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Rural small firms' website quality in transition and market economies

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Abstract

Purpose – The purpose of this paper is to investigate website quality in rural firms in four countries, by using Gonzalez and Palacios's Web Assessment Index (WAI). There is an assertion in the literature that quality is lower amongst rural firms than urban firms, and lower amongst small firms than large firms. The disadvantages of lack of access to skills and economic peripherality in rural areas are attributed to this. Concurrently, there is reason to surmise that the websites of firms in transition economies may be higher quality than those in market economies. The paper aims to explore websites in distinct rural regions to investigate if variation occurs.

Design/methodology/approach – To evaluate website quality the WAI was applied to a sample of 60 rural firms representing 15 each in Scotland, New Zealand, Southern Russia and Hunan Province in China. Analysis of the categorical data was performed using a variety of established methods.

Findings – The WAI is of use in terms of website quality management. Additionally, comparisons between the quality of websites in the sample of small rural firms with those of large firms in previous studies support the contention that large firms generally have better quality websites. Results also illustrate that there are some differences in website quality between rural small businesses in the different locations. In particular, small rural firms in Hunan Province in China had websites of observable better quality than those elsewhere. The authors conclude that skills, knowledge and infrastructure have a bearing on the sophistication of small firms' websites.

Research limitations/implications – Implications include that variation in the rural economy by region prevails as the rural economy is not, as often implied, a homogeneous concept.

Practical implications – There are implications in terms of exploring the effects of regulation, culture and infrastructure on rural small to medium-sized enterprises (SMEs). The internet may indeed contribute to rural economies, but only insofar as it is facilitated by infrastructure and access to skills, and by culture and perceived usefulness by business owners.

Originality/value – The paper contributes to the understanding of rural entrepreneurship as a heterogeneous concept by comparing practice in four distinct rural regions. It also adds weight to the emerging identification of exogenous factors as being at least as much a factor in determining the use of ICT in rural SMEs as endogenous motivations, skills and resources.

Keywords Transition economies, ICT, Entrepreneurship, Internet, Rural, Small to medium-sized enterprises, Web sites, SME, Market economies, Small firms

Paper type Research paper

Introduction

There is much evidence that access to information and communication technology (ICT) provides important economic and social opportunities. As peripheral economies, rural communities and transition countries have been the subjects of much debate about potentially limited ICT access and skills availability (Epstein *et al.* (2011). Using the Web Assessment Index developed by Gonzalez and Palacios(2004), the aim of this paper is to determine if a digital divide exists between small rural firms in four

different countries: Scotland, New Zealand, Russia and China. The selection of the four countries was intended to allow for comparison between rural economies still observably in transition in terms of the market system, and modern Western economies. The study of rural firms, in particular, aims to look at those identified in the literature as more peripheral economically than those in urban centres, with the itinerant resource and skills disadvantages that might comprise barriers to effective and efficient business use of ICT and particularly the internet.

This exploratory paper uniquely joins the rural and country perspectives of the digital divide together. Comparing the website quality of rural small firms across countries provides an opportunity to investigate how rural small firm characteristics relate to their country-specific policy and infrastructure contexts. Moreover, the paper indicates whether differences in website quality impinge on a rural small firm's ability to operate effectively within global markets if they desire market expansion.

The paper starts with a review of the literature, specifically in terms of the rural business environment; the environment in transition and established market economies; and provides a rationale for the use of Gonzalez and Palacios's WAI. From these reviews three research questions are generated. The Methodology section describes in detail the sampling, data collection and analysis undertaken. This is followed by a presentation of the results of the study, and the paper concludes with an analysis of the findings and the implications thereof, including suggestions for further research.

Rural business internet use

In rural areas problems of remoteness prevail for firms and this has an effect on business internet activity. Though vastly improved in recent years, access to high speed internet connectivity can be erratic in many countries (Cuadrado-Roura and Garcia-Tabuenca, 2004; Galloway, 2007). For small firms generally, lack of availability of ICT expertise is identified as a further supply-side barrier to internet use (Lawson *et al.*, 2003), and particularly so in rural areas as a result of fewer competing specialists (Galloway and Mochrie, 2005). A role for policy in terms of raising awareness of rural business use of ICT and requisite skills has thus been identified in several studies (e.g. Grant, 2003; Laukkanen and Nittykangas, 2003). Certainly, in some countries and regions policies have been put in place to encourage e-commerce adoption and development by SMEs in general. Some of these policies have resulted in the provision of grants and/or direct expert assistance to SME owners on how they could improve the quality of their websites. In research in the UK, Beckinsale *et al.* (2006) find, however, limited or no awareness of government e-commerce initiatives or assistance amongst small firm operators. Alternatively, knowledge of e-commerce opportunities in SMEs was via the experience of the owners or commercial relationships with ICT firms providing consultancy services or providers of software or hardware. Similar is found in Galloway *et al.* (2011) where it was found that private sector intermediaries had more effect on rural SME owners' decision to have a website, and the quality of their internet business use, than public policy initiatives. But access to consultants and supply chain operators is contingent on a number of factors, not the least of which are geographic location and critical mass of potential customers for these private firms. So serendipity or local or extended network access are implied as important factors in

determining the likelihood of having access to ICT skills and expertise in rural areas, and the idiosyncratic and ad hoc nature of these is likely to create a diversity of quality.

