

Risk and disintermediation in tourism

Arne Wiig

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1. Introduction

Information is the glue in the supply chain of tourism (UNCTAD, 2001; Wiig, 2003). In the so-called 'new economy', information is digitalised and provided over large networks (Tapscott, 1996; Shapiro and Varian, 1999). The Internet has revolutionised supply-chain management, for example by providing consumers information about tourist destinations and their main attractions. Consumers may also search the Internet for information about specific tourist products and their respective prices. E-mail makes it possible to communicate directly with the supplier at low cost, and if service providers develop e-commerce solutions, ordering (e.g. booking) and payment can be undertaken interactively between the customer and the supplier.

Service providers in developing countries, who are not accessible on the Internet, are dependent on intermediaries to provide information and bundle their tourist product. In developing countries a large share of tourist products is booked through middlemen, and revenue retention is low; approximately 30 per cent according to the World Trade Organisation (1998). Commission to intermediaries constitutes a large share of revenue (in the range from 10 to 40 per cent, depending on the market in question). A web page (either in terms of an individual homepage or by registering at a web portal) is a prerequisite or necessary condition for direct contact with customers, particularly when tourists lack information about the potential service providers and their products. Potential customers can then communicate directly with the service providers through e-mail or fax. Increasingly, customers use the Internet to visit travel-related web sites. One in 25 internet visits is to a travel web page (www.hitwise.com), and the Internet may therefore facilitate direct ordering and disintermediation. This article analyses conditions under which the Internet facilitates disintermediation in tourism. Disintermediation is important because it may increase the revenue retention rate.

There is no clear answer as to whether the Internet leads to disintermediation or not. Chircu and Kauffman (2000) provide a literature review of the impact of information and communication technology (ICT) on the structure of the supply chain and, from this literature, the evidence is mixed. My point of departure is that intermediaries play the role of both bundler of goods ('make a package') and certifiers (guarantee the quality). The possibility of disintermediation depends on whether the Internet influences these roles (Wiig, 2003). In this paper, I focus on the role middlemen have as certifiers. The certification role is linked to the fact that tourism is an information-intensive product characterised by asymmetric information. Service providers generally have more information about the product than customers, and intermediaries may guarantee the quality of the product in question. Without the guarantee, the customer may not be willing to buy directly from the supplier. Although the Internet is a necessary condition for direct contact, it is not a sufficient condition if information on the Internet is not trustworthy.

Customers face two main types of uncertainty when dealing directly with a service provider: i) uncertainty related to the management of the particular transaction (is the product of appropriate quality?); and ii) uncertainty related to the system around the transaction (is it safe to make the visit, or will I get the money back if something goes wrong?) Both types of uncertainty are decisive for the customer's choice of tourist destination and management of the transaction (e.g., the use of intermediaries). The first type of uncertainty is directly related to the product in question and therefore varies across product markets and destinations, while

the second is related to the environment in which the transaction takes place. The system-dependent uncertainty normally varies across tourist destinations. When customers lack information about intrinsic product characteristics, as frequently is the case in tourism, they may use system-dependent measures of uncertainty as signalling devices.

The general focus of this article is on the conditions for the profitability of direct marketing on the Internet. What complementary assets are required to market directly on the Internet, and to what extent are these assets available in developing countries, making direct contact a viable option? A particular focus has been the impact of trust-enhancing institutions. More specifically, are there any empirical evidence that the traditional intermediaries' role as certifiers declines when risk factors are reduced. To answer this question I conducted an econometric analysis of the hotel industry in 120 countries, examining the relationship between direct marketing and risk.

This research distinguishes itself from earlier research not only by its methodological approach, combining traditional data sources such as the World Bank with data from Google searches, but also by linking the concept of web marketing to system-related risk. It extends beyond traditional studies of the digital divide by explicitly using social capital to explain cross-country variation in the use of homepages for marketing purposes.

Section 2 provides an overview of the theoretical literature and distinguishes between different levels of risk. Section 3 presents and discusses the empirical findings, while section 4 concludes.

2. Theory and literature review

The main point of this article is that complementary factors are needed in order to exploit the opportunities that ICT provides, particularly the opportunity of direct marketing. Firms that can command complementary factors are in a better position to adopt new technology and appropriate the benefits through disintermediation (Chircu and Kauffman, 2000; Teece, 1986). So, what potential complementary assets are needed? In uncertain environments, trust is a prerequisite for trade. Trust not only influences whether transactions take place, but also the organisational structure of the transactions. Whether trade occurs directly or through an intermediary depends partly on the trustworthiness of the individual service provider (Hoffman et al., 1999; Davenport, 2001). Institutions signalling trustworthiness are therefore one type of complementary factor, increasing the gain of internet marketing, which will be explored in more detail in the following analysis.

