EXPLORING THE TRANSFORMATION OF TOURISM FIRMS' OPERATIONS AND BUSINESS MODELS THROUGH THE USE OF WEB MAP SERVICES

Marianna Sigala, Department of Business Administration, University of the Aegean, Greece m.sigala@aegean.gr

Dimosthenis Marinidis, Department of Business Administration, University of the Aegean, Greece dmarinidis@aegean.gr

Abstract

The production and consumption of tourism experiences demand the use of mapping services. Nowadays, the ubiquitous and open standards of the Internet have given rise to distributed GIS and web map services, while Web 2.0 have further expanded the functionality of web map services. This study aims to first analyze the functionality and the services of web map services, and then, to investigate the types of their exploitation by tourism firms that in turn transform the ways in which firms design their business operations and business models To that end, after defining web map services as a form of distributed GIS (and so, as a type of a web service), the first section debates how the capabilities of web services enable the redesign of business operations and models. The section continues by analyzing and identifying the functionality of web 2.0 enabled web map services that can be integrated into business operations. Having identified the functionality of web map services, the second section of the paper adapts Venkatraman's (1994) model on IT-induced transformation in order to identify and classify the different levels and types of exploitation of the functionality of web map services by tourism firms. Each type-level of exploitation of web map services is analysed by presenting different examples of web map services' applications from the tourism industry. The analysis of these examples also considers the impacts of web map services on the business operations and models. Finally, the practical and theoretical implications of the proposed framework are discussed.

Keywords: mapping services, operations, business models, tourism, web 2.0, GIS

1 INTRODUCTION

Tourism by nature involves the transfer of people to places away from home, while all tourism experiences take place in certain geographical areas. Geographic locations themselves and their resources (e.g. cultural, natural) constitute major tourists' attractions motivating and inspiring tourists to travel to a place. As geographical resources and information play a critical role in generating, directing and organizing tourism activities in destinations, Geographical Information Systems (GIS) are widely adopted in tourism settings - from information kiosks, mobile guides and hiking maps (Duran et al, 2004). Nowadays, advances in distributed Geographic Information Systems (GIS), that combine the power of GIS with the ubiquity of the internet (Duran et al., 2004), have further enhanced the accessibility and dissemination of geographical capabilities and knowledge (Tait, 2005) to internet users. Actually, tourism is one of the first industries to embrace the use of GIS technology over the Internet (Wang et al, 2004) and the provision of web map services has become a widespread and expected standard for many e-tourism applications. By using web map services, tourists can more quickly, precisely and accurately find all travel information for organizing their itineraries (Ilies & Ilies, 2006). As a result, GIS enabled web applications have transformed the trip planning process

from a frustrating (Pan & Fesenmaier, 2006) to a more enjoyable and efficient experience (Pan et al., 2007). However, tourism firms differ in their exploitation levels of web map services which reflect various types of integration of web map services with business operations. For example, web map services can be used from providing a simple digital representation of the location of a tourism firm to measuring and managing the number and the flow of tourists at an environmental sensitive tourism destination. Nowadays, advances in free web map services (such as Google (Maps), Yahoo! (Maps), Microsoft (Virtual Earth), MapQuest and ArcWeb) have introduced new (collaborative) ways for the development, searching, reading and dissemination of geographical information and services. These cheap, web-based, multi-layer and multi-advantage web map services stimulate the creation of more sophisticated and information empowered tourists, as well as they enable and foster numerous new business opportunities and models.

In this vein, this study aims to first analyze the functionality and the services of web map services, and then, to investigate the types of their exploitation by tourism firms that in turn transform the ways in which firms design their business operations and business models. To that end, after defining web map services as a form of distributed GIS (and so, as a type of a web service), the first section of the paper debates how the capabilities of web services enable the redesign of business operations and models. The section continues by identifying and analyzing the functionality of web map services that can be integrated into business operations. The section also expands the current literature by demonstrating the ways in which the exploitation of web 2.0's features namely, social intelligence and social networking capabilities, has nowadays enhanced and expanded the functionality of web map services. Having identified the functionality of web map services, the second section of the paper adapts Venkatraman's (1994) model on IT-induced transformation in order to identify and classify the different levels and types of exploitation of the functionality of web map services by tourism firms. Each type-level of exploitation of web map services is analysed by presenting different examples of web map services' applications from the tourism industry. The analysis of these examples also considers the impacts of web map services on the business operations and models. Finally, the practical and the theoretical implications of the proposed framework are also discussed.

