Abstract
Whereas the resource-based view (RBV) of the firm is the dominant theory in strategic management research, it has hardly been applied to e-Business. This paper aims at identifying key performance drivers for small and medium-sized companies that sell online (e-SMEs), by empirically examining the impact of resources and capabilities on financial performance and on Internet performance. Regression results of 106 companies showed that resources and capabilities differ in their impact on financial and on Internet performance. Business resources are important predictors of both financial performance and Internet performance. However, dynamic capabilities only affect financial performance (and not Internet performance), and IT resources only drive Internet performance (and not financial performance). The findings have implications for both researchers and practitioners. For researchers the results imply that the choice of the dependent variable can change the main conclusions of a study and, therefore, has to be conducted carefully. For managers of e-SMEs the main conclusion is that dynamic capabilities do not drive Internet performance.

Keywords: e-Business, Internet, resource-based view, performance, SMEs

INTRODUCTION
Ninety-nine per cent of all companies in the USA and Europe are small and medium-sized enterprises (Adam et al. 1998) and they create about 80% of economic growth (Jutla et al. 2002). Yet research on small and medium-sized enterprises (SMEs) is still rare, especially in the area of e-Business. This is surprising because the rapid development of the World Wide Web as a communication and marketing medium would appear to offer small and medium-sized enterprises (SMEs) tremendous opportunities. Implicit promises include access to world markets, low cost entry into new markets, and the ability to gain efficiencies in business processes.

We define e-Business as business activities conducted over the Internet (Zhu et al. 2003), and focus especially on e-commerce SMEs (e-SMEs), defined as small and medium-sized companies that sell online (Feindt et al. 2002). Therefore, the sample includes clicks-and-mortar companies and dotcoms. The advantage of concentrating on companies that sell online is that only those companies that use the Internet to some degree are analysed. In contrast, the term e-Business is used for an activity, and does not affect the sampling procedure. Our definition of e-Business includes more activities than just sales, like for example transactions with suppliers and gathering information. The advantage of the relatively wide definition of e-Business is that we could ground this research in a rich literature review.

Whereas little research has been conducted about performance drivers of e-SMEs, the question ‘why are firms successful?’ has been driving strategic management research for decades. The dominant framework in strategic management research for identifying reasons for performance differentials has been the resource-based view of the firm (RBV), with its main proposition that a firm’s performance is driven by the resources and capabilities it controls (Barney 1991; Penrose 1959; Wernerfelt 1984). The RBV has been applied in several management studies, but research on strategic assets in the context of e-Business is still rare (see Melville et al. 2004 for a review). Although it has been suggested that a main reason for small companies’ performance problems in deploying IT and the Internet is resource poverty (Kleindl 2000) and that companies that expand into e-Business need to develop additional strategic assets (Daniel and Wilson 2003), little is known about which resources and
capabilities drive Internet performance compared to drivers for financial performance. Thus this paper addresses the suggestions of Ray et al. (2004) to supplement research on the impact of strategic assets on the highly aggregated firm performance by analysing the impact on more disaggregated performance levels. Our paper aims at examining similarities and differences of the impact of strategic assets on Internet and on financial performance. The key research questions for the paper are:

- Which resources and capabilities are important for Internet performance?
- Which resources and capabilities are important for financial performance?
- Do the resources and capabilities that drive Internet performance differ from those that drive financial performance?
- Can the choice of the dependent variable (e.g. Internet or financial performance) change the main conclusions of a study?

We approached those questions by conducting a postal survey of 106 e-SMEs. Our research contributes to the literature by demonstrating that the choice of the performance measure as a dependent variable can change the main conclusions of a study and should, therefore, be conducted carefully. Furthermore this paper can help managers to understand better the role of resources and capabilities as drivers of Internet performance and financial performance.

The remainder of the paper is structured as follows. In the next section the literature on the RBV and on e-Business is briefly reviewed. After that hypotheses are developed and a research design is suggested. Finally, the results are presented, the implications for theory and practice are highlighted and the limitations of the study are discussed.

**THE RESOURCE-BASED VIEW IN E-BUSINESS RESEARCH**

The resource-based view is based on the work of Penrose (1959), Wernerfelt (1984) and Barney (1991), who suggested that firms control a bundle of strategic assets (resources and capabilities), which can lead to competitive advantage. Definitions for resources, capabilities, and strategic assets are provided in Table 1.

The RBV has also been applied to e-Business research. For example Rindova and Kotha (2001) examined how the organizational form, function and competitive advantage of Yahoo! and Excite dynamically coevolved. The authors introduce the concept of ‘continuous morphing’ to describe the comprehensive ongoing transformations through which the firms sought to regenerate their transient competitive advantage on the Internet. Dynamic capabilities and strategic flexibility are two organizational mechanisms that facilitate continuous morphing. Tigre and Dedrick (2004) found out that industries with strong IT capabilities and a historical orientation toward automation tend to adopt e-business earlier. Zhu and Kraemer (2002) examined the relationship of dynamic capabilities and some measures of financial performance (profitability, cost reduction and inventory efficiency) and came to inconsistent results for traditional and technology companies. Zhu (2004) found complementarity between e-commerce capability and IT-infrastructure and a positive relationship to financial performance (measured in terms of sales per employee, inventory turnover and cost reduction). Barua et al. (2004) found that strategic assets (processes, IT and customer and supplier readiness) enhance online informational capabilities which then lead to higher financial performance.

