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INVESTIGATING E-BUSINESS PRACTICES IN TOURISM: A COMPARATIVE ANALYSIS OF THREE COUNTRIES

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This study examined the behaviour of tourist companies in relation to the adoption of e-business technologies and applications. The study aimed to identify groups of companies with homogenous behaviour among three European countries (Greece, Portugal and Norway). Based on data from a European survey, the study employed two-step cluster analysis which revealed 14 clusters of common behaviour (five clusters in Greece, five in Portugal and four in Norway). These clusters were named as: Leaders' 'Technology Experts', 'Fast Adopters' 'Beginners', 'Late Adopters'. In Norway, the group 'Late Adopters' also included companies characterised as 'Beginners' in the other two countries. We suggest further investigation among European countries in order to reveal more groups of similar behaviour toward e-business adoption.

Keywords: *E-business, tourism sector, cluster analysis*

JEL Classification: *L83, M1, O1*

INTRODUCTION

During the last decades, the developments in information communication technologies (ICTs) have changed dramatically the 'business as usual' way in the tourism sector: (a) transactions are becoming cheaper and faster due to the inexpensive information processing and exchange, and (b) business processes are re-engineered to achieve integration and seamless co-ordination of activities of a company's value chain. Doing business electronically reduces administration costs, improves the accuracy and quality of information for decision making, and facilitates strategic co-operation between trading

partners. E-business has become a strategic decision, yet it remains unclear what are the strategies that companies adopt when the deal with e-business (Sanders, 2007; Lasch et al. 2007; Rudall and Mann, 2006; Iansiti, 2005; Didascalou et al. 2009; Lekakou et al. 2009; Soteriades et al. 2009; Psillakis et al. 2009).

Different schools of thought uncover different business strategies and policies dealing with e-business implementations to operational level. For example, Porter's theory implied that each company is obligated to apply a technological strategy in order to "stay alive" in turbulent competition (Porter, 2001; Porter and Millar, 1985). However, some companies seem to take the lead and be more innovative than other companies that find the following the leaders are more cost-effective and efficient, and less risk-taking. For example, tourism agents that provide suitable services and holiday packages to their customers, by imitating practices from their competitors, do not apply an innovative strategy (Niininen et al. 2007). A drawback of being a follower is that consumers may have become loyal to other companies that offer similar products and services (Valos et al. 2007). This approach could be mostly applicable and successful for numerous tourism agents who want achievable goals with low-risk.

We examined the behaviour of tourist companies in relation to the adoption of e-business technologies and applications in three European countries, Greece, Portugal and Norway.

PATTERNS OF ORGANISATIONAL BEHAVIOUR REGARDING E-BUSINESS ADOPTION BY TOURISM COMPANIES

The influence of e-business on company's performance on tourism sector has been researched in an extensive way (Yilmaz and Clark, 2006; and Vafiropoulos, 2006; Morrison and Teixeira, 2004; Vrana and Zafiropoulos, 2006; Christou and Saveriades, 2010). Most studies advocated that e-business technologies have a relative advantage of operational efficiency with overtly competitive advantages in other parts of the value chain. For example, Yilmaz and Butici (2006a) measured performance variables on value chain from customers' perspective related to technological adoption. Poon and Lau (2000) tried to analyse the value chain of tourism industry using Michael Porter's theory. Grangsjo (2003) investigated the relation between competition and co-operation and how this notion could be supported by managerial tasks in order to improve competitive attitude related to synergy with competitors. Additionally, Dabas and Manaktola (2007) emphasised the electronic distribution strategies of tourism companies.

Various studies investigated the impact of e-business on tourism sectors at national level. Williams et al. (2004) measured the factors that contributed to web site accessibility by comparing UK and German tourism organizations and suggested an array of e-business applications that create a better effective online environment. Sigala (2003) measured the impacts of e-business on productivity in tourism hospitality in UK and found that factors such as payroll systems, ICT infrastructure and distribution channels were related to firm performance. Sahadev and Islam (2005) investigated hospitality in Thailand and found that e-business adoption can create marketing and sales prospects. Dabas and Manaktola (2007) evaluated the impacts of ICTs adoption on reservations systems in hospitality sector in India, while Braun and Hollick (2006) investigated the relation between knowledge management and online delivering skills. Therefore, we hypothesise:

Hypothesis 1: There are different patterns of behaviour of tourism companies regarding e-business systems and applications