2 WEB MAP SERVICES: DEFINITION, IMPACTS AND FUNCTIONALITY

2.1 Defining web map services as web services: impacts on business operations and models

GIS applications require the seamless integration of spatial data and services provided by multiple and different sources and vendors. Thus, the interoperable standard communication protocols of web services have been heavily used for solving this interoperability problem and boosting the development of distributed GIS services (Sayar et al., 2005). This is because web services represent '… a language and environment neutral programming model that will accelerate application integration inside and outside the enterprise' (Gottschalk et al., 2002). Indeed, although there is no universally accepted definition of web services, all definitions (e.g. Smith, 2001; Wusteman, 2006; Guidy et al, 2007; Moitra and Ganesh, 2005; Sayah and Zhang, 2005; Fensel and Bussler, 2002; Lau and Ryman, 2002; Vidgen et al, 2004) converge and agree on the ability of web services' network-enabled software components to allow business processes or information to be accessed over the internet and to interact with one another dynamically, which in turn provide a distributed computing technology and enable the seamless interoperability of web-based applications. In other words, web services allow application-to-application integration and dynamic interaction via the internet as well as they represent reusable components that can be published, located and invoked over the Internet by using standard protocols (Daniel et al, 2004; Currie and Parikh, 2005; Wang et al, 2004; Ismail et al, 2002).

Because of these features, web services have been heavily used for developing and diffusing GIS services, and this has been widely recognised and evidenced by the recent boom of distributed GIS

services (e.g. Tait, 2005). Indeed, National Research Council (NRC, 1999) advocated that the internet's infrastructure and software as well as the development of web services have empowered the GIS community to disseminate and share GIS capabilities and content/data, while Longley & Batty (2003) have shown how the web is a new medium enabling increased participation in the development of GIS services. Distributed GIS services are simply GIS technology that is built and deployed using the standards and the software of the internet (Tait, 2005). Several organizations such as the Open GIS Consortium (OGC), the International Standards Organization (ISO) and the Federal Geographic Data Committee (FGDC), support the definition of geographic web service standards that support the publication of geographic content and functionality. By using web service standards, distributed GIS allow many GI systems to be linked and accessed as a single virtual system offering the following three major benefits: a) wide distribution, as it is easier to distribute geospatial data and applications across platforms, operating systems, computer languages, etc.; b) integration of applications and businesses operations, as it is easier for application developers to integrate geospatial functionality and data into custom applications; and c) the development of a huge infrastructure being built to enable the web services architecture (including the development tools, application servers, messaging protocols, security infrastructure, and workflow definitions).

The most commonly used distributed GIS services are the GIS Mapping Services and the GIS Data Services. The Open GIS Consortium (OGC) calls the mapping services as Web Map Services (WMS) and the data services as Web Feature Services (WFS) and Web Coverage Services (WCS). Geoportals (defined as websites presenting an entry to geographical content on the web, Tait, 2005) represent a key application of distributed GIS services that combine several GIS applications and provide the following most typical geographical web service functionality: map rendering; feature streaming; data projection; geographic- and attribute-based queries; address geocoding; gazetteer/place name searches; metadata query and management; network analyses; 3D terrain visualization; and data extraction. In other words, geoportals are built on geographic web services and give user-friendly accessibility to high-end GIS applications over the Internet. Three distributed GIS components (Service Oriented Architecture, SOA) are required to implement a geoportal (Tait, 2005); a web site presenting the geographic application or portal; web services that publish geographic functionality as a web service; and data management software providing a managed relational environment for both raster and vector geographic content.