Financial performance is a common and an extremely important dependent variable in strategic management and e-Business research. But the examination of Internet performance in addition to financial performance yields some advantages. First, companies may have competitive advantage in some areas and competitive disadvantages in others. Therefore, strategic assets may have different impacts on financial and Internet performance, and examining their association with the highly aggregated financial performance can lead to misleading results for Internet performance. Second, the benefits that were created by the competitive advantage of deploying the Internet could be appropriated by various stakeholders before they increase financial performance. And third, a firm may be unable to fully exploit the potential of the Internet. In conclusion, a firm may excel in some

<table>
<thead>
<tr>
<th>Table 1. Definitions</th>
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<tr>
<td><strong>Resources</strong></td>
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<tr>
<td><strong>Dynamic capabilities</strong></td>
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<td><strong>Strategic assets</strong></td>
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</table>
business processes, be average in others, and be bad in still other ones. Financial performance depends, among other things, on the net effect of its processes. Deploying Internet performance, which is a disaggregated dependent variable compared to financial performance, can facilitate the testing of resource-based logic (Ray et al. 2004). Furthermore it enables comparisons between the impact of strategic assets on financial and Internet performance. Surprisingly, we have not been able to find a study that directly compares the impact of resources and capabilities on financial performance with their impact on Internet performance.

THEORY AND HYPOTHESES

Powell and Dent-Micallef (1997) developed a model for analysing the impact of business resources, human resources and IT resources on IT-performance and financial performance. It is based on the work of Walton (1989) and Keen (1993). Walton (1989) and Benjamin and Levinson (1993) divided strategic assets into the categories organizational, business, and technological. Keen (1993) used the categories human, business, and technology assets. He believed that IT can be used to leverage human and business resources and thus create competitive advantage. The model for our research (see Figure 1) is a modification of the Powell and Dent-Micallef (1997) framework. The main difference is the replacement of human resources by dynamic capabilities, because dynamic capabilities are measured on an organizational as compared to an individual level, which seems to be more appropriate for an organizational-level study. Whereas we use a research model that is very similar to the Powell and Dent-Micallef model we deploy it in a different context. In particular we aim to compare drivers of Internet and of financial performance, and to analyse how the choice of the dependent variable can affect the conclusions in e-Business research. Financial performance is a proxy for overall firm performance and Internet performance is defined as the degree to which firm performance has been improved by the Internet.

Dynamic capabilities

Dynamic capabilities include the following processes (Teece et al. 1997):
1. Building strategic assets and learning;
2. Coordinating and integrating internal and external assets; and
3. Reconfiguring and transforming strategic assets.

The basic assumption of the dynamic capabilities framework is that today’s fast changing markets force firms to respond quickly and to be innovative. Therefore, the following three dynamic capabilities are necessary. First, in order to meet these challenges organizations and their employees need the capability to learn quickly. Second, new strategic assets, like for example knowledge, technology and customer feedback, have to be integrated within the company. And third, existing strategic assets have to be transformed or reconfigured (Teece et al. 1997).

The dynamic capabilities framework is generally accepted in strategic management research (see, e.g., Eisenhardt and Martin 2000; Teece et al. 1997), and has also been applied to IT research (e.g., Sher and Lee 2004) and in e-Business research (e.g., Daniel and Wilson 2003). In particular Daniel and Wilson (2003) examined the role of dynamic capabilities in e-Business transformation of large ‘bricks and clicks’ companies. They identify eight distinct dynamic capabilities associated with e-Business transformation. One group is associated with the need for innovation due to the characteristics of the e-Business environment, while the second group relates to the need to incorporate or integrate e-Business in the existing operations of the business. Whereas the importance of dynamic capabilities for firm performance is generally accepted in strategic management research (Eisenhardt and Martin 2000; Teece et al. 1997) and several case studies have indicated their importance for e-Business (e.g., Daniel and Wilson 2003; Rindova and Kotha 2001) little is known about how dynamic capabilities affect different levels of performance. This paper aims to compare the impact of strategic assets on financial performance with the impact on Internet performance. Therefore the relationships of the strategic assets with each dependent performance measure is analysed separately, and then the results are compared. We suggest the first set of hypotheses:

Hypothesis 1a (DC-FP): Dynamic capabilities explain significant financial performance variance among e-SMEs.
Hypothesis 1b (DC-IP): Dynamic capabilities explain significant Internet performance variance among e-SMEs.
Business resources

Resources are converted into final products or services using a wide range of other firm assets and bonding mechanisms such as technology, management information systems, incentive systems, and more. These resources consist inter alia, of know-how that can be traded (for example patents and licences), financial or physical assets (for example property, plant and equipment), human capital and so on (see Grant (1991) for a detailed description of tangible and intangible resources). The majority of e-Business research only examines dynamic capabilities rather than resources (e.g., Daniel and Wilson 2003; Rindova and Kotha 2001). However, we believe that resources also play an important role for Internet performance. We, therefore, include business resources in our model to analyse how they affect different levels of performance and to compare their impact to dynamic capabilities.

