Relationship with primary institution is longer (0,1)	0.585510	0.492703	1	0	1

**Table I.**  
Variables and descriptive statistics

**Notes:** Total number of observations is 3,561. Descriptive statistics for control variables are not reported here

at the complex nature of relationship bonds by looking at the influence of geographical distance, the length of relationship and the number of the sources of finance used by the principal to see if there are any evident explanations for the use of online loan applications. A further twelve variables are used to identify the nature of the human capital of the principal. Some of these relate to standard human capital attributes (e.g. gender, ethnicity, age, business experience and financial wealth) but included are also measures of credit card use and their capacity to provide formal business information (e.g. bank statement record user, tax forms). Finally, the third set of data provides information on venture characteristics to establish how well established in age, ownership or in capitalisation they are.

In terms of our first hypothesis that online loan applications are impacted by the bank-consumer nexus, there is some evidence to suggest that these factors do impact. Principally, what Table II shows is that business consumers are more likely to make online loan applications if they have a longer relationship with their primary financial service provider than those with other providers. There are two possible reasons for

Parameter	Estimate	Standard error	Chi-square	Pr > Chi-square
<i>Finance supplier</i>				
Length of relationship with primary institution in months*	0.0349	0.1188	0.0860	0.7693
Relationship with primary institution is longer (0,1)	0.4161	0.2441	2.9067	0.0882
Primary institution is a depository financial institution (0,1)	0.2345	0.6601	0.1262	0.7224
Distance to the primary institution in miles*	0.1599	0.0802	3.9716	0.0463
Number of sources of financial services	0.2229	0.0824	7.3189	0.0068
<i>Principal characteristics</i>				
Owner managed (0,1)	-0.2883	0.2882	1.0012	0.3170
College degree or above (0,1)	0.3239	0.2100	2.3791	0.1230
Male owner (0,1)	0.2318	0.2350	0.9723	0.3241
Minority owner (0,1)	-0.0835	0.2745	0.0926	0.7609
Owner's age in years*	-2.1069	0.5910	12.7094	0.0004
Years of experience*	0.3787	0.2199	2.9654	0.0851
Personal wealth in \$ million	-0.1696	0.2384	0.5061	0.4768
Business credit card user (0,1)	0.3546	0.1978	3.2138	0.0730
Tax form record user (0,1)	-0.2133	0.2640	0.6528	0.4191
Financial statement record user (0,1)	-0.1389	0.2972	0.2183	0.6403
Bank statement record user (0,1)	0.1837	0.5062	0.1317	0.7167
Ownership owned by principal owner (%)*	0.2101	0.3421	0.3772	0.5391
Primary institution is closer (0,1)	0.0143	0.2596	0.0031	0.9559
<i>Venture characteristics</i>				
Family owned (0,1)	-0.0698	0.3167	0.0486	0.8256
Firm age in years*	-0.2666	0.1677	2.5278	0.1119
Total employment number*	-0.0419	0.0956	0.1920	0.6613
Business assets in \$*	0.0200	0.0557	0.1288	0.7196
Number of owners*	-0.1771	0.2753	0.4140	0.5200
Number of observations	2,642			
- 2LogL	944.370			
Likelihood ration	80.3051			
DF	37			
Percent concordant	71.1			
P <sub>seudo</sub> R <sup>2</sup>	0.08			

**Notes:** \* These variables are calculated as natural log value of one plus true value. The probability modeled is online loan application = 1. Not reported (but available upon request from the authors) are the results of control variables

**Table II.**  
Probability of applying  
loans online

this effect. One is that online application complements the trust built up through personal contacts and lowers the transaction costs for both small business borrowers and primary lenders (Uzzi, 1999). This interpretation is based on the assumption that small business borrowers apply loan online from the primary institution. It is not implausible because the primary financial service provider has the advantage of prior monitoring information which, in turn, encourages their consumers to use online applications to lower the cost to the consumer.

Further support for this view is evident in terms of physical distance. Table II suggests that distance is positively associated with the likelihood of applying for a loan

online, indicating that online loan application reduces the transaction costs. However, Table II also indicates that the probability of applying loan online is positively associated with the number of financial services used. This also supports *H1*. Overall, it appears that the closer the relationship, the less likely the business applies loans online. This is because the benefits of private information collection in close relationships are favourable for both the bank and their customer since concentrated relationships provide: stronger incentives for banks to invest in producing information; and borrowers may benefit from this with easier access to finance (Petersen and Rajan, 1994) and favorable contract terms, such as lower costs (Berger and Udell, 1995).

Table II identifies that there are few principal characteristics that influence online loan applications. Of note, however, is that the probability of applying loan online decreases with the age of entrepreneur. Interestingly, however, the obverse holds for those with greater business experience since they are more likely to perceive, as with credit card users, advantages in online loan applications. On the whole, these points aside there is little wholesale evidence for the impact of these factors and *H2* is partially supported. Meanwhile, none of the suggested variables characterising the venture (*H3*) have any impact, pointing to the suggestion that younger ventures or those with potentially weaker capital structures are no more likely to apply online.

### Conclusions

The aim of this paper was to investigate three particular aspects of online loan applications. In particular, we wished to deepen our understanding of the nature of the bank-consumer nexus given the development of advanced information technologies and how these have altered finance. Prior research has indicated that these relationship bonds are principally moderated by notions of trust. Online banking developments, whilst they potentially offer both the bank and the business consumer significant cost advantages have not, based upon these results, had a significant early impact on the relationships. Instead of preferring “arms length” transactional savings (Uzzi, 1999), the evidence presented here argues that the intangible nature of personal contact is sticky and remains pivotal. This situation is likely to be fluid. The paper finds evidence that business experience impacts favourably on the likelihood of loan applications, indicating that there are some learning effects. One implication, therefore, may be that practitioners have to continue to strive to explore and extend their marketing strategies to embed the advantages of online loan applications. Whilst it may be clear to the banking industry that there are clear cost advantages, business consumers still appear to perceive fewer advantages. Given that there is still a need to understand the logic of personal trust, one further implication is the need to consider how such technologies can be used to put their business customers “arms around” rather than keep them at “arms length”.