COUNTRY INFLUENCES ON PATTERNS OF E-BUSINESS ADOPTION

Niininen et al. (2007) tried to measure the impacts of online marketing through ICTs usage on tourism, travel and hospitality industry. For this purpose, they adopted a three-step model based on customer centric marketing (CCM) investigating customer and business performance variables. They concluded that CCM is a strategic tool, which can increase accessibility on web site services, provide better e-mail feedback communication, increase profitability and created value-added to the end-product or service. In a qualitative research of Martin (2004), hospitality companies were interviewed (n=128) in order to measure that impact of the Internet on decision making process. Researcher found that ICTs could influence the relation between suppliers and individuals by creating add-value to business web-site services through peer-to-peer communication via e-mail or telephone contact. Additionally, the researchers stated that tourism companies should continuously enhance their operational process by adopting state-of-the-art equipment such as virtual interactivity and high speed connectivity especially with suppliers and partners. Lebe and Milfelner (2006) researched the impact of ICTs at hotel sector in the rural areas of Slovenia. Monitoring all tangible and intangible relevant infrastructures and examining which are the needs of hotel sector, they noticed that online services were absent and tourist performance was drawn back.

Hypothesis 2: Patterns of E-business adoption will not differ across different countries

THE STUDY

The data collection of this study was based on the research project of European e-Business Market Watch 2006 (www.ebusiness-watch.org) in the European Union (EU) between May and April of 2006. The questions of this survey covered a set of tasks related to ICTs adoption on tourism sector interrelated to e-Business W@tch observatory. We concerned these issues critical to monitor the tourism industry. Particularly, our study evaluated the critical issues as presented above:

(a) ICT infrastructure and Internet accessibility,
(b) Internal business process automation,
(c) Procurement and supply chain integration, and
(d) Marketing and sales processes

The sample of this research was based on the European e-Business Market W@tch survey in tourism industry. A total of 399 questionnaires were used from the tourism industry sector.

TWO-STEP CLUSTER ANALYSIS

Cluster Analysis is an exploratory tool designed to reveal natural groupings (or clusters) within a data set, which can be a mix of interval and nominal data. Two-step clustering generates pre-clusters and finally it clusters the pre-clusters. By using Principal Components Analysis (PCA), a researcher can get information from the variance related to the set of variables that we initially posed (Table 1).

The first step in cluster analysis was to define the pre-cluster method, set the log-likelihood function and then measure the variables distributions and maximise the distance among clusters. Then, using the Schwarz's Bayesian Criterion (BIC) as the most suitable clustering criterion avoiding alias, the number of clusters that fit better in the data was calculated. The above procedure concluded with 15 clusters in total, which are presented in Table 2. Specifically, five clusters were revealed for Greece (n=119) five for Portugal (n=140), and four clusters for Norway (n=140).

Table 1 Auto-clustering Method

Clusters	Greece(n=119)		Portugal (n=140)		Norway (n=140)	
	BIC Change(a)	Ratio of BIC Changes(b)	BIC Change(a)	Ratio of BIC Changes(b)	BIC Change(a)	Ratio of BIC Changes(b)
1						
2	-52.410	1.000	-121.213	1.000	-45.142	1.000
3	-29.658	.566	-43.426	.358	-21.358	.473
4	-13.504	.258	-24.425	.202	-16.051	.356
5	-10.183	.194	-2.918	.024	10.091	-.224
6	33.387	-.637	29.678	-.245	24.713	-.547
7	38.909	-.742	42.109	-.347	47.499	-1.052
8	47.749	-.911	42.174	-.348	50.151	-1.111
9	54.951	-1.048	48.079	-.397	52.260	-1.158
10	56.028	-1.069	56.386	-.465	58.009	-1.285

***Notes**: a The changes are from the previous number of clusters in the table.*
b The ratios of changes are relative to the change for the two cluster solution.

Table 2 Cluster Distribution

	Greece		Portugal		Norway	
	N	%	N	%	N	%
Cluster 1	36	30.3%	34	24.3%	28	20%
Cluster 2	29	24.4%	35	25%	46	32.9%
Cluster 3	6	5%	14	10%	17	12.1%
Cluster 4	29	24.4%	32	22.9%	49	35%
Cluster 5	19	16%	25	17.9%		
Combined	119	100%	140	100%	140	100%
Total	119	100%	140	100%	140	100%

DEMOGRAPHIC ANALYSIS

Demographic analysis may reveal important aspects of organisational behaviour especially when researchers targeting to uncover groups with distinct attributes (Cuervo and Menendez 2006; Falk, 2005).