The concept of business resources is a modification of the Powell and Dent-Micallef (1997) framework and consists of five sub-categories: relationships with customers and suppliers; external-driven e-business; benchmarking; strategic use of the Internet; and financial resources. We now consider each of them in turn.

The variable set for business resources covers a wide field of strategic assets (see Powell and Dent-Micallef (1997) for a more detailed description). In contrast to our set of dynamic capabilities it also includes external aspects. The relationships with customers and suppliers can be a valuable strategic asset for financial performance (Hall 1993; Winter 1987) and Internet performance (Keller Johnson 2002; Schroder and Madeja 2004). Similarly, supplier- and customer-readiness for conducting online transactions can be a source of competitive advantage (Zhu et al. 2002). Benchmarking is used as a proxy for the management’s interest and activity in competitive intelligence (Powell and Dent-Micallef 1997).

Especially for small companies a lack of financial resources can be a source for competitive disadvantage (Caldeira and Ward 2003; Chow et al. 1997). Therefore we can say:

Hypothesis 2a (BR-FP): Business resources explain significant financial performance variance among e-SMEs.

Hypothesis 2b (BR-IP): Business resources explain significant Internet performance variance among e-SMEs.

IT resources

IT resources can be defined as ‘the extent to which a firm is knowledgeable about and effectively utilizes IT to manage information within the firm’ (Tippins and Sohi 2003: 748). We used the Tippins and Sohi (2003) framework, which consists of IT knowledge (the extent to which a firm possesses a body of technical knowledge about objects such as computer based systems), IT operations (the extent to which a firm utilizes IT to manage market and customer information), and IT objects (computer-based hardware, software and support personnel).

The importance of IT for firm performance is still unclear. Empirical work is frequently inconclusive (see Wade and Hulland (2004) for a review). Conceptual work frequently suggests that IT per se can’t create sustainable competitive advantage (Clemons and Row 1991, Mata et al. 1995), but that IT resources can be complementary and thus increase the value of other strategic assets (Henderson and Venkatraman 1993; Porter 2001). Powell and Dent-Micallef (1997) examined the role of IT resources empirically. Although they found no direct linkage between IT resources and financial performance, they found some indicators for complementarity of IT resources and other strategic assets (e.g., human resources and business resources). In conclusion, current research suggests no direct linkage between IT resources and the highly aggregated financial performance.

Please note that this is the only hypothesis that does not imply a positive relationship.

Hypothesis 3a (IT-FP): IT resources do not explain significant financial performance variance among firms.

Hypothesis 3b (IT-IP): IT resources explain significant Internet performance variance among e-SMEs.

METHODOLOGY

The sample

There are various examples of cross-sectional e-Business research (e.g., Gibbs and Kraemer 2004; Xu et al. 2004) and of research within one specific industry (e.g., search
engines (Rindova and Kotha 2001) or the airline industry (McIvor et al. 2003)). This study aims at identifying performance drivers that are widely generalizable for SMEs in different industries and is, therefore, cross-sectional. Thus it complies with the resource-based view, which is grounded in the assumption that performance differences are mainly caused by firm and not by industry effects (e.g., Barney 1991; Hawawini et al. 2003; Penrose 1959). Yeoh and Roth (1999) argue that resources and capabilities are unique for each industry; we believe that, for example, the quality of customer relationships, which has already been applied for retailers (Powell and Dent-Micallef 1997) or the capabilities of coordination, which has been used for manufacturing companies (Caloghirou et al. 2004), can be valuable for all profit-organizations. Furthermore, the Internet blurs and shifts existing market boundaries (Amit and Zott 2001) and, therefore, the significance of differentiation between industries appears to be less important. In our analysis we distinguished between manufacturing, retail and service industries and did not find any significant industry effects.

Feindt et al. (2002) defined e-commerce SMEs as small and medium-sized companies that sell online. This definition includes so called dotcoms and clicks-and-mortars. SMEs, as defined by the European Union, are organizations employing less than 250 people.

We used the ‘First Stop Shop’ (an organization funded by the European Union and the Belfast City Council) database for our sample, because it was the only database that we are aware of that also includes a large number of websites of local companies (Belfast/ Northern Ireland/UK). We focused especially on local companies because this paper is part of a bigger research project, which also required interview data. We selected those companies that provided their Internet address in the database and sent them a questionnaire. The managers were then asked about the percentage of sales that are conducted online and only those companies that sell online were included in our analysis.

The original database contained 7,600 companies; 2,377 of which provided their Internet address. After separating the non-profit organizations, 1,963 addresses remained. 50 companies were used for the pilot. A questionnaire was sent to the remaining 1,913 subjects. Forty-four questionnaires were returned because the companies have gone away or closed, and 11 answered that they would not complete the questionnaire because it was not appropriate for their organization. This led to a sample of 1,858 companies, from which 228 questionnaires were returned, giving a response rate of 12.3%. However after eliminating the remaining non-profit organizations, non-independent, too large, and companies without online sales, 106 companies remained.1 It is hardly possible to identify the usable response rate, but we can offer an educated guess. The questionnaire was sent to any company with a website. In our analysis however, we included only those that create revenues on the Internet. According to the E-Business Policy Group (2002) about 33% of website owning companies in the UK sell online. The population of companies consists of 1,858 firms; we therefore expect about 613 companies (=33%) to sell online. In our survey, 106 questionnaires were returned which equals a usable response rate of 17.3% (106/613). This response rate is not great but similar to the 15–24% range reported in similar studies (e.g., Provan and Skinner 1989) and was satisfactory considering the requirement of CEO’s direct involvement (Lee et al. 2001).