(Geographic) Web service components can also comprise other web services which are all then subsumed into broader web service applications. Thus, a geographic web service application can be a distributed application, using components sourced from multiple locations over the Internet. Because of this service oriented architecture (SOA) of geographic web services, organisations can create or build customised or new applications for supporting their business processes by simply selecting required web services from those available over the Internet. In other words, geographic web services support the migration from a systems-based IT architecture to a loosely-coupled one enabling firms to have the required agility and flexibility to adapt IT applications (and so, organisational processes and models) to the changing market and business dynamics (Hagel, 2002; Vidgen et al., 2004). For example, firms can very easily and with low cost adopt and embed web map services into their websites, e-commerce and other e-business applications.

Overall, because of their web service nature, web map services can support the integration and the interoperability of various technological applications and services that may exist within but also beyond and across organizational boundaries. Indeed, web services are also exploited for linking applications outside the organization and providing the integration technology for B2B (business-to-business), B2E (business-to-employee) and B2C (business-to-consumer) transactions (Vidgen et al, 2004). By fostering and quickly realising the potential of value-chain partnerships, web map services play a significant role in enabling organisational flexibility and transforming the nature of inter-organizational commerce (e.g. Daniel et al, 2004; Vidgen et al., 2004). The use of web services for linking and integrating applications internally within a firm represents the first phase of web service implementation and it aims to assist firms to reduce their costs related to the development, the

acquisition and the deployment of information systems (Silicon.com, 2003; LaMonica, 2003). An example of an internal exploitation of web services aiming to streamline and improve the performance of business operations is provided by Hannon (2001); a global firm used web services for integrating several different accounting ledgers of its geographically distributed offices that were also operating different accounting suites. Studies (e.g. MetaGroup, 2003) have shown that the majority of firms are still in this first stage of web service implementation. On the other hand, the use of web services for integrating information systems between separate organizations is viewed as the "second wave" of web service adoption that is currently underway (IDC, 2002). External exploitation of web services aims to distribute and integrate online location-based services across several organizations by allowing distributed GIS users to share and use each other's services. For example (Dangermond, 2002), a local government planning department can share, as a web service, its local area plans with other government departments and third parties (such as utility companies). The utility company will then be able to overlay its own infrastructure maps, containing information such as where its pipelines are located. Tait (2005) identified four other examples of external exploitation of web map services and demonstrated how the latter can foster and support the development of new kinds of collaborative communities that are able to share and leverage their geographic knowledge.

Recently, the free availability of Application Programming Interfaces (API) from popular web applications (e.g. GoogleMaps, YahooMaps, and Microsoft LiveMaps) has democratised the development and use of geographical information and services by: enabling internet users to also acess and development of geographical content and services; diffusing web map services in websites and e-commerce applications; and opening up numerous opportunities to create new web 2.0 empowered applications by mashing-up various technological services and information. For example, users are allowed to embed and include GoogleMaps into their websites and social networks (e.g. facebook profile). Moreover, by having access to the API, internet users can also manipulate and customise maps by adding (geo)tags on them that may also be enriched with user-generated content such as customer reviews, photos, videos etc. At Google Earth Hacks (www.gearthhacks.com), one can find numerous customised maps developed by users or networks of users, such as a GoogleMap featuring the paths of Alexander the Great.

In summary, it is evident that the characteristics of web map services and the availability of APIs provide firms with numerous opportunities to redesign their operations (either internally and/or externally) and to develop new (collaborative) business models by involving more partners and/or users-customers into their value chains and systems. The next section identifies and analyses the functionality of web map services that firms can exploit and integrate into their business operations and models. The section also discusses the ways in which the social networking capabilities and the social intelligence of web 2.0 have expanded and enhance this functionality of web map services.