In most cases, the creation of a web page (or registration in a tourist web portal) is not free but a costly investment. And as for investments more generally they are undertaken only if they are expected to be profitable.. The investment costs varies across different internet providers, countries and portals. The cost generally increases when the web page has online booking possibilities. There are two types of possible gain for the service provider. The Internet may, on the one hand, result in internal cost savings (improve the logistics between service providers in the supply chain). On the other hand, the Internet may be used for marketing purposes: it may increase transparency and lead to increased sales, a factor that will be elaborated in more detail below.¹

¹ The Internet may also lead to stiffer competition, with a following reduction in market sales. Lack of price information made this impact difficult to analyse.

A European study of the use of ICT in the tourist sector concluded that it was more common to use ICT for marketing purposes in tourism than in other sectors (seven industries were compared), but that ICT was not as integrated in business processes as in other sectors (European Commission, 2003a). The study found that a larger share of tourist enterprises (74%) has a web page as compared to enterprises in the non-tourist sectors (67%). Part of the reason for this is that the utilisation of web pages for marketing purposes or as selling platforms is more common in the tourist industry, particularly for air travel and hotels, than in other industries.² More than one in three tourist enterprises in Europe (or twice as many as in other sectors combined) sell their products online, and this share is increasing rapidly. Although the importance of online marketing in tourism is high compared to other sectors, the level of online hotel booking is remarkably low. In Europe it accounts for only 2% of total hotel bookings (Marcussen, 2003a).³ Most bookings are still done by travel agents through Global Distribution Systems. Part of the reason for this is that customers are still not confident with the online booking of hotels. So far, customers mainly use the Internet to acquire information about the standards and locality of the hotels – not for online booking.

In circumstances characterised by asymmetric information, proper certification mechanisms or other trust-enhancing factors are of vital importance in order to increase sales since they may reduce the transaction costs that arise when there is asymmetric information between the customer and the service provider. If customers cannot rely on the information provided on the homepage, they will not use the information, and direct contact becomes a non-viable option.

There are numerous definitions of trust. Here, I will highlight trust as referring to the belief that party A expects that party B will not exploit the vulnerability A has created for himself through this particular action (James, 2002).⁴ By booking an unknown hotel online, for instance, a person is exposed to being cheated. Trust-enhancing factors reduce this risk of being exploited, and trust is a key aspect of social capital.

Humphrey and Schmitz (1998) differentiate between three levels of trust: macro, meso and micro. *Macro*-level trust refers to trust that is driven or produced by formal institutions or by belief in laws. Macro-level trust is related to the accountability of public institutions and reflects the degree to which government institutions can be trusted to protect business interests. Macro-level trust indicators are similar to what McKnight and Chervany (2001) have termed institutional trust. Macro-level trust indicators are available by country, but not by product. An overview of available sources of macro-level trust indicators can be found at <http://www1.worldbank.org/publicsector/indicators.htm#icrg>. The most common indicator applied in the literature is the International Country Risk Guide (ICRG) indicator (see, for instance, Knack and Keefer, 1995). The ICRG indicator measures the institutional environment, which is part of what shapes 'social capital' around business transactions in a country. The main idea is that social capital or trustworthiness facilitates direct business transactions. Based on a predetermined set of common indicators and weighting procedures, an expert panel has given ratings to each country. Trust data from the General Social Survey

² 84 percent of tourist enterprises use their websites for selling products as compared to 79% for other sectors.

³ Online booking and payment for tourist services are more common in the US than in Europe (Marcussen, 2003ab). In a study of 25 hotels registered in the Bergen Tourist Board portal, Norway (www.visitbergen.com), I found that 23 hotels had their own homepages with booking facilities (directly or through their hotel chain). Yet, online booking constituted only a minority of the bookings. On average, online booking through the portal or directly on the homepage of the hotels constituted only 2% of the bookings.

⁴ For an overview of the literature on the relationship between trust and trade see Sandelien (2003).

are also commonly applied in the literature (see, for instance, Zak and Knack, 2001). This data is based on interviews among random individuals in each country, in which respondents are asked: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” This measure only refers to how citizens in a country perceive their own country – not to how other people in other countries perceive the risk of doing business. ICRG takes account of this.

Meso-level trust is tied to a person conditioned by characteristics of the group or network the person belongs to (e.g., family or ethnicity). This type of trust is only applicable to particular groups of agents. Micro-level trust is trust achieved through shared experience among individual agents. There are, however, few available indicators of these two levels of trust. There is no third-party certification of individual homepages for any tourist destinations in developing countries. Alternative quality measures of individual service providers’ homepages are how many external links there are to the homepage. More links reflect the fact that more sites refer to a particular homepage, and this may increase the confidence or (micro) trust in an individual home site. This is the ranking principle applied by Google. Web sites with a large number of external links pop up first. Photos, online booking facilities, memberships of hotel chains or tourist boards with rating facilities, and so forth, may increase confidence in a homepage, but creating an index of this is extremely subjective. Nevertheless, it has been done in product markets.⁵

Lack of social capital reduces trust and may prevent the customer from using the information provided on a particular internet site, and thus reduce the incentives the service providers have to market online. Both Chinn (2004) and Caselli (2001) find a positive impact of regulatory quality on the internet digital divide (as measured by computer or internet penetration across countries), suggesting that the accountability of prevailing institutions matters for direct marketing⁶ They have not explicitly analysed its impact on direct marketing.