Firm characteristics of early and late respondents in terms of size (number of employees) and financial performance were compared to check for non-response bias. These comparisons did not reveal any significant differences, indicating that non-response was not a problem (Tippins and Sohi 2003).

Eight (7.5%) of the respondents were manufacturing, 38 (35.9%) service, and 60 (56.6%) retail companies. On average 19.8% of company revenues were created online, 24% of products and services were procured on the Internet, and 18.9 staff were employed.

The measures

The independent variables. The independent variables are shown in Table 2. They were all measured on a 5 point Likert scale. They consist of business resources (a modification from Powell and Dent-Micallef 1997), dynamic capabilities (a modification from Sher and Lee 2004), and IT resources (a modification from Tippins and Sohi 2003). Only slight modifications were necessary because the original measures were actually designed for large rather than small companies. The measures are shown as Appendix 1. We dropped the following two variables: One of the set for business resources about cross sectional teams and one of the set for IT resources about a formal IT department. We believe that small companies typically neither have cross sectional teams nor a formal IS department, and we therefore dropped them. We included 10 new questions, the vast majority of them in the dynamic capabilities section according to the suggestions of Caloghirou et al. (2004). The reason for the modifications of the original dynamic capabilities construct was that they were used as a set of dependent variables and that section appeared quite short. The questionnaire is shown as Appendix 1 and details of the modifications can be obtained from the first author.

The dependent variables. In this paper we distinguish between financial performance and Internet performance. Financial performance is a proxy for overall firm performance and Internet performance is defined as the
degree to which firm performance has been improved by
the Internet. The performance measures of Powell and
Dent-Micallef (1997) were used. Financial performance
was examined in terms of revenues, sales growth and
return on assets. Revenues indicate the company's
success in its market transactions; sales growth indicates
the increasing customer acceptance; and return on assets
indicates the management's effectiveness in employing
their assets. Managers are asked if their performance over
the past three years was outstanding and if they have
exceeded their competitors. Internet performance is a
modification of Powell and Dent-Micallef's IT perfor-
mance. Like Zhuang and Lederer (2003), we slightly
changed the Powell and Dent-Micallef measures by
replacing the impact of IT by the impact of the Internet.
Therefore, managers were asked about the impact of the
Internet on their productivity, competitive position,
sales, profitability and overall performance.

It is broadly accepted that objective performance
measures are highly correlated with the subjective ones,
and can be used if subjective data is not available (Dess
1987; Dess and Robinson 1984; Powell and Dent-
Micallef 1997). By using subjective measures it is
assumed, given the senior executives involved, that
respondents had sufficient perspective and information
to assess their firm performance relative to competitors.
Some researchers even prefer subjective measures,
because it could reduce the problems of varying
accounting conventions in areas such as inventory
valuation, depreciation and officers' salaries (Powell
and Dent-Micallef 1997). We ideally would have
preferred to triangulate the perceived performance
with accounting-based data, but SMEs are usually
held privately and would not provide confidential
information as a matter of policy. We have also been
unable to find valid secondary data. But even where
secondary data is available, SME organizational form
(sole proprietorship, partnership, corporation, etc.) can
cause artificial differences. Also, owner compensation
can affect the performance of small, privately held firms
(Dess and Robinson 1984).

RESULTS

Strategic assets and financial performance

The vast majority of quantitative resource-based research
deploys linear regression models (e.g., Klassen and
Whybark 1999; Robins and Wiersma 1995; Wang and
this linear regression model was estimated:

\[ Z_Y = \alpha + \beta_B Z_B + \beta_D Z_D + \beta_I Z_I + \epsilon \]

\( Z_Y \) stands for financial performance, \( \alpha \) for the intercept \( B \)
for the variable set of business resources, \( D \) for dynamic
capabilities, and \( I \) for IT resources. \( \beta_X \) are the
standardized partial regression coefficients. According
to the hypotheses it is assumed that \( \beta_B \) and \( \beta_D \) will be
positive and significant and \( \beta_I \) will be about zero (Powell
and Dent-Micallef 1997). \( \epsilon \) is the residual term that
captures the net effect of all unspecified factors.

The correlations of all variables are presented as
Appendix 2. Table 3 shows the Cronbach alphas as a
measure for scale reliability. The dependent variables
were relatively high with 0.95 for Internet performance
and 0.9 for financial performance. Cronbach alphas of all
independent variables exceeded the recommended minimum of 0.6 (Bagozzi and Yi 1998), with a range from 0.6 to 0.9 for business resources (overall 0.8), 0.6 to 0.9 for dynamic capabilities (overall 0.9), and 0.6 to 0.9 for IT resources (overall 0.9).