2.2 The functionality of web map services and its enhancement by Web 2.0

Tait (2005) identified four major functionalities of distributed GIS (and so, of web map services) namely search, mapping, publishing and administration capabilities. As it was previously shown, APIs, (geo)tags and other Web 2.0 tools provide internet users with new possibilities to (co)-create, disseminate, share, read and combine (mash-up) the geographical content, metadata and services of web map services. Hence, the four original functionalities of web map services need to be expanded in order to consider the impact of the two features of Web 2.0 namely, the social networks and the social intelligence. The social networks expand the functionalities of web map services by giving them a collaborative dimension, while the social intelligent enriches the functionalities with user-generated content and personalisation capabilities. Table 1 describes the expanded functionalities of Web 2.0 enabled web map services as well as it identifies the major Web 2.0 tools that enable them.

Functions	**Description**	**Web 2.0**		**Web 2.0 tools**

		enhanced functions	Description	supporting the functionality
Search	Place location and provision with particular set of features or objects.	**Social search**	Search geographical related information based on others' personalized maps and/or (geo)tags (social collaborative searching services): tourists can identify other users with similar profile, interests, travel experiences and travel needs (e.g. hotels providing services for people with disabilities) and search/identify location related items-firms based on others' personalized maps.	Tag-searching, vertical meta-searching, link-searching, social bookmarking etc.
Mapping	Map visualization capabilities in order to add value to the search process.	**Social mapping**	Creation of maps by allowing any user to include any location related item (hotel, attraction, monument, restaurant etc) on a map and by enriching it with multimedia content (text, picture, artifact, video etc) that may also include tourists' feedback and experience of the place. Users may also embed and include these personal maps on websites and social networks.	Tags, hotspots, points of interest (POIs), embed maps on social profile and websites
Publishing	Manual or automated publishing (through a web page or a web service interface) of metadata content.	**Social (collaborative) publishing of special interest maps**	Enhancement of social collaborative values and practices through "map networking". For example: • Create social networks based on geographical routes and location-items: e.g. www.mapme.com, www.upmapper.com, travel.yahoo.com (Travel Planner) • (Collaboratively) create personalized maps and share – disseminate them amongst their social networks or publicly with all internet users. E.g. tourists can create routes or directions and add mapping layers with metadata either alone or with their friends (by inviting them to join the personalized map and contribute content to it) • Add and publish their personalized maps on their websites and/or social networks e.g. in their Facebook profile.	RSS, web-authoring, Pod/web-casting, extensions, Wikis, blogs, forums, social networking and searching, social bookmarking, etc.
Administration	Administration (review/approval) of metadata content.	**Mash-up map enabled services**	Free provision of APIs so other users can administer and combine web map services with other online information services and content for creating new value added mash-up Web Map Services enabled applications	APIs, mash-ups, content publishing through APIs

Table 1. Functionality of Web 2.0 enabled web map services

3 A TAXONOMY OF WEB MAP SERVICES' EXPLOITATION AND TOURISM FIRMS' TRANSFORMATION: AN EXPLORATORY FRAMEWORK

3.1 Theoretical background of the framework

Venkatraman (1994) developed a framework for identifying the different stages of IT induced business transformation. Since then, this framework has been widely used for measuring the business transformation impacts enabled by IT applications in several industries as well as within the tourism sector (e.g. Sigala et al, 2001). Vidgen et al. (2004) have also used Venkatraman's framework for identifying the opportunities created by web services' exploitation to redesign business operations, processes and networks as well as redefine business models. Web map services are regarded as web services and so, the adaptation of this framework for investigating the former's impact on business operations and models is warranted. Venkatraman's (1994) framework develops along two dimensions: the range of IT's potential benefits and the degree of IT induced organizational transformation. The framework posits that firms accrue greater benefits from their IT investments, when they accompany exploitation of IT with appropriate organizational changes; i.e. five levels of IT induced organizational transformation are identified and the IT benefits increase as firms move from the lowest to the highest levels of IT driven organizational change (Venkatraman, 1994). Hence, the business benefits of IT deployment are marginal, when IT applications are superimposed on existing organizational structures for simply digitizing current operations and processes. In this vein, this study adapts Venkatraman's (1994) framework for achieving two purposes: a) to identify the types of exploitation of web map services within the tourism industry; several examples are analysed referring to deployment of web map services at two management levels, i.e. the micro level (tourism firms' management) and the macro level (tourism destination management); and b) to rank these types of exploitation of web map services into a taxonomy reflecting both the levels of organizational change that they induced as well as the potential business benefits that they can generate.