Human capital is obviously another complementary factor to direct marketing. Lack of human capital may restrict the ‘supply of disintermediation’ by making it difficult to operate a computer or a homepage and therefore to adapt to new technology (OECD, 2000). Chinn and Farlie (2004) analyse cross-country disparities in *access* to personal computers and the Internet, and they find that human capital is particularly important in explaining the demand for computers, but not as important in explaining the use of the Internet. They find that the digital divide is mainly explained by income differences, although public investments in human capital, telecommunication infrastructure and regulatory infrastructure can mitigate the gap.⁷ Human capital also matters for the *actual use* of computers. Caselli (2001) found that human capital matters for personal computer adoption, while Pohjola (2003) found that human capital is significant in explaining investments in information and communication technology. Similarly, I expect that the creation and actual use of a homepage may require substantial educational *ability*.

Since e-commerce solutions through online booking and payment facilities might be expected to increase the tendency to book directly online and thereby to facilitate direct contact, we

⁵ See, for instance, Pare (2003). For an overview of the literature on online trust see Yousafzai et al., 2003; Table A1.

⁶ Knack and Keefer (1997) and Zak and Knack (2001) found evidence that social capital increases economic growth, although the robustness of the analyses is disputed (Beugelsdijk, et al., 2004)

⁷ See Fink and Kenny (2003) for a discussion of alternative measures of the digital divide.

also need to include measures of financial sector development. At the same time, from the discussion above we need to be aware that the current stage of e-commerce in the hotel industry is premature (online booking and payment in the hotel industry is yet not very common)

Based on the literature review referred to above, in addition to social capital I will therefore control for the following complementary assets: human capital, infrastructure development, financial sector development and income.

3. Methodology and empirical results

If trust-enhancing institutions are important complementary factors for direct marketing on the Internet, then one would expect the use of the Internet for marketing purposes to decrease with the quality of the institutional environment. I have therefore tested as to whether disintermediation is more common in markets with less institutional risk. More specifically, the general hypothesis I have tested is whether we find any empirical evidence that the role of traditional intermediaries as certifiers declines with the reduction of uncertainty. I test this by applying cross-country data of the inbound international tourist sector (hotel sector).

I have chosen the hotel industry as the case since it is a differentiated product, partly reflecting differences in quality ratings. Without trustworthy grading systems across countries, branding or other certification mechanisms are important. Furthermore, it is more likely that the hotel industry has adapted to the new internet age than, say, guest houses, since hotels generally have a larger share of international tourists than guest houses do.⁸

3.1 Data sources of the dependent variable

I face an immediate methodological problem: there is hardly any data available. Ideally, one needs to collect data on the share of direct orders in a country (as the weighted sum of an individual firm's share of direct orders); or alternatively, the share of hotels in a country with a web page (since these have invested in direct marketing). The problem is that the total number of hotels and its distribution (the size of the firms and whether they have a web page or not) are unknown across countries. Without any information on the characteristics of the population, traditional cross-country random sampling techniques are difficult to apply. These problems are even more severe if one tries to extend the analysis by the possible application of time series or the use of panel data.

My approach is inspired by the idea of acquiring information about the share of hotels across countries having a registered homepage at a given point in time. There are generally three available data sources for information about *hotels*. First of all, we have worldwide yellow pages. But few countries are available and the information content varies across tourist destinations.⁹ Tourist boards may also provide information about the population of hotels in a country. Links are provided to a large number of tourist boards, but lists of available hotels and their (web) addresses are not directly accessible from the tourist board for a large number of the countries.¹⁰ Since data on disintermediation is almost non-existent, particularly across

⁸ Since there is a fixed cost involved, one would also expect that hotels would more frequently create their own homepages, as they are generally larger than guest houses.

⁹ See <http://www.yellow.com/international.html>

¹⁰ see http://travel.luxweb.com/services_new/office_tourisme.php and <http://www.morrismurdock.com/TravelInfo/tourist.cfm>

markets with differences in risk, I have used a third web-based source for gathering information about hotels in a particular destination. I have applied the number of hotels registered in the World Wide Web (web hits or H).

As I have used the Internet as the data source, the reliability of the data represents a challenging problem. I have therefore applied a common search phrase as well as a reputable search engine. Many hits are not relevant when searching on the Internet. I have tailored a specific search where I have specified the product (hotel), a particular location (the capital of a country) and only registered non-similar hits.¹¹ 'Hotel' constitutes one of the most common search terms on the Internet and is therefore widely used by customers.¹² I have chosen the capital of a country since I would expect this to reduce internal regional variation in third variables such as telecommunication and air transport facilities across countries. A problem with this choice, however, is that the capital may not be representative of the tourist industry in a country. I have used Google as the search engine. Google is the largest search engine in the world; its search algorithm also powers other search engines throughout the world.¹³ According to the Economist, 75% of referrals to web sites originate from Google's algorithms at present.¹⁴