With reference to websites specifically, there is some evidence that small firms' websites tend to be lower quality than large firms websites (European Commission, 2002; von Iwaarden et al., 2003). Gonzalez and Palacios(2004)) explain this variation in quality by asserting that: "with only limited resources in terms of time and money...many [websites] are poorly designed". Cox and Dale (2002) observe similar, noting that the quality of business websites ranges from the amateur (implying non-specialist or even hobbyist) to the professional. Due to relative resource disadvantage, it is likely that the proportion of non-specialists is greater in small firms than in large firms. Following on from this rationale, it is reasonable to suspect that the number in the rural small firms sector is greater still. Notwithstanding this, there is much consensus in the literature that internet presence, most often comprising websites, must be of high quality to most advantage firms (Hernández et al., 2009; Law *et al.*, 2010; Kuo and Chen, 2011).

The hypothesis inferred is that websites in rural small firms are likely to be of lower quality than those in urban areas because of their precarious position in terms of access to ICT skills and resources for website development. For those rural firms located in environments such as Russia and China we might hypothesise that access to skills and resources would be more precarious still. Analysis of previous research in transition economies belies this idea, however, and it is to the contention that transition economies might exhibit higher quality internet presence and presentation that we now turn.

Rural business internet use in established market economies and transition economies

It is not the intention in this paper to provide an analysis of the economic conditions for entrepreneurship in transition economies as this has been covered extensively in the literature elsewhere (e.g. the special editions in the *Journal of Small Business and Enterprise Development* in 2006 and 2008 on Chinese entrepreneurship; Gibb, 1993, and Hisrich and Grachev, 1993, on Eastern Europe). As an outcome summary, however, the shift in balance of economic contribution from public to private enterprise in transition economies is now well established (e.g. Batjargal, 2007; Phan *et al.*, 2010). In both Russia and China specifically, Peng (2001) reports that since the late 1990s the private sector has accounted for 70 percent of GDP. While controls on operations, strategies and growth have been imposed on private firms in both countries, the start-up rates in China and Russia are now comparable with many European and North American countries (e.g. Peng, 2001). Although Russia is more advanced in terms of transition than some other former Communist systems, Doern and Fey (2006) contend that there is still much flux in the Russian business environment. The situation is similar and arguably more pertinent in China, as state imposed rules, controls and structures continue to change unpredictably (Martinsons, 2008). As theorised throughout the extant literature (e.g. Audretsch, 1995), turbulence and uncertainty are good conditions for entrepreneurship, and in fact, there is consistent reportage from both Russia and China of private start-ups motivated by opportunity exploitation as well as in response to the contraction of state organisations (e.g. Batjargal, 2007). Alongside this, as with studies in other countries and socio-economic contexts, there is much variation

between the urban and rural economies in both China and Russia (e.g. Phan *et al.*, 2010).

For internet activity specifically, the opening up of many of the former Communist states to market conditions has resulted in an observable rapid internet adoption rate (Warf, 2009), and much further expansion is expected (Doern and Fey, 2006; Batjargal, 2007). In Russia specifically, affordable internet access is still underdeveloped, but recent years have seen a surge in use of communal internet provision, such as internet cafes and internet access in workplaces. In Russia, though recently supported by investment, internet infrastructure remains poor quality compared to most Western countries, and particularly so in rural areas, (Doern and Fey, 2006). On the other hand, there is a good pool of ICT skills in Russia as a result of recent investment in educational training. The case is similar in China, where the rapid and effective dissemination of skills and access to knowledge resources is most likely to be attributable to specific Chinese cultural habits, most notably, guanxi. Guanxi is defined as a Chinese form of network-based social capital that can apply to individuals and to organisations and involves trust, patronage, obligation and reciprocity (Park and Luo, 2001). Guanxi has been found to have an effect on both economic and social life, and on skils dissemination (Knight and Yueh, 2008). Correspondingly, Batjargal (2007) links successful business activity on the internet in China to a combination of social and human capital. Thus, technology skills for business in China are regarded as strong (Phan *et al.*, 2010). At the same time though, Batjargal (2007) reports the emergence of firms that specialise in web hosting and solutions in the context of the highly complex, politically-charged and dynamic regulatory environment for the internet in China. For those that specialise in small firms' web presence, a market dominance of these firms is observed in several Chinese areas.

Other aspects of the environments in Russia and China are implied as advantageous for internet business also. The business and the consumer experiences in these transition environments is said to be inefficient and frustrating. With reference to Russia specifically, Doern and Fey (2006) claim that "traditional businesses continue to experience many inefficiencies incurred by the transition from central planning (e.g. high bureaucracy, poor facilities, corruption, old relational ties)" and as a result business and consumption on the internet is an attractive option because of its level playing field for business and efficiency gains. In China, despite a ban on internet investment in the late 1990s, there is in fact now much encouragement and support of internet use and investment in infrastructure, including in rural areas, despite ongoing state control of content, and restrictions on access to the wider international web (Batjargal, 2007; Phan *et al.*, 2010).

Thus the situation in both China and Russia is highly complex and each is distinct: China has provided much support and investment in internet infrastructure, while Russia's is under-developed. Internet use is growing in both countries, and the use of communal facilities for internet access has been one means by which people have mitigated high costs and relatively low technology provision in Russia. Both environments are turbulent and are still subject to unpredictable moves by governments that modify business and internet practice, but within that dynamic environment private venturing opportunities have been manifest, and internet skills developed, either by concurrent educational policies, as in Russia, or by the practice of traditional cultural social systems whereby skills and expertise are accessible through

networks, as in China. Doern and Fey (2006) point out that in the context of business and internet dynamism "companies selling online would benefit from adopting easy to use and easy to search websites".