All variables are significantly correlated to Internet and financial performance (see Table 3). Managers of e-SMEs attributed financial performance to dynamic capabilities ($r = 0.414^{***}$), to business resources ($r = 0.331^{**}$) and to IT resources ($r = 0.259^{**}$).

Table 4 shows the results from the multiple regressions for the independent variable sets (business resources, dynamic capabilities and IT resources), the control variable (firm size, ln emp, measured as the natural logarithm of employees), and for the dependent variable (financial performance). The variables combined explain 26.9% of performance variance, and an estimated 23.8% of variance in population (using adjusted $R^2$, which estimates population effects based on sample degrees of freedom). The adjusted $R^2$ of 23.8% is similar to other resource-based studies deploying highly aggregated financial performance as a dependent variable (for example, Robins and Wiersma (1995) had 23%) and it is higher than the 20% of the study in which the conceptual framework was developed (Powell and Dent-Micallef 1997).

The significant intercorrelations between some variables suggested multicollinearity, which was resolved by dropping variables (Gujarati 1995). Variables with a higher correlation than 0.5 to included variables were dropped (benchmarking, integration, reconfiguration, IT knowledge and IT objects).

The variables ‘relationships’, ‘external driven e-Business’, ‘strategic Internet’ and ‘IT operations’ were excluded because regression analysis with them yielded no significant results. Thus business resources were only measured by financial resources, dynamic capabilities by learning, and IT resources were excluded completely. The results of the regression analysis after dropping the strongly correlated variables were similar to the results of the original construct (see Table 4).^2 Furthermore, the assumptions of multiple regression^3 (Hair et al. 1995) were examined according to the suggestions of Pallant (2002) and the results showed that the assumptions were not violated.

The data support hypothesis 1a (DC-FP) which stated that dynamic capabilities have a positive relationship to financial performance, with learning being most important (although less so, since it is highly correlated with the other variables of dynamic capabilities). The results also provide support for hypothesis 2a (BR-FP), which suggests that business resources are positively associated with financial performance, with financial resources being most important. Also hypothesis 3a (IT-FP), which suggested no direct relationship between IT resources and financial performance, was supported by the data.

### Table 3. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alpha</th>
<th>Mean</th>
<th>S.D.</th>
<th>Internet performance</th>
<th>Financial performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relation</td>
<td>0.7</td>
<td>3.991</td>
<td>0.665</td>
<td>0.099</td>
<td>0.171</td>
</tr>
<tr>
<td>Extern Dr</td>
<td>0.6</td>
<td>2.604</td>
<td>0.973</td>
<td>0.499***</td>
<td>0.298**</td>
</tr>
<tr>
<td>Benchmar</td>
<td>n.a.</td>
<td>2.962</td>
<td>1.210</td>
<td>0.555***</td>
<td>0.241*</td>
</tr>
<tr>
<td>Strat Int</td>
<td>0.9</td>
<td>3.712</td>
<td>1.051</td>
<td>0.617***</td>
<td>0.073</td>
</tr>
<tr>
<td>Fin Res</td>
<td>n.a.</td>
<td>3.028</td>
<td>1.125</td>
<td>0.130</td>
<td>0.474***</td>
</tr>
<tr>
<td>OVERALL BR</td>
<td>0.8</td>
<td>3.297</td>
<td>0.682</td>
<td>0.707***</td>
<td>0.331**</td>
</tr>
<tr>
<td>IT Know</td>
<td>0.9</td>
<td>3.452</td>
<td>0.979</td>
<td>0.461***</td>
<td>0.192</td>
</tr>
<tr>
<td>IT Oper</td>
<td>0.9</td>
<td>2.646</td>
<td>0.958</td>
<td>0.479**</td>
<td>0.293**</td>
</tr>
<tr>
<td>IT Object</td>
<td>0.6</td>
<td>3.281</td>
<td>1.001</td>
<td>0.299**</td>
<td>0.116</td>
</tr>
<tr>
<td>OVERALL IT</td>
<td>0.9</td>
<td>3.903</td>
<td>0.837</td>
<td>0.507***</td>
<td>0.259**</td>
</tr>
<tr>
<td>Integ</td>
<td>0.7</td>
<td>3.792</td>
<td>0.575</td>
<td>0.431***</td>
<td>0.331**</td>
</tr>
<tr>
<td>Learning</td>
<td>0.8</td>
<td>3.724</td>
<td>0.700</td>
<td>0.473***</td>
<td>0.389***</td>
</tr>
<tr>
<td>Reconfig</td>
<td>0.6</td>
<td>3.418</td>
<td>0.648</td>
<td>0.198*</td>
<td>0.337**</td>
</tr>
<tr>
<td>OVERALL DC</td>
<td>0.9</td>
<td>3.620</td>
<td>0.531</td>
<td>0.425***</td>
<td>0.414***</td>
</tr>
<tr>
<td>INTERNET PERFORMANCE</td>
<td>0.9</td>
<td>2.975</td>
<td>1.047</td>
<td>1.000</td>
<td>0.286**</td>
</tr>
<tr>
<td>FINANCIAL PERF</td>
<td>0.9</td>
<td>2.890</td>
<td>0.846</td>
<td>0.286**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Notes: $N=106$; *** Correlation is significant at the 0.001 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)
Strategic assets and Internet performance

The linear regression model:

\[ Z_2 = a + b_1Z_0 + b_2Z_1 + \beta_3Z_2 + \epsilon \]

differs only slightly from the one above. First, in this section \( Z_2 \) stands for Internet performance (instead of financial performance), and second, \( b_1 \) is estimated to be positive and significant (and not about zero).