Table 3 presents the demographic and e-business profile analysis. Regarding firm size, measured by the number of employees, most

companies were small and medium enterprises and only 4.1% had more than 250 employees. A significant part of companies in the sample were small ones (38.4%), with less than 10 employees. Additionally, firm sizes matters when it relates to Internet access: The percentage of companies with Internet access gradually increases with the increase of firm size. This was also found to stand true for all EU member-states, including the sample-ones (Greece, Portugal). Regarding the year of foundation, the 38.2% of companies were established between 1981 and 1996, a 25.8% before 1980 and only 8.9% between 2003 and 2006.

Table 3 Demographic and e-business applications profiling

	Greece-Portugal-Norway (n=399)	**EU-19 (n=1701)***
Size (number of employees)		
1-9	38.4%	34.4%
10-49	41.3%	31%
50-249	16.2%	18.8%
250+	4.1%	3.1%
Number of employees with Internet access		
1-9	16.4%	16.9%
10-49	27.5%	34%
50-249	50.5%	41.7%
250+	-	-
Year of Foundation		
Before 1980	25.8%	21.1%
1981-1996	38.2%	38.5%
1997-2002	18.4%	22.3%
2003-2006	8.9%	9.6%
E-Applications		
Intranet	35.3%	34.1%
ERP	18.4%	9.6%
Knowledge Management	18.6%	14.9%
EDM	18.1%	14.3%
Accounting Software	50.7%	51.9%
SCM	17.4%	12.5%
CRM	24.2%	15.6%
E-Skills		
ICT experts	26.1%	21.7%
E-Learning	18.6%	18%
Marketing and Sales		

Website Construction	75.6%	74.4%
E-Orders		
0%-4%	11.8%	16.6%
5% -9%	10.1%	10.5%
10% - 25%	8.5%	8.1%
26% - 50%	11.6%	6.8%
51%-100%	18.1%	9.4%
E-Procurement (E-Invoices send)		
1%-4%	4.6%	4.1%
5%-9%	3.6%	3.4%
10%-49%	4.6%	5%
50%-100%	1.9%	2.9%
E-collaboration – (E-Invoices received)		
1%-4%	9.4%	6%
5%-9%	2.9%	3.2%
10%-49%	5.8%	5.1%
50%-100%	2.4%	2.3%
ICT infrastructure – (Internet Access)		
Internet	95.2%	94%
56K (analogue)	4.6%	7.2%
ISDN	7.7%	14.7%
Broadband via DSL	53.9%	47.5%
Broadband via Cable	22.7%	15.5%
Direct fibre connection	4.1%	5.2%
Wireless broadband connection	8.7%	8.5%
Other access	4.1%	3.5%
Remote Access	33.3%	30.3%
ICT Budget		
0%	11.4%	9.8%
1%-4%	33.8%	28.7%
5%-9%	10.9%	11.5%
10%-49%	8.9%	11.1%
50%-100%	0.2%	1.1%

(*) Source: Analysis of data from e-business-watch, (www.ebusiness-watch.org, 2007).

Regarding e-business profile, the analysis showed that tourism companies in three countries have the following usage: Intranet (35.3%), Enterprise Resource Planning – ERP (18.4%), Electronic Document Management EDM (18.1%), and accounting software (50.7%). More

sophisticated e-business applications have lower adoption rates, and specifically: Customer Relationship Management CRM (24.2%), Knowledge Management Applications (18.6%), and Supply Chain Management - SCM (17.4%). E-skills capacity, measured by the percentage of personnel with e-skills (ICT experts) and the percentage of e-learning of personnel, was relatively low (26.1% and 18.6% respectively) but at the average of EU-19. In general, the levels of electronic capacity of internal operations were higher than the EU average across all sectors.

Regarding marketing and sales ICT applications, the analysis indicated that the majority of companies (75.6%) had a website and used the Internet (95.2%), only few of them used the Internet to send or receive invoices electronically. For connecting to the Internet, tourism companies show a preference for DSL access (53.9%) followed by broadband access via cable (22.7%) and wireless (8.7%).

Tourism companies spend a small percentage of their budget for information and technologies and systems. A significant percentage of companies (11.4%) reported a nil budget for ICTs and only 9.1% of companies spend more than 10% of their budgetary monies for ICTs.