So the need to have efficient high quality websites is consistent amongst firms in Western and transition economies. In established Capitalist economies there are problems associated with achieving this: inefficiencies in free markets, where lack of economies of scale and critical mass prohibit equality of experience, affect access to ICT expertise in rural environments. On the other hand, the emerging internet cultures in the transition economies of China and Russia have involved social and business reaction to government controls and infrastructure limitations, and the collectivity of state support potentially has made equality of technology experience more likely than in free markets. In the context of the current paper, the possibility of higher quality website presentation in China and Russia than in Scotland and New Zealand is thus suggested.

Measuring website quality

Since the current study aims to compare website quality in transition economies and established market economies, identification of an instrument versatile enough to facilitate robust analysis in these diverse contexts is required. But quality itself must be defined. A successful website is defined by Lee and Kozar (2006) as one that achieves most "hits" or visits. They assert that high volume of hits indicates quality as perceived by users and is demonstrated by the volume of these users. Various studies subscribe implicitly to this notion, and seek to determine the factors that contribute to quality resulting in high volume hits. In various industries and in non-commercial contexts, some degree of consensus has thus emerged. Most notably, ease of use is identified as the most important factor for users by Chiou *et al.* (2010) in their review of ten years of studies of consumer responses to websites. This is corroborated by numerous others for example, Law *et al.* (2010) in the tourism sector; Kim and Neihm (2009) in the apparel industry; Kuo and Chen (2011) in retail; and amongst myriad health and medical studies of website quality (e.g. Reavley and Jorm, 2011, for mental health-related sites). Another important feature found in many studies, particularly for commercial organisations, is aesthetics or entertainment – the extent to which a website comprises a pleasurable experience for users (e.g. Lee and Kozar, 2006; Kim and Niehm, 2009). The measurement of website quality is complex though, and while there have been many instruments developed in the last decade or so, there are problems with multiple definitions and constructs, and applicability across different business contexts, particularly industry sector (e.g. Aladwani and Palvia, 2002; Hernández *et al.*, 2009). Gonzalez and Palacios(2004) have attempted to rectify some of these problems with their WAI, hence the use of this instrument in the current study. They identify accessibility, speed, navigability and content quality as being key dimensions affecting website quality, regardless of firm context. Their WAI therefore measures website quality globally, i.e. it can measure the quality of a company's website irrespective of industry or location and can thus afford objective comparison across industries and sectors (Hernández *et al.*, 2009).

Web Assessment Index (WAI) dimensions

The first dimension "accessibility" describes how easy it is for current and potential users to access and identify a company's website. The term visibility, popularity and

site success have been used by other studies to describe the accessibility experience. A high level of traffic is important since search engines like Google give a website an elevated priority for users actively searching for relevant information related to it (Lee and Kozar, 2006; Hernandez et al., 2009). Measurements of accessibility can be obtained from a search engine positioning of the website and site popularity (Gonzalez and Palacios, 2004). The second dimension is speed. A range of studies highlight that a positive correlation exists between web site loading time and user satisfaction and that fast loading is essential for customer willingness to finalise online transactions (e.g. Cao et al., 2005; Yen et al., 2007). The third dimension is navigability. As noted already, numerous studies have determined that websites must be easy to use and enable users to undertake searches via site maps, internal search engines or the provision of a permanent site menu (e.g. Robbins and Stylianou, 2003; Chiou et al., 2010). Hernández et al. (2009) state that if it only takes a few clicks to locate the product required, this will enhance user satisfaction and customer loyalty. The fourth dimension is content which comprises three basic functions: informative, transactional and communicative (Hernández et al., 2009). The informative aspect relates to the precision, relevance and timeliness of data provided. Much of this data will relate to a company's background, activities and product or service descriptions, etc. The transactional aspect refers to the ease of performing an online purchase. Hernández et al. (2009) include the facilities that support the transactional function such as financial intermediaries involved and the number of steps needed to complete a purchase. The communicative aspect relates to the readiness of a company to assist its users and to encourage a continuous exchange of information between all of the parties involved (Chen and Yen, 2004). Aesthetics are critical components of this last feature (Kim and Niehm, 2009).

Research questions

Based on the preceding review of the literature, the following research questions are generated.

RQ1. Is variation between the quality of Chinese, Russian, New Zealand and Scottish rural small business websites observable?

Guidelines for identifying a "high" or "poor" quality website needed to be established. The most effective means of doing this was to compare the study's rural small business websites against acknowledged high performing company websites previously evaluated by Gonzalez and Palacios(2004). Hence the following question was posed:

RQ2. How does the website quality of Chinese, Russian, New Zealand and Scottish rural small businesses compare against other businesses previously investigated by Gonzalez and Palacios's WAI?

A practical output from this study was to identify ideas and practices that can improve rural small business websites. Certainly discovering how small businesses can optimise each category of website quality: accessibility, speed, navigability and site content would be valuable. Based on the aforementioned argument it would be useful to determine:

RQ3. How strong is the relationship between the different categories of small business website quality: accessibility, speed, navigability and site content in the four countries studied?