The number of hits (H) reflects the number of registered homepages in the hotel industry. One would expect there to be more registered web pages in markets where disintermediation is common, since the creation of web pages is a prerequisite for disintermediation, and H is my applied measure of disintermediation. The measure is biased since it does not take into account the total number of hotels at a particular destination. H only provides information about the part of the population that at a particular destination and particular point in time (day of searching the web) is available on the Internet either through a portal (electronic intermediaries) or directly accessible through a homepage. Ideally one should control for the number of hotels, but because of scarce data material, I have instead controlled for the number of tourist arrivals (T).¹⁵ As the market size (T) may have an independent impact on the penetration of web marketing (as measured with H/T), I use a quadratic function of T on the right hand side, as I have used H as the left hand variable. Results are not critically dependent on the use of a quadratic function. The alternative approach of using a share variable (e.g., H/T) as the left hand variable, would not utilise the full information in the data, particularly about the impact of risk, since the two variables have collapsed to one, and risk may have a separate impact on each of these.¹⁶

¹¹ I explicitly searched 'hotel' and excluded 'hotels' in order to reduce the number of portals, e.g. my search in Google was: Hotel Accra Ghana in title (- hotels), but by restricting to non-similar hits, I got a measure of the population of hotels located in Accra that were accessible from the Internet.

¹² Although its share is low (hotel constitutes 0.6% of all the search terms related to the travel industry), there are a large number of search terms. No-frill carriers such as EasyJet and Ryanair were the two most popular terms typed into search engines which resulted in traffic to travel industries' web sites in the UK. These represented 4.2 per cent of all search terms that delivered users to web sites in the travel industry (www.hitwise.co.uk), while Expedia, the largest online travel agency in the UK, constituted 0.7%. Hotels are therefore a very common search term for customers.

¹³ See <http://searchenginewatch.com/reports/article.php/2156451>

¹⁴ Economist 30 October 2003 How good is Google?

¹⁵ I have used tourist arrivals in a country as proxy for the tourist arrivals in the capital. Data on tourist arrivals in the capital is generally not available.

¹⁶ There are two main reasons why I use H as the left side variable. First of all, my proxy of the population of hotels may be an endogenous variable. One may claim that a higher risk may lower the number of tourist arrivals in a country. It is more difficult to claim that a higher risk influences the number of hotels in a country, as domestic hotel guests may not be concerned with the same type of risk as international visitors. By using a share variable as left hand variable combined with the use of tourist arrivals as proxy for the number of hotels, one

In addition to the problem of using H as proxy for disintermediation, another validity problem is related to language. Although “hotel” is an international, commonly used word worldwide, hotels with homepages may not term themselves hotels on the Internet, particularly if their primary markets are non-English speaking intra-regional tourists or their internet host is non-English speaking. As long as English-speaking tourists are potential visitors to a hotel, one should not expect this to be a serious problem, since the conditional cost of signalling (in English) that the site is a hotel, given that the hotel is already on the web, is extremely low, while the benefit could be high. Even when a site does not undertake this signalling act, the validity problem mainly arises if non-English speaking sites are systematically related to our independent variables. I would expect that the problem is most relevant for East Asian and West African countries. A low number of hits in these countries could therefore stem from language rather than uncertainty, particularly if non-English speaking destinations are also relatively more uncertain tourist destinations. I do not find any evidence that these countries have a higher risk than other countries in my sample.

In sum, I have applied the number of web hits on Google as the dependent variable proxying the extent of direct contact, and I presume that a higher level of this variable increases the number of transactions that are facilitated directly between an individual service provider and a customer. By controlling for the number of tourist arrivals, the number of web hits can be interpreted as the probability of reaching the customer directly.

3.2 Independent variables

The structural relationship I want to test is:

$$H = a_0 + a_1 T + a_2 * T^2 + a_3 R + a Z + e$$

where R refers to uncertainty, while Z and a are vectors of country-specific control variables apart from tourist arrivals (T) and e is an error term with normal characteristics. Tourist arrivals have already been discussed and I assume that our function is concave in T.¹⁸

Travellers not only face one type of uncertainty, but may face various types of uncertainty at the same time. Internal and external conflict, political violence and homicide in particular may influence the way trips are organised. Fear may increase the use of intermediaries. The same applies to religious and ethnic tensions among citizens. Corruption, as well as unaccountable and unstable government, makes the political and economic environment less predictable. A lack of law and order makes it unwise to pay directly to a service provider in advance, making the use of an intermediary more likely.¹⁹

may therefore underestimate the impact of risk. The second reason is that these theoretical models are approximately the same. Let H refer to the number of hits and T refer to tourist arrivals and for the moment let us simplify by emphasising these variables only. The econometric model $H/T = a + \beta_1 * T$ is equivalent to $H = aT + \beta_1 * T^2$

where the latter is the one I estimate. Strictly speaking, the same is only true if we include additional explanatory variables that influence H, but not H/T.

¹⁸ See footnote 16. I have checked that the function is non-decreasing in the relevant range of T.

¹⁹ To what extent uncertainty also has an independent impact on the number of tourist arrivals is checked separately below through a two-stage regression analysis.