ATTITUDINAL PROFILING

Table 4 presents the composition of demographic profiles among three countries within clusters while Table 5 presents the composition of demographic profile across clusters.

i. Greece attitudinal profiling

The attitudinal profiling of Cluster 1 (‘Beginners’) includes businesses with number of employees (business size) between 10 and 49 individuals (55.6%) and businesses with workforce between 50 and 249 individuals related to Internet accessibility (50%), while the majority of those businesses (50%) were established between 1981 and 1996. Similarly, business size for Clusters 2 (‘Late Adopters’), 4 (‘Technology experts’) and 5 (‘Fast Adopters’) is between 10 and 49 individuals with percentages 65.5%, 55.2% and 57.9% respectively. Cluster 3 (‘Leaders’) is consisted of businesses with unit’s size larger than 250+ individuals. Furthermore, Clusters 2, 3 and 5 include businesses with Internet access between 10 and 49 individuals with percentages 44.8%, 50% and 47.4% respectively. Cluster 4 is associated with workforce with Internet accessibility more than 250 individuals. Finally, the year of foundation

for businesses of Clusters 2 and 4 is estimated between 1981 and 1996 (37.9% equally), while Clusters 3 and 5 before 1981 (50% and 42.1% respectively).

ii. Portugal attitudinal profiling

The attitudinal profiling of Cluster 1 ('Technology Experts') is consisted of businesses with number of employees (business size) between 1 and 9 individuals (38.2%) and businesses with workforce between 10 and 49 individuals related to Internet accessibility (26.5%), while the majority of those businesses (50%) were established between 1981 and 1996. In continuation, business size for Clusters 2 ('Beginners') and 4 ('Late Adopters') is between 10 and 49 individuals with percentages 42.9% and 46.9% respectively, while Cluster 3 ('Fast Adopters') includes businesses with unit's size larger than 250+ individuals (35.7%) and Cluster 5 ('Leaders') businesses with size between 50 and 249 individuals (60%). Furthermore, Clusters 2 and 4 include businesses with Internet access between 10 and 49 individuals with percentages 42.9% and 59.4% respectively, while Clusters 3 and 5 is associated with workforce with Internet accessibility more than 250 individuals (50% and 52% respectively). Finally, the year of foundation for business units of Clusters 2, 4 and 5 is estimated between 1981 and 1996 (54.3%, 46.9% and 44% respectively), while the year of foundation for businesses of Cluster 3 was before 1981 (57.1%).

iii. Norway attitudinal profiling

Cluster 1 ('Technology Experts') is consisted of businesses with number of employees (business size) between 1 and 9 individuals (71.4%) and businesses with workforce between 50 and 249 individuals related to Internet accessibility (78.6%), while the majority of those businesses (50%) were established between 1981 and 1996. Firm size for Clusters 3 ('Fast Adopters') and 4 ('Leaders') is between 10 and 49 individuals with percentages 42.9% and 46.9% respectively, while Cluster 2 ('Late Adopters') includes businesses with size between 1 and 9 individuals (54.3%). Finally, the year of foundation for business units of Clusters 3 and 4 was before 1981 (52.9% and 36.7% respectively), while the year of foundation for businesses of Cluster 2 was between 1981 and 1996 (50%).

Table 4. Composition of Demographic profiles in Greece within clusters (n=399)

	Greece (n=119)					Portugal (n=140)					Norway (n=140)			
	Beginners	Late Adopters	Leaders	Technology Experts	Fast Adopters	Technology Experts	Beginners	Fast Adopters	Late Adopters	Leaders	Technology Experts	Late Adopters	Fast Adopters	Leaders
Clusters	1	2	3	4	5	1	2	3	4	5	1	2	3	4
Size	(n=36)	(n=29)	(n=6)	(n=29)	(n=19)	(n=34)	(n=35)	(n=14)	(n=32)	(n=25)	(n=28)	(n=46)	(n=17)	(n=49)
Percentage	30%	24%	5%	24%	16%	24%	25%	10%	23%	18%	20%	33%	12%	35%
Size (Number of Employees)														
1-9	27.8%	31%	-	20.7%	10.5%	38.2%	34.3%	21.4%	28.1%	12%	71.4%	54.3%	29.4%	44.9%
10-49	55.6%	65.5%	-	55.2%	57.9%	32.4%	42.9%	14.3%	46.9%	12%	21.4%	43.5%	52.9%	49%
50-249	16.7%	3.4%	33.3%	24.1%	26.3%	26.5%	22.9%	28.6%	25%	60%	7.1%	2.2%	11.8%	6.1%
250+	-	-	66.7%	-	5.3%	2.9%	-	35.7%	-	16%	-	-	5.9%	-
Employees with Internet access														
1-9	25%	20.7%	16.7%	20.7%	26.3%	23.5%	42.9%	21.4%	59.4%	16%	10.7%	4.3%	-	10.2%
10-49	25%	44.8%	50%	34.5%	47.4%	26.5%	28.6%	28.6%	18.8%	32%	10.7%	17.4%	11.8%	26.5%
50-249	50%	34.5%	33.3%	44.8%	26.3%	17.6%	28.6%	50%	6.3%	52%	78.6%	78.3%	88.2%	63.3%
250+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Foundation Year														
Before1980	27.8%	34.5%	50%	34.5%	42.1%	20.6%	22.9%	57.1%	28.1%	28%	17.9%	30.4%	52.9%	36.7%
1981-1996	50%	37.9%	33.3%	37.9%	36.8%	50%	54.3%	35.7%	46.9%	44%	50%	50%	23.5%	30.6%
1997-2002	16.7%	24.1%	-	24.1%	10.5%	17.6%	14.3%	-	18.8%	28%	17.9%	13%	17.6%	18.4%
2003-2006	5.6%	3.4%	16.7%	3.4%	10.5%	11.8%	8.6%	7.1%	6.3%	-	14.3%	6.5%	5.9%	14.3%