Methodology

Sample

The sample of rural small business websites was drawn from Hunan Province in China, New Zealand, Scotland and Southern Russia. Focusing on specific geographical areas of Russia and China simplified the sampling procedures and meant we could say something meaningful about the areas concerned. In addition, two of the researchers involved were natives of Southern Russia and Hunan province respectively. Investigating these parts of Russia and China enabled the researchers to use their local knowledge to ensure appropriate rural small businesses were selected. Hunan Province is located in the middle of Southern China and covers an area of 211,800 square kilometres. Within China it is ranked number 11 in terms of geographical size compared to the other provinces and municipalities. Southern Russia is located in the extreme southwest, between Ukraine and Kazakhstan. Specifically, small business websites were drawn from Krasnodar, Adygeya, Voronezh and Rostov regions.

Sample selection

Two phases were undertaken to select the samples for this study. First, the terms rural and urban were defined. Rurality is defined as comprising a mainland settlement of fewer than 10,000 residents (Defra, 2004), however, rural areas are very diverse, with some areas very isolated and others relatively well-served by an infrastructure that affords a proximity to urban services. To account for the diversity of "rural" small businesses, a further criterion to help determine whether the physical address of a business's website was rural was included. This specified that if a firm's physical address was at least 60 minutes from an urban area (i.e. mainland settlement of more than 10,000) either by car or boat then the researchers classified it as a rural location.

Sample creation for both New Zealand and Scotland was relatively straightforward, but it was much more problematic for Hunan Province and Southern Russia. Since two approaches were employed, each will be discussed in turn, starting with New Zealand and Scotland.

Wikipedia (http://en.wikipedia.org/), the free open-source encyclopaedia, was used to alphabetically identify a list of both New Zealand and Scottish cities, towns and villages. These were categorised into either rural or urban locations using population data from the 2006 New Zealand Population Census data and the 2001 UK Population Census. In addition, the 60 minute test previously described was employed. The outcome of this categorisation process was the creation of two alphabetic lists detailing rural New Zealand and Scottish settlements respectively. To make the selection of areas in either of these two locations as random as possible every third settlement was investigated.

For Hunan Province and Southern Russia no reliable online resources were available. Therefore, the study's Chinese and Russian researchers visited local library resources to construct alphabetical lists for detailing Hunan province and Southern Russian rural settlements. As for New Zealand and Scotland, every third settlement that conformed to the less than 10,000 population and 60 minute transport criteria was investigated.

Identification of small businesses within each settlement also required different approaches. For both New Zealand and Scotland the Yellow Pages online directory of business services (www.yell.com/) was used.

Conveniently Yellow Pages search results provide both traditional contact details and if a website was available for each firm. The possession of a website acted as a

convenient filter for identifying potential companies to include in the study. Websites were then visited to establish the number of employees working for the company. To be considered a small business the company needed to employ between 0 to 49 employees (BIS, 2011). For the most part this was a straightforward exercise as most websites provided employee numbers; many small business websites used their size as a favourable point of difference from larger rivals. If there was any doubt about employee numbers the company would be rejected and the next result investigated. The above process was repeated until a sample of 15 New Zealand and 15 Scottish rural small business websites was collected. An artist, adventure tourism operators, architect, builders, motor vehicle parts retailers, household appliance repair company, Bed and Breakfasts, motels, hotels, food and drink retailers, gift shop retailers, car hire venture, business consultants and landscape gardener were just some of the small business websites analysed.

The identification of Hunan Province and Southern Russian rural small businesses was a more labour intensive activity as online businesses directories are limited or non-existent for both geographical areas. To obtain a sample, the study's Chinese and Russian researchers made extensive use of Google and other local search engines such as Baidu in China. Via a slow iterative process of entering industry type and geographical information the researchers identified rural small business websites. The researchers' previous experience identifying New Zealand and Scottish rural small business along with their local knowledge aided the selection process In total, 15 Hunan and 15 Southern Russian rural small business websites were identified, including an arts and craft retailer, holiday lodges, small hotels, electronic component suppliers, adventure tourism operators, computer repair retailer, food retailers and wholesalers, garden products distributor, computer and mobile phone retailers and a tea retailer. The general characteristics of the total sample are detailed in Table I.

Country and business type	n
Hunan Province	
Accommodation	5
Customer services	10
Total	15
Southern Russia	
Accommodation	5
Customer services	10
Total	15
New Zealand	
Accommodation	5
Customer services	10
Total	15
Scotland	
Accommodation	6
Customer services	9
Total	15
Note: $n = 60$	

Table I.
Description of sample

Procedure

Information about website quality was collected during the period February to April 2011. Four researchers evaluated each business's website using an adapted WAI questionnaire (see Appendix). They also measured the physical performance of each business venture's website by using specialist performance evaluating websites including Linkvendor.com, Linkpopularity.com, prchecker.info, pagespeed.googlelabs.com and seocentro.com. If any discrepancies arose when analysing a website's characteristics, a further round of evaluation was undertaken to ensure agreement amongst the researchers. In an attempt to minimize subjectivity, the four researchers received very precise guidelines for employing the WAI questionnaire. Liao *et al.* (2006) state that the validity of the results obtained from this rigorous checking procedure is verified by similar previous studies.

The sample's small size and the categorical nature of the data collected meant non-parametric techniques were required for data analysis purposes. Analysis therefore included several non-parametric techniques such as Kruskal-Wallis test, Mann-Whitney U test and Spearman's rank order correlation.