The three variable sets correlate statistically significant to Internet performance (see Table 3). Managers of e-SMEs attributed Internet performance to dynamic capabilities (\( r = 0.425*** \)), to business resources (\( r = 0.707*** \)) and to IT resources (\( r = 0.507*** \)).

Table 5 presents the results from the multiple regressions for the independent variable sets (business resources, dynamic capabilities and IT resources), the control variable (firm size, \( \ln \) emp measured as the natural logarithm of employees), and for the dependent variable (Internet performance).

The variables combined explain 52.1% of Internet performance variance, and an estimated 50.2% of variance in population (using adjusted \( R^2 \), which estimates population effects based on sample degrees of freedom). It is interesting to note that the firm size (measured by the natural logarithm of employees) is negatively related to Internet performance. This implies that smaller companies are more successful in deploying the Internet.

Again the variables ‘benchmarking’, ‘integration’, ‘reconfiguration’, ‘IT knowledge’ and ‘IT objects’ were dropped because of multicollinearity issues. The regression analysis with the remaining variables yielded no significant results for the variables ‘relationships’, ‘financial resources’ and ‘learning’. Therefore, they were excluded too. Business resources were now measured by ‘external driven e-Business’ and ‘strategic Internet’; IT resources by ‘IT operations’; and dynamic capabilities were excluded.

Hypothesis 2b (BR-IP) and Hypothesis 3b (IT-IP) were supported. But surprisingly dynamic capabilities did not have the hypothesized relationship with Internet performance (Hypothesis 1b). A possible explanation could be that flexibility is a strategic necessity for small companies, and, therefore, does not drive Internet performance (this is further discussed later in the paper).

Because the impact of dynamic capabilities on small companies has hardly been the subject of research we wanted to find out more about firm size effects. Therefore a hierarchical regression analysis was conducted:

\[ Z_2 = a + \beta_0Z_0 + \beta_2Z_2 + \epsilon \]

With \( D \) standing for dynamic capabilities and \( S \) for firm size (measured as the number of employees). The results are shown in Table 6.

The existence of an interaction effect can be tested by comparing the adjusted \( R^2 \) of the term without the moderating variable with the adjusted \( R^2 \) with the moderating variable (Jaccard et al. 1990). In this data the adjusted \( R^2 \) in the term without the number of employees was 0.179*** and in the term with the

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Table 4. Strategic assets and financial performance

<table>
<thead>
<tr>
<th>Construct (Single VARIABLE)</th>
<th>Financial PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business resources (Financial resources)</td>
<td>.282* (.351***)</td>
</tr>
<tr>
<td>Dynamic capabilities (Learning)</td>
<td>.332** (.289**)</td>
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<tr>
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<tr>
<td>ln emp</td>
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<tr>
<td>R</td>
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<tr>
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<td>.269 (.306)</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>.238 (.285)</td>
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Notes: *** Correlation is significant at the 0.001 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

Table 5. Strategic assets and Internet performance

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<td>Business resources (External driven) (Strategic Internet)</td>
<td>.574*** (.245**) (.397***)</td>
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Notes: *** Correlation is significant at the 0.001 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

Table 6. Firm size effects

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<td>-.211 * (-.181*)</td>
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<td>Adjusted R Square</td>
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Notes: *** Correlation is significant at the 0.001 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)
number of employees it was 0.217***, which suggests that firm size moderates the relationship between dynamic capabilities and Internet performance. As shown in Table 6, firm size moderates the relationship between dynamic capabilities and Internet performance negatively. In other words dynamic capabilities have no relationship with Internet performance for large companies, but the impact of dynamic capabilities decreases with firm size.

DISCUSSION AND CONCLUSIONS

Without adequate means of performance measurement, theory development is impeded, and it becomes difficult to develop useful prescriptions for managers. With little agreement on the definition and the dimensions of performance, it is not surprising that the methods for performance measurement vary widely (Murphy et al. 1996). Our findings suggest that the choice of the dependent variable can change the conclusions and, therefore, needs to be made very carefully. Given the wide range of perspectives and approaches in e-Business research, it is unlikely that any single performance measure or dimension could appropriately serve the needs of a diverse set of research questions. ‘Rather than limit the number of measures used, it might be more useful to recognize the multiple dimensions of performance and allow theory the freedom to guide selection of the appropriate means of addressing performance’ (Murphy et al. 1996: 21). Therefore, the selection of a given performance dimension should be explained and justified. Furthermore studies should include multiple dimensions of performance if possible, because they represent the trade-offs firms face. Actions taken to improve performance on one dimension may well depress performance on another dimension and have no effect on others (Murphy et al. 1996). A high performing firm is thus not reflected in the maximization of performance along any single dimension, but rather in the ability of simultaneously maintaining several performance parameters within safe limits (Ashby 1971). Financial measures are necessary, but not sufficient to capture total organizational performance, and should be supplemented by non-financial measures (Venkatraman and Ramanujam 1986).