Table 5 ICT and e-business profile within clusters (n=399)

		Greece (n=119)					Portugal (n=140)					Norway (n=140)			
		Beginn	Late	Leader	Techno	Fast	Beginn	Late	Leader	Techno	Fast	Beginn	Late	Leader	Techno
Clusters		***1***	***2***	***3***	***4***	***5***	***1***	***2***	***3***	***4***	***5***	***1***	***2***	***3***	***4***
		(n=36)	(n=29)	(n=6)	(n=29)	(n=19)	(n=34)	(n=35)	(n=14)	(n=32)	(n=25)	(n=28)	(n=46)	(n=17)	(n=49)
Technology for Manag. Information(e)	*We*	80.6%	69%	100%	100%	100%	55.9%	68.6%	78.6%	31.3%	68%	85.7%	87%	88.2%	91.8%
	Int	100%	96.6%	100%	100%	100%	67.6%	100%	100%	84.4%	100%	100%	97.8%	100%	100%
	Re	58.3%	20.7%	83.3%	41.4%	52.6%	12%	9%	10%	17%	40%	39.3%	39.1%	41.2%	44.9%
	Intr	50%	10.3%	50%	51.7%	42.1%	38.2%	25.7%	71.4%	21.9%	48%	42.9%	34.8%	64.7%	30.6%
	Kn	2.8%	-	16.7%	20.7%	-	23.5%	11.4%	50%	9.4%	32%	17.9%	19.6%	41.2%	12.2%
	ED	12%	9%	10%	17%	15.8%	14.7%	20%	21.4%	18.8%	40%	28.6%	21.7%	35.3%	20.4%
	ER	27.8%	10.3%	83.3%	24.1%	26.3%	20.6%	14.3%	50%	18.8%	44%	10.7%	10.9%	17.6%	18.4%
	Acc	55.6%	51.7%	-	62.1%	47.4%	47.1%	54.3%	35.7%	37.5%		75%	60.9%	47.1%	61.2%
	SC	19.4%	3.4%	16.7%	24.1%	31.6%	14.7%	17.1%	35.7%	21.9%	44%	28.6%	17.4%	41.2%	18.4%
	CR	25%	6.9%	50%	41.4%	26.3%	20.6%	8.6%	42.9%	3.1%	12%	12%	9%	10%	17%
e-Skills	*ICT*	47.2%	31%	83.3%	51.7%	68.4%	12%	9%	10%	17%	24%	32.1%	50%	47.1%	36.7%
	E-	25%	10.3%	33.3%	10.3%	15.8%	12%	9%	10%	17%	16%	21.4%	21.7%	41.2%	24.5%
E-Orders	*0%*	44.4%	6.9%	-	20.7%	5.3%	-	11.4%	35.7%	-	40%	-	4.3%	-	8.2%
	5%	-	-	66.7%	41.4%	-	-	5.7%	28.6%	-	40%	17.9%	23.9%	-	14.3%
	11	55.6%	89.7%	16.7%	-	94.7%	97.1%	82.9%	28.6%	90.6%	-	32.1%	17.4%	-	28.6%
	26	-	-	-	13.8%	-	2.9%	-	-	3.1%	12%	21.4%	54.3%	-	10.2%
	51	-	3.4%	16.7%	24.1%	-	-	-	7.1%	6.3%	8%	28.6%	-	100%	38.8%
E-Invoice	*0%-4%*	5.6%	-	50%	-	5.3%	-	-	50%	-	-	14.3%	-	-	-
	5%-9%	5.6%	-	16.7%	-	-	-	-	42.9%	3.1%	-	3.6%	-	-	2%
	10%-	88.9%	100%	33.3%	100%	94.7%	100%	97.1%	-	96.9%	100%	71.4%	100%	100%	98%