Instrument

The various WAI questions asked and website characteristics measured provided the necessary data for evaluating the importance of the four factors seen as being critical to the quality of a business website, i.e. accessibility, navigability, speed and content quality. Like Gonzalez and Palacios(2004) and other studies (Buenadicha *et al.*, 2001; Hernández *et al.*, 2009), this study weighted the question responses obtained for each factor via a scale from 0 to 100 points; the greater the number of points, the more important the factor. The study weighted each of the four factors according to the formula used by other studies and agreed by independent experts (as did Buenadicha *et al.*, 2001 and Gonzalez and Palacios, 2004). Content quality was assigned a rating of 50 points, the highest weighting, as it is identified as being critical for performing electronic transactions. Both navigability and accessibility were allocated 20 points each and 10 points to speed. This consistent utilisation of the same weightings means the final index produced by this study could be compared with other industries and companies active in the e-market.

Results

Website quality compared

Table II presents summary data on the results obtained from calculating the WAI for Hunan Province, Southern Russian, New Zealand and Scottish rural small businesses.

Country (number of firms)	Content	Navigability	Accessibility	Speed	Index
Hunan firms (15)	54.67	57.44	12.67	63.87	47.74
S. Russian firms (15)	34.67	51.28	8.67	66.73	36.00
NZ firms (15)	31.33	46.15	18.67	70.00	35.63
Scottish firms (15)	38.67	51.28	22.67	72.87	41.41
Average	40.75	52.49	15.88	68.37	40.89

Table II.
WAI values for the rural small firm websites

Note: Each factor was measured on a 1-100 scale

The results show that the index for small firms in Hunan Province was the highest by a reasonable margin over second-placed Scotland. New Zealand recorded the lowest index, which was very similar to the Southern Russia score. To determine whether there were significant differences among the websites of the four countries a Kruskal-Wallis test was conducted on the median levels of website quality as measured by Gonzalez and Palacios's WAI. The test, which was corrected for tied ranks, was significant $X^2(3, n = 60) = 11.65$, $p = 0.009$; the mean ranks of website quality were 42.00 for Hunan, 32.73 for Scotland, 25.27 for Southern Russia and 22.00 for New Zealand. As the test was significant, pairwise comparisons among the four countries were completed using Mann-Whitney U-tests.

Mann-Whitney U tests found that significant differences existed between the rural small business websites of the four countries across a number of the WAI factors: accessibility, navigability, content, speed and website quality (see Table III). The content of rural small business websites in Hunan Province bettered all of their counterparts. They also outperformed New Zealand and Southern Russian counterparts in terms of overall website quality. The navigability of rural small business websites in Hunan significantly surpassed those from New Zealand as well. However, they were not superior in all areas, as their Scottish equivalents achieved significantly better download speeds. Finally, both New Zealand and Scottish rural small business websites recorded better accessibility scores than the corresponding Southern Russian websites.

To evaluate the usefulness of Gonzalez and Palacios's WAI the study compared results with the WAI obtained by the top 200 Spanish firms' websites and with the WAI for the Spanish retail industry, since many of the small business websites investigated in each country were closely linked by the nature of their products and service sold (see Table IV). These Spanish company indexes were already calculated by Gonzalez and Palacios(2004), so their independence and reliability is assured.

The results in Table IV show that a single website score from this study surpassed Gonzalez and Palacios(2004) Spanish company results. Specifically, the Spanish retail trade industry result for accessibility (21.18) was similar to that obtained by Scottish rural small business websites (22.67). Apart from this single result all others obtained

WAI factor/country (mean rank)	U	z	p	r
Accessibility:				
New Zealand (18.97) vs S. Russia (12.03)	60.5	− 2.241	0.030	0.41
Scotland (19.70) vs S. Russia (11.30)	49.5	− 2.690	0.025	0.49
Content:				
New Zealand (10.53) vs Hunan (20.47)	38.0	− 3.108	0.002	0.57
Scotland (10.53) vs Hunan (20.47)	38.0	− 3.093	0.002	0.56
S. Russia (10.47) vs Hunan (20.53)	37.0	− 3.141	0.002	0.56
Navigability:				
New Zealand (11.50) vs Hunan (19.50)	52.5	− 2.710	0.007	0.49
Speed:				
Scotland (20.27) vs Hunan (10.73)	41.0	− 2.971	0.003	0.54
Website quality:				
New Zealand (11.50) vs Hunan (19.50)	46.0	− 2.758	0.006	0.50
S. Russia (10.93) vs Hunan (20.07)	44.0	− 2.841	0.004	0.52

Table III.
Summary of
Mann-Whitney U Tests
illustrating significant
differences only between
the small rural businesses
from each country using
the WAI factors

Table IV.
Website quality
comparisons

	Weighting	Hunan small firms	Southern Russian small firms	NZ small firms	Scottish small firms	Top 200 Spanish firms (from Gonzalez and Palacios, 2004)	Spanish retail trade industry (from Gonzalez and Palacios, 2004)
Accessibility	20	12.67	8.67	18.67	22.67	24.40	21.18
Speed	10	63.87	66.73	70.00	72.87	74.47	87.90
Navigability	20	57.44	51.28	46.15	51.28	75.81	75.00
Content	50	54.67	34.67	31.33	38.67	64.10	69.50
Index	100	47.74	36.00	35.63	41.41	56.62	62.98

in this study were inferior to Gonzalez and Palacios(2004) Spanish study across all of
the WAI categories: accessibility, navigability, content, speed and website quality.