3.2 Types and levels of exploitation of web map services

According to Venkatraman's (1994) initial framework and Vidgen et al.'s (2004) later study, this paper has also identified five types and levels of exploitation of web map services in the tourism industry. It is however important to underscore that these levels of exploitation should not be conceptualized as stages of evolution. In other words, the implementation of previous levels is not a prerequisite for exploiting web map services at a higher level. However, firms can generate greater business benefits when they increase their levels of exploitation from Level 1 to Level 5, but in order to materialize these benefits, firms should undertake relevant and appropriate organizational changes. These five levels of exploitation, their related benefits and organizational transformations and changes are discussed below by providing examples of web map service applications from the tourism industry.

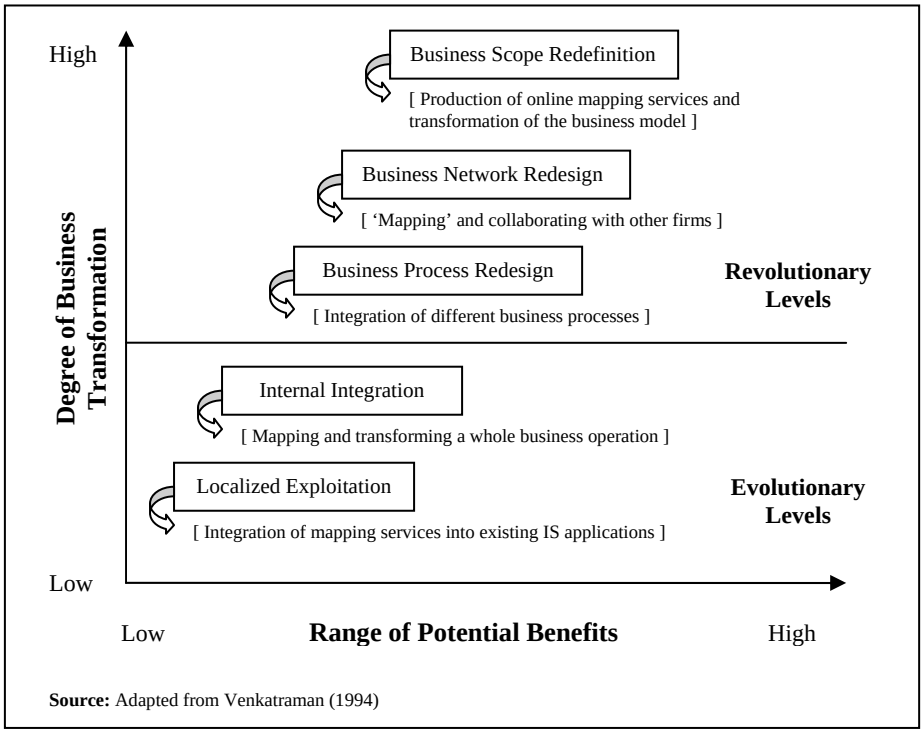

Figure 1. Mapping Services Business Transformation Framework

3.2.1 Level 1: Types of web map services' exploitation reflecting 'Localized Exploitation'

According to Venkatraman's (1994) framework, the simplest and the most basic IT exploitation refers to the integration of IT into existing information systems (IS) (i.e. localized exploitation). Similarly, Vidgen et al. (2004) identified a level of web service exploitation named as 'web service enhancement' and representing the integration of web services into existing internal (e.g. accounting systems) or external (e.g. e-commerce application) IS of the firm. Thus, the first level of exploitation of web map services also represents the integration of web map services into existing IS applications.