The above described examination of financial performance was supplemented by Internet performance. The analysis on the more disaggregated level, can yield additional insights (Ray et al. 2004), in this case about the necessary strategic assets for Internet performance. The findings suggest that business resources drive both financial and Internet performance, with different resources as key performance drivers. The availability of financial resources had a strong relationship to financial performance, but not to Internet performance. This is similar to the research of Ray et al. (2004), which showed no significant relationship between investments in the service processes and the effectiveness of service processes. They suggest that higher investments in a specific process can hardly create competitive advantage, because it could easily be copied by their competitors, and thus it can’t be a source for sustainable competitive advantage. In contrast, the non availability of financial resources is an obstacle for many small companies and can be a source of competitive disadvantage (Caldeira and Ward 2003; Chow et al. 1997; Gribbins and King 2004).

Both resources, external driven Internet (which represents the willingness of stakeholders to use the Internet) and strategic usage of the Internet (which represents the management’s commitment to the Internet) affected only Internet performance, but not financial performance. If only the aggregated dependent variable financial performance would have been used in this study, the impact of these resources on Internet performance would not have been discovered.

The findings suggest that dynamic capabilities drive financial performance but not Internet performance. A possible explanation could be the differences of on- and off-line markets. Eisenhardt and Martin (2000: 1111) define high-velocity markets as ‘ones in which market boundaries are blurred, successful business models are unclear, and market players (e.g., buyers, suppliers, competitors, complementers) are ambiguous and shifting’, which sounds like a perfect description of virtual markets. We measured Internet performance in terms of the impact of the Internet on firm performance. Whereas this is not a perfectly adequate way for evaluating the performance in virtual markets, we argue that Internet performance is affected by markets that are characterized by a higher velocity than the traditional off-line markets, which mainly affect financial performance.

In low-velocity markets dynamic capabilities are traditional routines (Nelson and Winter 1982, Zollo and Winter 2002), which are complicated, predictable, analytic processes that rely extensively on existing knowledge, linear execution and slow evolution over time. In contrast, in high velocity markets dynamic capabilities are simple (not complicated), experiential (not analytic), and iterative (not linear) processes (Eisenhardt and Martin 2000). Winter (2003: 992) suggested that instead of developing patterned and repetitive dynamic capabilities, firms could use a firefighting mode, ‘a high-paced, contingent, opportunistic and perhaps creative search for satisfactory alternative behaviours’, which can also be described as ad hoc problem solving. Current research has shown that speed and flexibility are a typical strength of SMEs (Dean et al. 1998), and that managers of SMEs often use a firefighting mode (Hudson et al. 2001) to respond to new challenges from the environment or other relatively unpredictable events. This implies that the typical behaviour of SMEs automatically matches the require-
ments of dynamic capabilities in high-velocity markets. However, if the majority of SMEs already have the required dynamic capabilities, they cannot be a source of competitive advantage in high-velocity markets. This was also supported by further analysis which suggests that the relationship of dynamic capabilities and Internet performance is stronger for smaller companies than for larger companies. As expected, IT resources have a significant and positive relationship with Internet performance, but no significant relationship with the highly aggregated financial performance.

Another implication is that the measurement of the impact of strategic assets on more disaggregated levels of performance can increase the explanatory power of resource-based models. The adjusted $R^2$ is twice as high for Internet performance (0.5) as it is for financial performance (0.24). This means that deploying more disaggregated performance measures can enhance the evaluation of the phenomenon under study.

Since this study explores the performance contribution of strategic assets, it provides several managerial implications for e-SMEs. The strong relationship between dynamic capabilities and financial performance suggests that firms that can demonstrate timely responsiveness and rapid and flexible product innovation, coupled with the management capability to coordinate and redevelop internal and external competences effectively, will succeed (Teece et al. 1997). Our research suggests that small companies tend to have the dynamic capabilities that are required for conducting e-Business, which can be used to create competitive advantage over larger companies. However this is only a strategic necessity if the competitors are small companies. Business resources turned out to be another key success factor. Especially the availability of financial resources determines the financial success of e-SMEs. This supports previous research that already highlighted the importance of financial resources for SMEs (Chow et al. 1997). This implies that managers should conduct their financial and liquidity planning carefully, and try to avoid financial shortages. This can be achieved for example by developing linkages to venture capital companies (Lee et al. 2001) by enhancing borrowing capacity, or by effective cash management (Caloghirou et al. 2004).

Another implication for managers is that the choice of the performance measures matters. The selection of the performance indicators has to be conducted carefully and always focus on the right long-term goal: sustained profitability (Porter 2001).

Some limitations of this research should be noted. First, the analysis represents only a snapshot in time, and there are no guarantees that the conditions under which the data are collected will remain the same. Second, since the data were only collected from a single questionnaire, the results can be subject to common method bias. Third, the data were from companies in Belfast (UK), and as a result generalizability to other geographical settings is limited. The limited size of 106 companies in the sample should also be noticed. And fourth, the subjective measures for firm-performance have not been triangulated with secondary data thus we must acknowledge the possibility of a measurement error. The limitations suggest avenues for additional research. Studies adopting a more longitudinal focus could enhance the understanding about processes like, for example, the development and management of strategic assets. Furthermore this study only examined small and medium-sized companies, it could also be interesting to compare them with larger ones. Finally, it would also be interesting to find out more about the impact of resources and capabilities in low- and high-velocity markets.