The average download speed and accessibility of Scottish rural small firm websites
was similar to Spanish websites, high, but they compared poorly in regards to
navigability, content and website quality. In terms of navigability all of the rural small
business websites investigated received modest scores, compared to the 75 points
awarded by Gonzalez and Palacios(2004) to Spanish firms. However, these modest
scores may not be a major issue; most rural small business websites utilise few pages
(5 or 6) so the requirement to incorporate features that aid navigability are less
important, and indeed, a virtue of most of the small business websites in the sample
was their uncomplicated and elementary pages.

Similarly, with regard to content, all rural small firm websites investigated
possessed few of the features that the WAI emphasised as being important on their
pages (own search functions, site map and help page). The website content of rural
small businesses was heavily penalised for not incorporating features common to the
websites of large Spanish companies (some features common to larger companies
included personalisation capacity, entertainment elements, online orders, job
opportunities, daily news highlights, financial information, job opportunities, etc.).
The requirement for these "features" is less critical for the majority of small business
websites as they generally operate a narrow range of activities and products. Thus
Gonzalez and Palacios's WAI emphasis on features is arguably not entirely
appropriate for the largely featureless content of rural small business websites. For the
most part, given the scope of the activities performed by rural small businesses, the
lack of features was entirely appropriate. Most rural small businesses provided the
essential information required to transact or communicate with their customers, such
as product or service description, background information, online ordering and contact
details. Hence, Gonzalez and Palacios's WAI and its weighing for website content do
not capture the relative merits of being a small business.

Nonetheless, Hunan Province websites stood out in regards to their content (see
Table III) as they were significantly stronger compared to the other rural small
business websites investigated. Certainly it was noticeable that the content of many of
the Hunan Province rural small business websites incorporated a greater number of
features than those from the other countries investigated. Despite this though, another
notable result was the poor accessibility scores found for Hunan websites. As was
found for Southern Russia, potential customers in China would have difficulty identifying

company websites. In the case of the Hunan websites, the benefits of providing rich content were undone by poor use of links and the failure to belong to industry portals.

Relationship between WAI categories
Spearman's rank order correlations was used to investigate the relationship between the different WAI categories (accessibility, speed, navigability and site content) observed in the current study. Table V shows the significant correlations identified. Site content was significantly related to speed. This correlation suggests that the best designed sites are rich in content and download speeds are fast. The negative relationship between content and speed was anticipated as well. Websites that contain more informational, communicational and transactional elements are usually slower. Navigability was also significantly related with speed. This correlation implies that effective websites are easy to use and download quickly. In contrast, there were no significant relationships between speed and accessibility, between access and navigability, between content and access, and between content and navigability ($a < 0.05$).

Discussion and conclusions
Various implications emerge from this study. Table VI provides a summary of results for the three research questions.

In terms of identifying whether transition economies exhibit better quality internet presence than traditional market economies, results are mixed. Results from Hunan Province suggest best quality compared with the other regions sampled, but Southern Russia does not follow this trend and there is little commonality between the two

Factors	1	2	3
(1) Access			
(2) Speed	0.15		
(3) Navigate	−0.08	0.35[*]	
(4) Content	−0.15	−0.42[*]	−0.09

Notes: $n = 60$; access = popularity scale; speed = page load time measure; navigate = ease of use measure; content = number of informational, transactional and communicational items; [*]$p < 0.001$

Table V.
Spearman's rank order correlations between factors of website quality and Web Assessment Index

Research question	Result
Is variation between the quality of Hunan, Southern Russian, New Zealand and Scottish rural small business websites observable?	Yes. But not related to whether an established market or transition economy
How does the website quality of Hunan, Southern Russian, New Zealand and Scottish rural small firms compare against businesses previously investigated by Gonzalez and Palacios' WAI?	Negatively
How strong is the relationship between the different categories of small business website quality: accessibility, speed, navigability and site content in the four countries studied?	Some observed

Table VI.
Summary results

transition economies and the two mature Capitalist ones. The finding that relatively highest quality websites are measured in Hunan Province at first seems to be surprising. We pondered whether these websites had received some sort of official assistance (as a similar website format was adopted) or the random sampling process had unintentionally thrown-up a predominance of high content featured outliers. Certainly, Batjargal (2007) reports website and other ICT services are provided in many Chinese locations by a few large providers, supported and preferred by government, and it could be that we have observed a uniformity and quality that has been appropriated this way. Perhaps this, hand in hand with the Chinese strategic investment in ICT infrastructure and use, has driven up the quality and efficiency of small firms' internet performance. If this is the case, high quality is only likely to impact firm performance if accessibility and collective internet activity is promoted for the Chinese small firms sector, however. Further studies of the effects of this improved internet participation quality on firm, industry and national performance in China would be revealing and there may be lessons in terms of joined-up practice for other countries and regions. For the present study they are certainly implied.

Results show that the small firms' websites sampled in the current study are lower quality than those large Spanish firms tested by Gonzalez and Palacios(2004). It is important to note though, that the higher WAI scores of Gonzalez and Palacios's Spanish companies are probably due to their businesses being much more reliant on online transactions. Galloway *et al.* (2011) find that rural firms participate in the online environment to develop local market trade to a greater extent than in order to achieve extended market reach. It may therefore be the case that a small rural firm's website's transaction functionality may not be as pertinent as it is for large firms. Despite this, in terms of lower quality observable in most of the performance measures, the current study supports the contention, throughout the literature, that large firms' websites are better quality than small firms' sites. The multi-national nature of the current study suggests further that this is consistent geographically.