The International Country Risk Guide (ICRG) provides a composite index of political, financial and economic risk. The Political Risk Rating is composed of 12 weighted variables, covering both political and social attributes.²⁰ This includes law and order, internal and external security and government accountability, all of which are important variables in deciding whether one should deal directly with a service provider or not. The political risk index captures these types of uncertainty, although it may also include some indicators which play a minor role in customers' decisions.

By using this composite measure, information about risk is aggregated into a single measure, reducing the reliability problem related to the use of a single indicator. One weakness with the measure is, however, that it is based on subjective ratings by an expert panel. Nevertheless, the indicator is widely used by firms investing in developing countries. It is also widely used in the literature on the relationship between institutions and economic growth referred to above.

The infrastructure control variables applied are the number of computers and internet users in the country. These variables are decomposed by analysing the individual impact of the size of the population, as well as the impact of computer intensity and the intensity of internet users in a country.²¹ While the first reflects the availability of physical computers in a country, the second reflects the actual use of the Internet in a country. Normally one would expect that both variables would increase the likelihood of creating a homepage.

Since financial sector development may spur online booking and e-commerce solutions, I have also controlled for various measures of financial sector development.²² Market size is controlled for by the number of tourist arrivals.

²⁰ The index is composed of the following variables (weighting in brackets):

- Law and order (6). This is a measure consisting of two (independent) components. The 'law' component is a measure of the strength and impartiality of the legal system while the 'order' component reflects how people and the government obey the rules.
 - Internal conflict (12). This is an assessment of political violence in the country and its actual or potential impact on governance and business.
 - Religious tensions (6) and ethnic tensions(6) are additional measures of internal conflict in a country.
 - Government stability (12). This is a measure of the government's ability to carry out its programme and stay in office.
 - Democratic accountability (6) and bureaucracy quality (4) are measures of how responsive government is to its people and the degree of autonomy of the bureaucracy.
 - Military in Politics (6) and corruption (6) indicate underlying political difficulties in a country with a resulting problem in the business environment.
 - Socioeconomic conditions (12). This measure covers a variety of variables, ranging from infant mortality to the interest rate. It attempts to measure general public satisfaction with government policies. More satisfaction is assumed to stimulate the business climate in a country.
 - Investment profile (12). This is a measure of the government's attitude towards inward investments (based on measures of degree of taxation, repatriation, labour costs and risks to operations).
- External conflict (12). This is a measure of both the risk of armed threat or geopolitical disputes to the ruling government and the business threats of trade and investment restrictions.

²¹ Roller and Waverman (2001) provide an overview of various infrastructure variables. I have also applied telephone lines, although my results are not changed by this.

²² Levine (1997) provides an overview of the literature of the impact of the financial sector on development. A recent survey article that discusses various indicators of financial sector development is Andersen (2003).

Table 1. Variables and data sources

Variables applied and their source	SOURCE
Dependent variables	
Web hits	Google (October 2003)
Independent variables	
Gross domestic product per capita (constant 1995 US\$)	World Bank
International tourism, number of arrivals (in 1000)	World Bank
Population (in 100000)	World Bank
Political risk	PRS group ICRG (2000)
PCs per 1000	World Bank
Internet users per 1000	World Bank
School enrolment, secondary (% gross)	World Bank
Liquid liabilities (M3) as % of GDP	World Bank
Domestic credit provided by banking sector (% of GDP)	World Bank
Domestic credit to private sector (% of GDP)	World Bank
Source: World Bank, World Development Indicators 2004. All figures are from 2001 unless otherwise specified	

3.3 Mapping of web hits and political risk

Before I present a more rigorous statistical analysis, I will provide a broad picture of the distribution of the two key variables analysed. Figures 1 and 2 present the worldwide geographical distribution of web hits and political risk, respectively. They reveal that the geographical distribution of political risk corresponds to the geographical distribution of web hits, although there are some minor differences, particularly in Central Asia. Low-risk countries also seem to be high-income countries.