For example, a tourism firm can enhance GoogleMaps with tags providing information about the geographic location of the firm, the driving directions to the firm, the availability and the location of tourism attractions nearby the tourism firm etc and embed this customized maps into its existing website. For example, the DMO of Nova Scotia uses GoogleEarth for mapping its attractions on its website, http://novascotia.com/en/home/planatrip/googleearth/default.aspx). A travel cyberintermediary may also use GoogleEarth for locating the hotels that it sells into an interactive map (e.g. http://www.booking.com/general.html?sid=e4cd05a46bf9bff6480a0abf5f9e3a96;tmpl=docs/google_earth) and so, allowing website users to easily compare and select hotels based on their location and proximity to attractions, airports etc. Sheraton enhanced the search engine and booking tool of its website by adding an interactive map allowing website users to identify Sheraton properties not only based on their location but also based on rich user-generated-content (e.g. customer feedbacks on hotels, videos, photographs etc) appearing in the (geo)tag of the hotels. Previous guests can use the online interactive map for uploading their content for a hotel at a specific geographical location. Other potential customers, searching to book the most appropriate Sheraton property to spend their holidays, can search, filter and read this geographical related user-generated-content for deciding which hotel to select. In other words, the booking engine of the website has been enhanced so that hotel properties

can now be searched and booked not only based on their prices and availability, but also based on their location and geographical user-generated content tagged on an interactive map. Similarly, several tourism cyberintermediaries (e.g. travelocity.com, expedia.com and lastminute.com) have enhanced their online booking applications and tools with interactive maps that travelers can use for searching and booking travel products as well as sharing with others their post-trip experiences.

The provision of geographical information and services on an interactive map is crucially important for supporting the trip planning process of tourists and making the trip planning process more efficient, effective, experiential and enjoyable. However, this type of web map services exploitation does not require tourism firms to engage in any major organizational and operations management related changes. Such web map services can be easily integrated within existing IS applications without requiring as well as inducing substantial changes regarding the way booking processes take place and are organised. Although Venkatraman (1994) advocated that none type of exploitation of IT at this level is strategic in its generic form, one can identify several strategic implications that such geographical information may have for a tourism firm or destination. For example, strategic questions deriving from such web map services may relate to: how firms develop their pricing strategies in response to the prices of nearby competitors and/or the quality of the user-generated content included in (geo)tags? How a DMO manages the flow of tourists visiting attractions that are located close to each other and/or how a DMO can geographically disperse the organization of events in order to wider diffuse tourism impacts within a region? In other words, although such types of web service exploitation may not lead to significant organizational changes, the digitization of geographical content as well as its generated content may be exploited for better informing strategic decision making. On the other hand, the major weakness of such applications is that they can be easily acquired and imitated by competitors, as they mainly represent technical and not organizational changes (Venkatraman, 1994). In the long term, the wider industry adoption of such web map services may lead them to be regarded as a standard service that every firm should provide, and consequently, they would be unable to give firms with the competitive and differentiated customer value that they can provide nowadays.

3.2.2 Level 2: Types of web map services' exploitation reflecting 'Internal Integration'

According to Venkatraman (1994) this stage of IT exploitation 'Internal Integration' refers to the use of IT for the digitization of a whole business operation (i.e. the use of IT for integrating internal operations). Vidgen et al. (2004) also identified a stage of web service exploitation named as 'application sourcing' and referring to the use of web services for the acquisition of a suite of applications (such as ERP and CRM) supporting the provision of seamless processes. Similarly, web map services can also be used for transforming a whole business operation. This level of exploitation involves two types of integration: technical interconnectivity (dealing with the interconnectivity and interoperability of the different systems and applications through a common IT platform) and business process interdependence (dealing with the interdependence of organizational roles and responsibilities across distinct functional lines). In this vein, such types of web map services exploitation would require not only technical changes in IS and IT infrastructure, but also cross-functional intraorganisational changes. In order to decide the viability and value of such applications, each firm should develop its own vision and scope for internal integration after assessing the benefits of integrating current business processes.