### References

- Aladwani, A.M. (2001), “Online banking: a field study of drivers, development challenges, and expectations”, *International Journal of Information Management*, Vol. 21 No. 4, pp. 213-25.
- Allen, F., McAndrews, J. and Strahan, P. (2002), “E-finance: an introduction”, *Journal of Financial Services Research*, Vol. 22, pp. 5-27.
- Ang, J.S. (1991), “Small business uniqueness and the theory of financial management”, *Journal of Small Business Finance*, Vol. 1, pp. 1-13.

- Beck, H. (2001), "Banking is essential, banks are not. The future of financial intermediation in the age of the internet", *Netnomics*, Vol. 3, pp. 7-22.
- Berger, A.N. (2003), "The economic effects of technological progress: evidence from the banking industry", *Journal of Money, Credit and Banking*, Vol. 35, pp. 141-76.
- Berger, A.N. and Udell, G.F. (1990), "Collateral, loan quality, and bank risk", *Journal of Monetary Economics*, Vol. 25, pp. 21-42.
- Berger, A.N. and Udell, G.F. (1995), "Relationship lending and lines of credit in small firm finance", *Journal of Business*, Vol. 68, pp. 351-81.
- Bitler, P.P., Robb, A.A. and Wolken, J.D. (2001), "Financial services used by small businesses: evidence from the 1998 Survey of Small Business Finances", *Federal Reserve Bulletin*, April, pp. 183-205.
- Carow, K. and Staten, M.E. (1999), "Debit, credit, or cash: survey evidence on gasoline purchases", *Journal of Economics and Business*, Vol. 51, pp. 409-21.
- Corrocher, N. (2006), "Internet adoption in Italian banks: an empirical investigation", *Research Policy*, Vol. 35, pp. 533-44.
- Courchane, M., Nickerson, D. and Sullivan, R. (2002), "Investment in internet banking as a real option: theory and tests", *Journal of Multinational Financial Management*, Vol. 12, pp. 347-63.
- Degryse, H. and Ongena, S. (2005), "Distance, lending relationships and competition", *Journal of Finance*, Vol. 60, pp. 231-66.
- Frame, W.S., Srinivasan, A. and Woosley, L. (2001), "The effect of credit scoring on small-business lending", *Journal of Money, Credit and Banking*, Vol. 33, pp. 813-25.
- Gefen, D. (2000), "E-commerce: the role of familiarity and trust", *Omega: The International Journal of Management Science*, Vol. 28 No. 6, pp. 725-37.
- Granovetter, M. (1985), "Economic action and social structure: the problem of embeddedness", *American Journal of Sociology*, Vol. 91, pp. 481-510.
- Hensmans, M., van den Bosch, F.A.J. and Volberda, H.W. (2001), "Clicks vs bricks in the emerging online financial services industry", *Long Range Planning*, Vol. 34, pp. 231-47.
- Hsieh, Y., Chiu, H. and Chiang, M. (2005), "Maintaining a committed online customer: a study across search-experience-credence products", *Journal of Retailing*, Vol. 81 No. 1, pp. 75-82.
- Lee, M. and Turban, E. (2001), "A trust model for consumer internet shopping", *International Journal of Electronic Commerce*, Vol. 6 No. 1, pp. 75-91.
- Mantel, B. (2000), "Why do consumers pay bills electronically? An empirical analysis", *Economic Perspective*, Federal Reserve Banking of Chicago, Chicago, IL, pp. 32-47.
- Mantel, B. and McHugh, T. (2001), "Competition and innovation in the consumer e-payments market: considering the demand, supply, and public policy issues", *Emerging Payment Occasional Working Paper Series*, Federal Reserve Bank of Chicago, Chicago, IL.
- Petersen, M.A. and Rajan, R.G. (1994), "The benefits of lending relationships: evidence from small business data", *Journal of Finance*, Vol. 49, pp. 3-37.
- Petersen, M.A. and Rajan, R.G. (2002), "Does distance still matter? The information revolution in small business lending", *Journal of Finance*, Vol. 57, pp. 2533-70.
- Saloner, G. and Shepard, A. (1995), "Adoption of technologies with network effects: an empirical examination of the adoption of automated teller machines", *RAND Journal of Economics*, Vol. 26, pp. 479-501.
- Sanders, M. (2000), *Global eCommerce Approaches Hypergrowth*, Forrester Research, Inc., Cambridge, MA.



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- Tapscott, D., Ticoll, D. and Lowy, A. (2000), *Digital Capital: Harnessing the Power of Business Webs*, Harvard Business School Press, Boston, MA.
- Uzzi, B. (1997), "Social structure and competition in interfirm networks: the paradox of embeddedness", *Administrative Science Quarterly*, Vol. 42, pp. 35-67.
- Uzzi, B. (1999), "Social relations and networks in the making of financial capital", *American Sociology Review*, Vol. 64, pp. 481-505.
- Uzzi, B. and Lancaster, R. (2003), "Relational embeddedness and learning: the case of bank loan managers and their clients", *Management Science*, Vol. 49 No. 4, pp. 383-99.
- Yousafzai, S.Y., Pallister, J.G. and Foxall, G.R. (2003), "A proposed model of e-trust for electronic banking", *Technovation*, Vol. 23, pp. 847-60.

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