Figure 1 Mapping of Political Risk

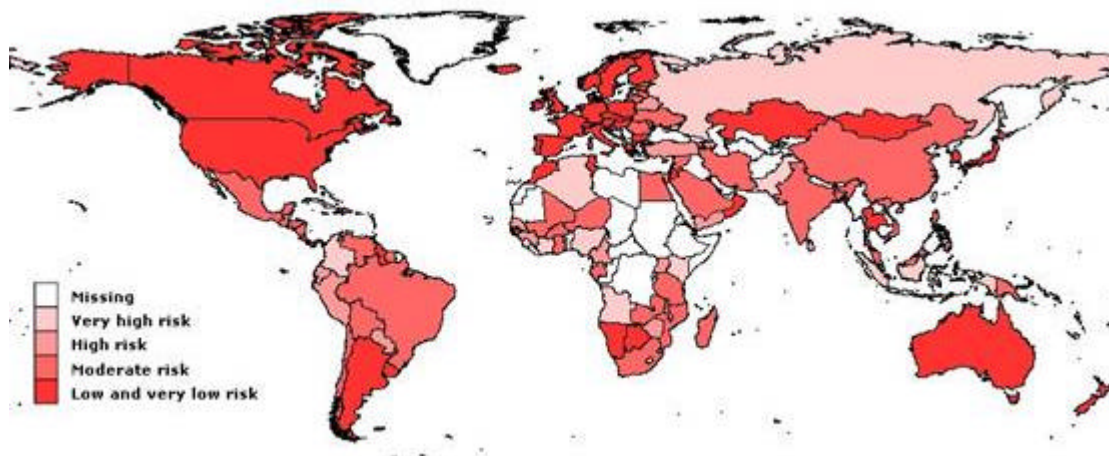
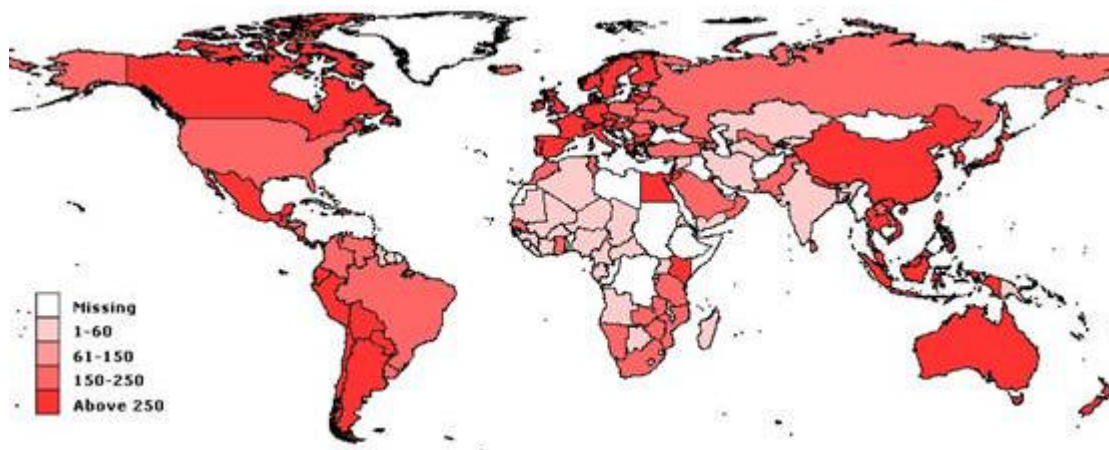


Figure 2. Mapping of Hits



3.4 Mechanisms and results

As argued in section 2, uncertainty may reduce the incentives a hotel has to create its own homepage. Since consumers may be reluctant to contact the service provider directly in uncertain environments, the service providers lack incentives to make their own homepages. Web marketing is a prerequisite for reaching tourists directly. The dependent variable that is applied to analyse this phenomenon is the number of web hits, while I have applied a composite measure of political risk as the core measure of uncertainty.

Web marketing may reflect the fact that a country is rich rather than being low risk. I have therefore tested for income level by using GDP per capita. I have included school enrolment in secondary education as a control variable of human capital (reflecting the ability to operate a computer and a homepage). Since web marketing requires an infrastructure, particularly access to a computer and to the Internet, I have therefore controlled for the intensity of PCs

and internet users. Low web marketing may also reflect the fact that the market is thin. I have therefore controlled for the number of tourist arrivals.

The availability of online financial transactions may facilitate online booking and therefore provide the incentive for making a homepage. I have therefore applied three common indicators (liquid liabilities, domestic credit by the banking sector, and domestic credit to the private sector) of financial development (see Table 2 and Andersen, 2003).

Since I have used web hits as the dependent variable, I reduce the problem of (reverse) causality. It is difficult to argue that the number of hits influences the risk or infrastructure variables. It may, however, be claimed that tourist arrivals could be influenced. More sites on the Internet may attract additional customers. The approach taken in this paper is, however, that the number of tourist arrivals is independent of the number of hits and mainly determined by other variables. More hits rather reflect the fact that it is more likely that the service provider is contacted directly, making the structure of the supply chain (the use of intermediaries) an endogenous variable. I have therefore not checked for causality by using instrumental variables, as I do not find any convincing theories for this phenomenon. I have, however, checked whether risk may have a separate impact on tourist arrivals (see below).

Descriptive statistics are given in Appendixes 1 and 2, while Appendix 3 lists the countries included in the statistical analysis.

Table 2 presents the regression coefficients from an ordinary OLS regression. Robust standard errors (SE) are presented in brackets. As revealed in Appendix 2, income is highly correlated with the penetration of PCs and internet users. Model 1 accounts for this by focusing on income. In order to elicit the impact of the independent variables, I have adjusted for the population size. Population is, however, not significant in any of the models and, apart from model 1, this variable is therefore dropped in the subsequent analysis. In model 2, I have controlled for each of the three financial indicators (of which I have only presented one, since these indicators are highly correlated and results are generally the same across indicators). Model 3 controls for human capital. Since both measures of telecommunication infrastructure are highly correlated, I have separated the two, and in model 4a and 4b income is substituted with these two variables respectively.