In conclusion this research empirically examined the relationship between strategic assets and performance in e-SMEs. A framework linking resources and capabilities to financial outcomes and Internet performance was tested. The results showed that business resources and dynamic capabilities are important predictors of financial performance for e-SMEs, and IT resources are not. These findings were supplemented by analyzing the impact of strategic assets on Internet performance. The results suggest that business and IT resources are important drivers for Internet performance, and dynamic capabilities are not. Another finding is that the choice of the dependent variable (in this case financial or Internet performance) can significantly affect the results and the conclusions of a study. Thus, this study contributes to the literature by providing empirical support for the applicability of the resource-based view of the firm to e-Business. The resource-based view enables grounding research in solid theory, which is often neglected in e-Business research.

Notes
1. On the basis of the database it was not possible to eliminate all non qualifying companies.
2. The VIF values for the construct were between 1.1 and 1.7 the VIF values for the single variables (after dropping variables) were between 1.1 and 1.4 which also suggests that multicollinearity is not a problem.
3. We checked for normality, linearity, homoscedasticity and independence of residuals.
4. In addition a single regression with lnemp as independent variable (in this case financial or Internet performance) was conducted. The results supported the negative relationship between the dependent and the independent variable (adjusted $R^2 = .039^*$; standardized beta = -.219).
5. Please note that the statistical procedure has been changed here. In the prior analysis the logarithm of the number of employees was used as a control variable. In this analysis however the firm size was the focus of the investigation. Therefore no control variable was deployed, and the
relationship between dynamic capabilities and Internet performance was examined, and the number of employees (instead the logarithm of the number of employees) was included as a moderating variable.

References


APPENDIX 1: THE QUESTIONNAIRE

1. Business Resources

Relationships.
1. We have very open, trusting relationships with our suppliers
2. We have very open, trusting relationships with our customers

External driven e-Business.
3. Our suppliers strongly urged us to adopt e-business
4. Our customers strongly urged us to adopt e-business

Benchmarking.
5. We actively research the best e-business practices of our competitors

Strategic use of the Internet.
6. The Internet has a strategic meaning for our company
7. We use the Internet actively to reach strategic aims

Availability of financial resources.
8. Overall, we have enough financial resources

2. IT Resources

IT knowledge.
9. Overall, our technical support staff is knowledgeable when it comes to computer-based systems
10. Our firm possesses a high degree of computer-based technical expertise
11. We are very knowledgeable about new computer-based innovations
12. We have the knowledge to develop and maintain computer-based communication links with our customers

IT operations.
13. Our firm is skilled at collecting and analyzing market information about our customers via computer-based systems
14. We routinely utilize computer-based systems to access market information from outside databases
15. We have set procedures for collecting customer information from online sources
16. We use computer-based systems to analyze customer and market information
17. We utilize decision-support systems frequently when it comes to managing customer information
18. We rely on computer-based systems to acquire, store, and process information about our customers

IT objects.
19. Every year we budget a significant amount of funds for new information technology hardware and software
20. Our firm creates customized software applications when the need arises
21. Our firm’s members are linked by a computer network

3. Dynamic Capabilities

Integration.
22. Overall, our management has expertise to conduct the major strategic moves
23. Overall, our employees have very good communication skills
24. Our management has expertise in coordinating internal processes and operations
25. The feedback of our customers helps us to improve our products and/or services
26. The Internet has changed our processes significantly
27. We have had problems integrating e-business applications in previous IT (reversed

Learning.
28. Overall, our company acquires new knowledge effectively
29. Overall, our company reacts quickly to market changes
30. Overall, our company accumulates knowledge effectively
31. Our company recognizes how customers can benefit from new technologies

Reconfiguration.
32. We continuously adapt to customers shifting needs
33. We quickly respond to competitive strategic moves
34. We easily get rid of assets that have no more value

4. Performance

Internet performance.
35. The Internet has dramatically increased our productivity
36. The Internet has improved our competitive position
37. The Internet has dramatically increased our sales
38. The Internet has dramatically increased our profitability
39. The Internet has dramatically improved our overall performance

Financial performance.
40. Over the past 3 years, our revenues have been outstanding
41. Over the past 3 years, our revenues have exceeded our competitors
42. Over the past 3 years, our sales growth has been outstanding
43. Over the past 3 years, our sales growth has exceeded our competitors
44. Over the past three years, our return on assets has been outstanding
45. Over the past 3 years, our return on assets has exceeded our competitors

General questions.
46. How many full-time employees work in your company?
47. What percentage of your revenue is created by e-commerce?
48. What percentage of the goods and services you buy are ordered via the Internet?
49. What is your SIC-code?
50. Are you a for-profit or a non-profit organization?
51. Is your company independent? (This means you have e.g. no parent company or you are not part of a franchising system).
APPENDIX 2: CORRELATIONS

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