s	*50%-*	-	-	-	-	-	-	2.9%	7.1%	-	-	10.7%	-	-	-
E-Invoices receive	*0%-4%*	5.6%	3.4%	50%	-	5.3%	11.8%	-	35.7%	-	-	82.1%	-	-	-
	5%-9%	5.6%	-	16.7%	-	5.3%	-	-	35.7%	-	-	-	6.5%	-	2%
	10%-	88.9%	96.6%	33.3%	96.6%	89.5%	88.2%	100%	28.6%	100%	100%	-	91.3	100%	98%
	50%-	-	-	-	3.4%	-	-	-	-	-	-	17.9%	2.2%	-	-
Internet Access (d)	*56K*	-	24.1%	-	3.4%	-	2.9%	-	-	6.3%	-	3.6%	2.2%	-	-
	ISDN	-	55.2%	-	34.5%	26.3%	-	-	-	-	-	10.7%	17.4%	-	8.2%
	Broadb	94.4%	-	-	44.8%	57.9%	41.2%	82.9%	71.4%	50%	60%	42.9%	21.7%	29.4%	38.8%
	Broadb	-	6.9%	33.3%	-	10.5%	11.8%	17.1%	14.3%	15.6%	36%	25%	28.3%	47.1%	30.6%
	Direct	-	-	16.7%	-	5.3%	8.8%	-	-	-	-	7.1%	8.7%	-	6.1%
	Wireles	5.6%	-	33.3%	17.2%	-	-	-	-	-	4%	10.7%	19.6%	5.9%	14.3%
	Other	-	13.8%	16.7%	-	-	35.3%	-	14.3%	28.1%	-	-	2.2%	17.6%	2%
ICT budget(a)	*0%*	-	-	-	6.9%	15.8%	26.5%	65.7%	-	-	-	-	17.4%	5.9%	-
	1%-4%	100%	100%	100%	51.7%	-	-	-	21.4%	96.9%	32%	42.9%	23.9%	-	85.7%
	5%-9%	-	-	-	41.4%	84.2%	73.5%	-	57.1%	-	68%	46.4%	56.5%	94.1%	-
	10%-	-	-	-	-	-	-	34.3%	21.4%	3.1%	-	10.7%	2.2%	-	14.3%
	50%-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

In particular, in Greece, Cluster 1, named as 'Beginner' is consisted of companies characterised by website existence (80.6%), Internet Access (100%), Remote Access (58.3%), Intranet (50%), Knowledge Management Applications (2.8%), EDM (12%), ERP (27.8%), Accounting Software (55.6%), SCM (19.4%) and CRM (25%).

Cluster 2, named as 'Late Adopters' consists of companies with the following characteristics: Website Construction (69%), Internet Access (96.6%), Remote Access (20.7%), Intranet (10.3%), EDM (9%), ERP (10.3%), Accounting Software (51.7%), SCM (3.4%) and CRM (6.9%). It is impressed the lack of Knowledge Management Applications.

Regarding Cluster 3, named as 'Leader', Website Construction and Internet Access are totally adopted by business units, followed by Remote Access (83.3%), Intranet (50%), EDM (10%), ERP (83.3%), SCM (16.7%) and CRM (50%). It is impressed the lack of Accounting Software Applications such as Office.

Cluster 4, named as 'Technology Experts' includes business units have totally adopted Website Construction and Internet Access, followed by Remote Access (41.7%), Intranet (51.7%), Knowledge Management (20.7%), EDM (20.7%), ERP (17%), SCM (24.1%), Accounting Software (62.1%) and CRM (41.4%). Related to e-skills, Cluster 4, the ICT experts' recruitment is estimated (51.7%) and online learning applications (10.3%).

Cluster 5, named as 'Adopter' is consisted of business units with Website and Internet Access applications, followed by Remote Access (52.6%), Intranet (42.1%), EDM (15.8%), ERP (26.3%), Accounting Software (47.4%), SCM (31.6%) and CRM (26.3%). Related to e-skills, in Cluster 4, the ICT experts' recruitment had high adoption rates (68.4%). In sharp contrast, online learning applications had low adoption rates (15.8%). Regarding the type of Internet access, tourism companies preferred aDSL and ISDN access (57.8% and 26.3% respectively), most of them (84.2%), keeping ICT budget low, between 5% and 9% of total budget.