Table 2 Results from the regression analysis. Dependent variable: Hits

Expl. Variables	Model 1a	Model 1b	Model 2	Model 3	Model 4 a	Model 4b
International tourism, number of arrivals (in 1000s)	0.0098*** (0.002)	0.0104*** (0.002)	0.0122*** (0.004)	0.0100*** (0.002)	0.0112*** (0.002)	0.0108*** (0.002).
Squared International tourism*10 ⁻⁷	-1.02*** (0.33)	-1.09*** (0.29)	-1.88 (1.19)	-1.04*** (0.30)	-1.14*** (0.29)	-1.08*** (0.30)
Political risk	1.87* (1.09)	1.76 (1.08)	1.72 (1.18)	1.39 (1.16)	2.10** (1.12)	1.96* (1.18)
Gross domestic product per capita	0.0029*** (0.001)	0.0028*** (0.001)	0.0018 (0.001)	0.0026** (0.001)		
Population	0.0046 (0.0039)					
Liquid liabilities (M3) as % of GDP			0.234 (0.26)			
School enrolment, secondary (% gross)				0.34 (0.33)		
PC per 1000					0.13 (0.084)	
Internet users per 1000						0.17** (0.09)
Constant	-13.6	-6.4	-15.8	-3.0	-27.45	-19.8
R ²	0.51	0.51	0.36	0.51	0.49	0.49
# obs.	109	109	96	109	108	110

*** Significant at 0.01 level (Robust standard errors in brackets)

** Significant at 0.05 level

* Significant at 0.10 level

As revealed in all models presented in Table 2, tourist arrivals have a significant impact on the number of web pages in a country, indicating that market size plays an important and positive role in web marketing. The coefficients are stable across model specifications. If we increase tourist arrivals with one SE from its mean, the number of hits will increase by 0.66 (based on calculations from model 1a).

Each financial variable is tested in model 2, but none of the financial variables are significant for any combination of the independent variables. The explained variation is also lower than in the other models and financial variables are therefore dropped in the subsequent models 3 and 4.

In model 3, I have controlled for education but do not find that education has any significant impact – a result that contradicts the findings referred to in section 2. This could reflect the fact that I have used WDI – not the Barro Lee data set (BLD). BLD is an older data set which does not cover all the countries I have analysed.

The coefficient of political risk has the expected signs in all models, and is stable across model specifications. It is significant in all models (in Model 1b political risk is significant at the 0.11 level) apart from the models where we control for human capital, but human capital is found to be insignificant. If we decrease political risk with one SE, the number of hits will, on average, increase in the range 0.17- 0.19 (in models 1-4), which can be compared to the 0.66 effect of tourist arrivals (in model 1).

Models 1 and 3 give the largest explained variation in the data, so adding financial variables or secondary education does not improve the explained variation of our data.

Income is also significant in explaining the number of hits. This is in accordance with the results found in the literature described in section 2. If we substitute GDP either with the intensity of internet users (model 4b) or with the number of personal computers (model 4a), both variables are significant. The impact of income may, therefore, rather be explained by these infrastructure variables – variables that are highly correlated with income.²³

Although the impact of political risk on hits is not as decisive as was the case for tourist arrivals, its impact increases when we control for endogeneity. A reduction in risk may increase tourist arrivals in addition to its impact on hits. I have therefore checked how robust my results are by also undertaking a two-stage regression in which I have regressed tourist arrivals on political risk in stage 1 and then in stage 2 regressed hits on risk and the residual (in addition to the other control variables). Political risk is still significant, and the coefficient increases (to 2.4 in model 1a based on two-stage regression).²⁴

4. Conclusion

The Internet is a general purpose technology that can, in principle, be adopted everywhere. Using the Internet, customers can communicate and transmit information directly with service providers worldwide, without intermediaries. In this article, the point of departure is that these processes have not been equally adopted across sectors and countries. In some countries internet penetration is lower than in other countries and in some countries direct transactions are more common than in others. Online booking of air tickets is, for instance, more common in the US than in Europe. Online booking of hotels in Accra is not common at all. Part of the explanation is related to technology and skills, but even if we control for these factors, there are some unexplained variations between countries. I have focused on the importance of social capital as a complementary asset to ICT.

We know that trust relations are fundamental for trade (de Groot et al, 2004). In spite of a significant lowering of trade barriers and transportation costs, countries still trade relatively more with neighbouring countries than can be explained by comparative advantage or market power. Part of the reason for this is that trust relations may decrease with distance. Inspired by these observations, I have analysed the impact of information and communication technology on the structure of the supply chain management in the tourist sector in countries with differences in social capital. I have analysed one particular aspect of social capital: differences

²³ I have therefore made additional analyses combining income with internet users (as in 4b) or personal computers (as in 4a). Both income and political risk are significant in these cases, but the infrastructure variables are insignificant.

²⁴ The impact of political risk on tourist arrivals is even higher than on the number of hits (see first part of note 15).

in political risk. I have made an attempt to analyse whether disintermediation is more likely in countries characterised by low risk. This question is important because the adoption of information and communication technology may vary across markets, due to available complementary assets. An appropriate design of an ICT policy requires an identification of such complementary assets. Changes in ICT, therefore, do not necessarily lead to changes in trade patterns without changing the social capital among the trading partners.