Relationships between the categories of website quality have implications for small firm owners' operation and management of their websites. For example, the negative relationship between content and speed identifies that the more content there is the slower the site. However, website content is one of the main pull factors in terms of attracting and keeping customers, so therein lies a dilemma for small firms. Once identified, solutions can be generated though, and in this case might include distributing content across many different pages and keeping the home page as simple as possible, or the use of intra-site links to quicken download speeds by spreading content across self-contained pages (Hernández *et al.*, 2009).

The current study is limited in several respects. First, it was cross-sectional, as data were collected from a single visit to each site at one point in time. The internet, website design and web technology are all dynamic and changeable forces, as are national regulatory environments, so similar studies are required at different times. Second, the current study focuses on firms' websites in rural areas in four specific countries, and within Russia and China, in specific regions. It would be useful to test results from this study with those that use the WAI to measure small firms' websites elsewhere in Russia and China, and in other countries throughout the world. Third, the study focuses entirely on firms in rural areas as these were considered most likely to exhibit poor quality as a result of skills and resource deficit for ICT use, relative to firms in

urban areas. Findings imply a case for extending the use of the instrument to compare and contrast website quality in urban locations in different regions, as through this the tentative results suggesting variation based on different national prioritisation and strategic support (or lack of it) for internet business in different countries might be tested further.

Further limitations are the sample size and the diverse industry characteristics of the rural small firms selected. Without doubt a small sample and the diverse industry characteristics of the rural small firms selected offers an increased chance that important differences observed are false and that some issues have been missed by the researchers. However, this research represented a preliminary research effort for evaluating and authenticating the WAI Index as an instrument appropriate for measuring the website quality of small rural firms. The study also provided an opportunity to develop a supporting research design for the WAI Index. From this perspective the results of the study indicate that extending the use of the instrument would be worthwhile as it acts as a suitable evaluative tool of website quality. It also offers an insight into where digital divide exists, either at the level of the economy via policies and infrastructure or at the firm-level via website skill deficiencies.

Another limitation is Google's web service for assessing download speeds. Google's web service provides measurements based on its computer infrastructure. In reality, the consumer experience may vary widely from the Google computer infrastructure due to the effectiveness or otherwise of the broadband service they employ.

Finally, the selection of the country economies involved was by convenience, as each of the researchers involved was born in one of the countries investigated. Thus the researchers' backgrounds afforded a unique opportunity to utilise their "expert" knowledge of each country to ensure accurate sources of information were obtained. Given the exploratory nature of the study, this limitation was considered to be acceptable. Certainly the prominence of China and Russia as growing and dynamic transition economies offered a reasonable test to be contrasted against both the mature Scottish and New Zealand market economies. The convenience element was a limitation that needs to be addressed by studying other economies; however, this is a task for another study now that a potentially useful research instrument and design have been identified.

Implications

A digital divide was discovered amongst the rural small firms from each of the economies investigated. However, the scope and level (firm or country) of the issues confronted differed. These differences highlight the utility of Gonzalez and Palacios(2004) WAI Index as an effective indicator/measure for determining the source and existence of a digital divide. Implications of the WAI Index's utility will now be discussed.

Proactive assistance from the Chinese government and/or Hunan regional agencies seems to be making a difference to the website quality of the Hunan-based SMEs investigated. However, the relatively high website quality of Hunan-based SMEs compared to others was undermined by their poor accessibility. Poor accessibility relates to more general issues about internet use. Various surveys and reports have revealed that Chinese e-commerce activities in general suffer from a poor telecommunications network, unreliable methods of credit payment and fundamental concerns about the security of transactions due to an immature legal system (Martinsons, 2008). These broader issues highlight that website quality is a minor

factor compared to the fundamental importance of building a robust internet infrastructure and economic environment for e-commerce to flourish. Certainly *ad hoc* government e-commerce policies and individual company initiatives such as improving website quality are pointless compared to the comprehensive development of a reliable infrastructure. Thus the Hunan experience reinforces the requirement for governments worldwide wishing to foster e-commerce activity that fundamental infrastructure investments are required to take advantage of any inherent resources and skill advantages their SMEs may possess. Similarly, results imply that Russian government needs to invest in a more reliable and stable e-commerce environment, so the SMEs investigated from Southern Russia can surmount poor accessibility issues. In spite of more mature or established SMEs from Scotland and New Zealand possessing lower website quality they benefit from more convenient, reliable and inexpensive access to the Internet. Moreover, unlike Chinese consumers, Scottish and New Zealand consumers can search the Internet to compare products offered by many rival suppliers and make online purchases with widely accepted credit cards. Improvements in website quality will only have an impact if there are no significant difficulties or barriers of doing business on the Internet.

The current study's results also illustrate that a website quality gap exists between rural SMEs and large firms investigated in Gonzalez and Palacios(2004). How this gap can be reduced will be challenging. Based on findings in Beckinsale *et al.* (2006) that ICT participation amongst SMEs is influenced more by local consultants and supply intermediaries than by government policies, it may be most useful if suppliers would act as a local network for passing on information and support opportunities from government agencies to assist SMEs. Another suggestion is that SMEs similarly could access government grants for developing internet technologies from local suppliers rather than direct from government agencies. Further support for this contention can be inferred from the quality of content observed in the Hunan sites, as developed by private specialist expertise.