In Portugal, Cluster 1, named as 'Technology Experts' consists of those companies with relatively high e-business adoption, and in particular: Website Construction (55.9%), Internet Access (67.6%), Remote Access (12%), Intranet (38.2%), Knowledge Management Applications (23.5%), EDM (14.7%), ERP (20.6%), Accounting Software (47.1%), SCM (14.7%) and CRM (20.6%). Related to e-skills, the ICT experts' recruitment and online learning applications were also low (12%). Companies in Cluster 1 preferred DSL to connect to the Internet (41.2%).

Cluster 2, named as 'Beginners' grouped together companies with similar e-business adoption rates to Cluster 1, 'Technology Experts', and in particular: Website Construction (68.9%), Remote Access (9%), Intranet (25.7%), Knowledge Management (11.4%), EDM (20%), ERP (14.3%), Accounting Software Applications (54.3%), SCM (17.1%) and CRM (8.6%). Related to e-skills, the ICT experts' recruitment is estimated (9%) and online learning applications (9%) as well. regarding the type of Internet access, 'Beginners' preferred DSL access (82.9%), and most of them (65.7%) had no plans to invest on information and communication technologies and the rest 34.3% invest 10-49% of their budget for ICTs.

Cluster 3, named as 'Fast Adopters' consists of those companies with relatively high growth rates of e-business adoption, and in particular: Website Construction (78.9%), Internet Access (100%), Remote Access (10%), Intranet (71.4%), Knowledge Management Applications (50%), EDM (21.4%), ERP (50%), Accounting Software (35.7%), SCM (35.7%) and CRM (42.9%). Related to e-skills, Cluster 3 is consisted of companies employing ICT experts (31%) and using online learning applications (10.3%). Cluster 4, named as 'Late Adopters' includes tourism companies with the following adoption rates: Website Construction (31.3%), Internet Access (84.4%), Remote Access (17%), Intranet (21.9%), Knowledge Management Applications (9.4%), EDM (18.8%), ERP (18.8%), Accounting Software (37.5%), SCM (21.9%) and CRM (3.1%). Related to e-skills, the ICT experts' recruitment and online learning applications are estimated at similar levels (17%).

Lastly, Cluster 5, named as 'Leaders' is consisted of companies with high e-business usage rates: Website Construction (68%), Internet Access applications (100%), Remote Access (40%), and Intranet (48%). In contrast to other clusters, tourism companies in Cluster 5 'Leaders' spend more monies in ICTs (5%-9% of total budget) than other companies do.

In Norway, Cluster 1, named as 'Technology Experts' consists of companies with the following characteristics: Website Construction (85.7%), Internet Access (100%), Remote Access (39.3%), Intranet (42.9%), Knowledge Management Applications (17.9%).

Cluster 2 includes business units with Website Construction (87%), Internet Access (97.8%), Remote Access (39.1%), Intranet (34.8%), Knowledge Management (19.6%), EDM (21.7%), ERP (10.9%), Accounting Software (60.9%), SCM (17.4%) and CRM (9%).

Cluster 3, named as 'Adopter' includes business units which have totally adopted Internet Access, followed by Website Construction (88.2%), Remote Access (41.2%), Intranet (64.7%), Knowledge

Management (41.2%), EDM (35.3%), ERP (17.6%), Accounting Software Applications (47.1%), SCM (41.2%) and CRM (10%). Related to e-skills, the ICT experts' recruitment is estimated (47.1%) and online learning applications (41.2%).

Regarding Cluster 4, named as 'Leader' includes business units which have totally adopted Internet Access, Website Construction (91.8%), Remote Access (44.9%), Intranet (30.6%), Knowledge Management Applications (12.2%), EDM (20.4%), ERP (18.4%), Accounting Software Applications (61.2%), SCM (18.4%) and CRM (17%).

CONCLUSIONS

This study investigated tourism business behaviour regarding e-business adoption in three European countries. The main objective was to uncover hidden patterns of behaviours that would constitute clusters of companies with similar behaviour and attitudes. It is evidenced that companies in the same sector have different adoption behaviour. It is common to found 'leaders' and 'followers' and 'late adopters'. However, this adoption behaviour has not well documented in tourism sector and more particular with e-business technologies and applications. Choosing three different European countries, all members of the European Economic Area, with different tourism profiles, helps compare tourism companies' behaviour and test whether or not there are solid patters dealing with e-business.