Although the data and the methodology applied have their limitations, they represent a serious effort to test the relationship between the digital divide and system dependent risk. So far, few available empirical analyses have linked risk and disintermediation. This study represents a new approach to analysing this topic.

Based on the use of non-traditional data (such as Google), I find some evidence that disintermediation is more likely in markets with low risk. Income level and market size are also significant explanatory variables, while human capital and the structure of the financial sector play an insignificant role. Although new information technology may facilitate direct marketing and a higher retention of revenue (by eliminating the intermediaries), the results of this study indicate that this process will mainly take place in low-risk countries.

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Appendix 1. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Hits	115	169	125	0	464
GDP per cap.	116	7975	11544	157	46895
Tourist arrivals (TA)	112	5484	11007	16	75202
TA ² /mill.	112	150	633	0	5655
Population	117	463	1535	3	12719
Political risk	117	68	12	43	93
Personal computers per 1000	115	125	167	1	682
Internet users per 1000	117	120	156	0	599
Secondary enrolment /gdp.	117	73	33	6	158
M3_gdp (liquid liabilities)	104	56	44	10	236
Domestic credit provided by bank sector/gdp	115	62	55	-73	316
Domestic credit to private sector/gdp	116	50	47	2.6	186

Appendix 2. Correlation matrix

	Hits	TA	TA ²	Popul- ation	Pol- risk	Gdp/ cap	Internet user/ 1000	Pc/1000	Second- ary Edu/gdp	Credit bank/ gdp	Credit priv/ gdp	Liquid liabilit- es
Hits	1											
TA	0.48	1										
TA ²	0.35	0.90	1									
Population	0.22	0.64	0.85	1								
Polrisk	0.38	0.20	0.09	-0.13	1							
Gdp/cap	0.42	0.25	0.08	-0.06	0.58	1						
Internet users/1000	0.43	0.28	0.11	-0.09	0.65	0.83	1					
Pc/1000	0.42	0.29	0.10	-0.09	0.65	0.92	0.93	1				
Secondary/ gdp	0.42	0.28	0.11	-0.02	0.56	0.53	0.62	0.59	1			
Credit provided by banking sector/ gdp	0.41	0.35	0.23	0.17	0.38	0.60	0.56	0.54	0.43	1		
Credit to private sector/gdp	0.51	0.41	0.27	0.17	0.53	0.71	0.70	0.69	0.49	0.90	1	
Liquid Liabilites	0.40	0.42	0.31	0.22	0.35	0.52	0.53	0.50	0.37	0.85	0.83	1

Appendix 3. List of countries

Albania	Guyana	Papua New Guinea
Algeria	Honduras	Paraguay
Angola	Hong Kong, China	Peru
Argentina	Hungary	Philippines
Armenia	Iceland	Poland
Australia	India	Portugal
Austria	Indonesia	Qatar
Azerbaijan	Iran, Islamic Rep.	Romania
Bahrain	Ireland	Russian Federation
Bangladesh	Israel	Saudi Arabia
Belarus	Italy	Senegal
Bolivia	Jamaica	Singapore
Botswana	Japan	Slovak Republic
Bulgaria	Jordan	Slovenia
Burkina Faso	Kenya	South Africa
Cameroon	Korea, Rep.	Spain
Canada	Kuwait	Sri Lanka
Chile	Latvia	Suriname
China	Lebanon	Sweden
Colombia	Lithuania	Switzerland
Congo, Rep.	Madagascar	Syrian Arab Republic
Costa Rica	Malawi	Tanzania
Cote d'Ivoire	Malaysia	Thailand
Croatia	Mali	Togo
Cyprus	Malta	Trinidad and Tobago
Czech Republic	Mexico	Tunisia
Denmark	Moldova	Turkey
Ecuador	Mongolia	Uganda
Egypt, Arab Rep.	Morocco	Ukraine
El Salvador	Mozambique	United Kingdom
Estonia	Namibia	United States
Finland	Netherlands	Uruguay
France	New Zealand	Venezuela, RB
Gabon	Nicaragua	Vietnam
Gambia, The	Niger	Yemen, Rep.
Germany	Nigeria	Zambia
Ghana	Norway	Zimbabwe
Greece	Oman	
Guatemala	Pakistan	
Guinea	Panama	

Summary

Tourism is an information-intensive market, characterised by asymmetric information between service providers and the customer. Intermediaries have traditionally played an important role as certifiers of products, and the revenue retention rate has been low, particularly for service providers in developing countries. This article analyses the conditions under which direct marketing on the Internet facilitates disintermediation in tourism.

Disintermediation and the profitability of using the Internet differ across markets according to available complementary factors such as human capital, technology and social capital. I will show that direct marketing on the Internet must be complemented by trust-enhancing institutions. These institutions do not exist in many developing countries, making disintermediation less likely.

I have conducted an econometric analysis of the hotel industry in 120 countries, examining the relationship between direct marketing and risk. Direct marketing decreases with uncertainty, when controlling for third variables (such as income level, PC penetration and education).

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