The consistency of website experience tentatively found in Hunan, and the potential corresponding effects on ease of use has implications worth considering in many commercial organisations, and in non-commercial sectors. Certainly, Reavley and Jorm (2011) suggest a consistency of approach to health-related websites is likely to improve the experience of users. Results from Hunan in this study seem to support that insofar as consistency of appearance and functionality and quality are likely to impact on user expectation and deliver an efficient, quality of experience. For the commercial organisation, and particularly small rural firms, the effects of this expectation-linked consistency may be no less impactful.

In summary, poor accessibility and a problematical domestic telecommunications and economic infrastructure seem to negate the value of rich content features exhibited by the Hunan websites. Content richness in itself is only an asset if a company possesses a wide portfolio of products. For most SMEs, possessing an array of rich content features is not required due to the narrow scope of their activities. Finally, government policy initiatives to support rural SMEs would be enhanced if private sector suppliers were involved. Private sector suppliers play a critical role as intermediaries for influencing SMEs, so they could be utilised to support and communicate government policy initiatives. Therefore, rural SMEs would benefit from a reliable and stable telecommunications infrastructure in tandem with private sector involvement for developing their capabilities.

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Appendix

		Metrics
Web assessment index		
Clarity of purpose	(a) Clear from start what is on offer information only or transaction capability	Transaction capability = 2, Information only = 1, Not clear = 0
	(b) information clearly organized on home page	Yes = l, No = 0
	(c) Clear links and instructions in menu home page for self service sites	Yes = l, No = 0
Accessibility		
(a) Presence in search engines	Use generic keywords of the company's products/services via Google, Yahoo and Bing to check search engine presence	Appears in first three pages or less = 1, more than three pages = 0
(b) Popularity	Use the PageRank Service (www.prchecker.info/check_page_rank.php) to check the link popularity of each site	
(b) Popularity	Use the following service (www.linkpopularity.com/) via Google and Bing search engine to check the popularity of each site	
Navigability	(a) Sitemap	Easily accessible on every page = 2, have to searchv1, none = 0
	(b) Whole site	Yes = 1, No = 0
	(c) Within specific category	Yes = 1, No = 0
	(d) Use of drop down lists	Yes = 1, No = 0
	(e) Results on one page, few and relevant	Yes = 1, No = 0
	(f) Criteria recognized whether single or plural	Yes = 1, No = 0
	(g) Keyword search function	Yes = 1, No = 0
	(h) Links to internal pages correctly described	Yes = l, No = 0
	(i) Minimum number of links to information on products/services	Arrive in three pages or less = 1, more than three pages = 0
	(j) Change colour once used	Yes = 1, No = 0
	(k) Allows undoing, redoing using links or back button in menu	Yes = 1, No = 0
	(l) Navigation bars better at top and side	Navigation bars at top/side = 2; Navigation bars at side or top = 1; No navigation bars = 0
	(m) Home button every page	Yes = 1, No = 0
	(n) Does not open up new screens	Yes = 1, No = 0
Speed		
(a) Loading speed	Use the following web service (http://pagespeed.googlelabs.com/) to check average load speed	

(continued)

Table AI.
Web Assessment Index

		Metrics
Contents quality		
Informational content	(a) Company background	Yes = 1, No = 0
	(b) Product/service description	Yes = 1, No = 0
	(c) Daily news highlights	Yes = 1, No = 0
	(d) Financial information	Yes = 1, No = 0
	(e) Job opportunities	Yes = 1, No = 0
	(f) Check order/shipment status	Yes = 1, No = 0
	(g) Search for dealers, agents, stores, etc.	Yes = 1, No = 0
	(h) External links	Yes = 1, No = 0
	(i) Link to firm divisions	Yes = 1, No = 0
Transactional content	(a) Online orders	Yes = 1, No = 0
	(b) Fill-in forms simple and self explanatory	Yes = 1, No = 0
	(c) Appropriate for different nationalities, e.g. address layout	Yes = 1, No = 0
Clicks	(a) Shopping basket button	Yes = 1, No = 0
	(b) Check out button	Yes = 1, No = 0
	(c) No. of clicks to order	Three clicks or less = 1, more than three clicks = 0
Communicational content	(a) Contact e-mail	Yes = 1, No = 0
	(b) Contact telephone or address	Yes = 1, No = 0
	(c) Receive news by e-mail	Yes = 1, No = 0
	(d) Free e-mail service	Yes = 1, No = 0
	(e) Personalization capacity	Yes = 1, No = 0
	(f) Entertainment elements	Yes = 1, No = 0
Text	(a) Too much/endless scrolling pages	Yes = 1, No = 0
Colour	(a) Matches brand or corporate image	Yes = 1, No = 0
Graphics	(a) Relevant, sharp and not too large (can affect download of page)	Images small/used as links = 2, images small = 1, images slow to download = 0
Animation	(a) Does not distract from content	Yes = 1, No = 0
	(b) Does not need extra software to download or increased modem speed	Yes = 1, No/unnecessary = 0
Consistency	(a) Page layout similar on each page	Yes = 1, No = 0
	(b) Same procedures for similar/ related things	Yes = 1, No = 0

Table AI.

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