Five patterns of behaviour were revealed in Greece and Portugal and four in Norway. Those groups were named as: 'Leaders' 'Technology Experts', 'Fast Adopters' 'Beginners', 'Late Adopters'. In Norway, the group 'Late Adopters' also included companies characterised as 'Beginners' in the other two countries.

'Leaders' can be regarded as the most technological advanced group among tourism companies. Leaders have high rates of adopting of advanced e-business applications SCM, CRM e-orders, e-invoices. Leaders spend the more monies than all other companies for ICT and e-business applications. The demographic profile of 'Leaders' was as expected for all three countries. Specifically, Leaders are large companies in Greece (66.7% of companies having more than 250 employees) and Portugal. It was striking to find that halve of the Leaders in Norway were small enterprises with 1-9 employees. Furthermore, it is expectable that few companies with be Leaders in a specific sector. Indeed, in Greece, Leaders were the 5% of the population, in Portugal the 10% but in

Norway 35% were characterised as leaders. This can be explained taking into account the fact that Norway is a more developed country than Greece and Portugal are. The structure of the sector also takes a significant role. Results indicate that in Norway small tourism companies lead the e-business development but in South Europe, the sector waits the large companies to take the lead and smaller companies then follow.

'Technology Experts', represent 24% of companies in Greece, 24% in Portugal and 20% in Norway. There is no clear demographic profile for this group of companies. However, it seems that most companies are medium-sized with more than 20 years of operations. One characteristic of Technology Experts is that the use advanced e-business applications in a large percentage, sometime more than simpler e-business applications. This indicates that these companies are aware of the full spectrum of e-business applications and have chosen the most beneficial to them. Also, this finding indicates that these companies have the necessary info-structure to operate these advanced applications.

'Fast Adopters' represent 16%, 10% and 12% of Greek, Portuguese, and Norwegian tourism companies respectively. All companies in Fast Adopters have 100% Internet Access and most characteristics are similar to 'Technology Experts' group of companies. Findings indicate that are companies that invest a significant part of monies in order not to lag technologically behind and become, like Technology Experts, the second to Leaders companies. For example, in Greece, Fast Adopters use Accounting Software (47.4%) less than Technology Experts (62.1%). The same stands true for CRM (41.4% and 26.3% respectively). However, Fast Adopters try to catch up by investing more e-skills (i.e. comparing ICT experts in Fast Adopters and Technology Experts were: 68.4% over 51.7% in Greece, and 24% over 17% in Portugal, respectively).

'Beginners' as well as 'Late Adopters' are the most disadvantaged companies regarding the adopting of e-business technologies and applications. Together, they represent 54%, 48% and 33% in Greece, Portugal and Norway respectively. The figures for Late Adopters are: 24%, 23% and 33% for Greece, Portugal and Norway respectively. Companies belonging to 'Beginners' as well as 'Late Adopters' are mostly small companies (i.e. for Greece, 96.5% of Late Adopters occupy less than 50 employees). These two groups of companies spend the less budget of all tourism companies for ICT technologies. Most figures indicate a low involvement with e-business: for example, technologies such as wireless broadband and direct fibre are almost absent from these two groups, except some usage from the more technologically advance Norwegian companies. The figures of Late Adopters are less favoured

than Beginners. For example, Late Adopters use CRM applications as low as 6.9%, 3.1% and 9% for Greece, Portugal, and Norway. However, the same figures for Beginners are: 25% and 8.6% for Greece and Portugal, respectively.

The above evidence suggests that there are different patterns of behaviour among tourist companies regarding e-business, but there are strong indications that the partners are indifferent. Indeed, all patterns of behaviour are found in all countries. For example, there are differences between leaders in Norway and Greece or Portugal. This is a significant finding that requires further research.

There are certain methodological limitations that require attention when interpreting the findings of the research. Due to the fact that this study was based on secondary data of e-business market watch, there was little control over the reliability and validity of the instrument used. The questionnaire was a generic one, applying to many sectors. The sample the survey of E-Business included only companies with computer usage, thus the percentages does not necessarily reflects the whole population, although computer usage was almost absolute when survey was conducted.

Despite the above limitations, this study uncovered important patterns of behaviour in tourism sector. Future research should shed more light on the characteristics of every cluster of companies and investigate country and sector-effects.

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