For example, Yahoo!travel (https://login.yahoo.com/config/login_verify2?.intl= us&.src=trv&.done= http%3A%2F%2Ftravel.yahoo.com%2Ftrip%3Faction%3Dcreate) has created a trip planning tool that has totally transformed the process referring to trip planning. By using this tool, travelers can create personalized maps with their preferred travel itineraries and attractions, they can share maps within their social networks, friends and/or co-vacationers who can in turn invited to comment, change and/or enhance the itineraries based on their preferences. Travelers are enabled and informed to design their personalized maps by searching and reading online the personalized maps, itineraries (e.g. wine tours

in Italy), (geo)tags and feedback-discussion of other travelers who wish to share their own experiences and knowledge. Overall, this map enabled tool has transformed online booking operations and trip planning process to a collaborative and social decision making process, whereby social networks and other travelers are incorporated into value chains and they become co-creators and co-producers of travel services by providing social and functional inter-customer support. As a result, such social networks challenge the role of travel consultants and marketers, which in turn forces tourism firms to rethink the job descriptions and responsibility of staff and departments. For example, marketers may need to be viewed not as salespersons but as enablers and supporters of customers' communities, while customers would need to be managed and integrated into service processes as collaborators and service co-providers (co-designers, co-marketers and co-creators of travel itineraries and experiences). Concerning the changes related to the technical interconnectivity, tourism firms would need to think of the integration of web map services with other IS applications such as, booking tools, search engines, customer databases, inventory management systems, yield – pricing systems etc.

3.2.3 Level 3: Types of web map services' exploitation reflecting 'Business Process Redesign'

According to Venkatraman (1994) this level of IT exploitation refers to the exploitation of IT aiming to achieve operational efficiencies through the whole redesign of business processes. Similarly, Vidgen et al. (2004) identified a stage of web service exploitation namely 'application brokerage' and referring to the use of web services for the acquisition of a suite of applications. In this vein, this third level of exploitation represents the use of web map services with the purpose to enable the seamless integration of different business processes. Benefits from IT induced business process redesign are limited in scope if the processes are not extended outside the focal organizational boundary for identifying options to also redesign relationships with the other organizations. But there is absolutely no evidence that deploying proprietary inter-organizational systems per se provides any competitive advantage (Venkatraman, 1994).

For example, the web map services offered at Sheraton's website do not only allow customers to search, contribute and read user-generated content about Sheraton properties on an interactive map, but Sheraton also uses this user-generated content for: new service development (staff uses this feedback for market research and identifying opportunities for providing new services); business process improvement (user- generated content is used for addressing operational problems identified by guests); CRM (e.g. user - generated content and social networking amongst guests is an effective way for creating a community of loyal guests of Sheraton properties, staying in touch and communicating with them, identifying valuable customers for future personalized targeting, and many other CRM practices). By expanding the exploitation of these web map services in order to 'informate' many other business operations, substantial intra-organisational changes are required. Thus, as this map based online application of Sheraton has become a shared and cross-functional business application, its successful implementation and the materialization of its benefits demand the engagement, coordination and cooperation of hotel staff from different departments and functions.

3.2.4 Level 4: Types of web map services' exploitation reflecting 'Business Network Redesign'

According to Venkatraman (1994) the level 'business network redesign' represents the exploitation of IT for expanding the business network of a firm and whereby IT is used for cooperating with other firms. Similarly, Vidgen et al. (2004) identified the stage of web service exploitation named as 'collaborative commerce' and involving the use of web services for connecting and collaborating with business partners. In this vein, this level of exploitation represents the use of web map services for enabling the collaboration of different and geographically dispersed firms. Business partners associated with mapping services can integrate transactions based on web services standards and offer their core competencies as services to other companies. In other words, this exploitation level represents the affordability of web map services to instill and foster the expansion of the business network of a firm by connecting and collaborating with other business partners. For example,

Happymappy.com cooperates with many mapping services (such as GoogleMaps) and with Expedia.com (for obtaining a booking engine) in order to create a one-stop platform whereby users can search (based on a map) and then, book the tourism firms and services of their choice. Indeed, the development of mash – up applications can boom the creation of as such collaborative practices within the tourism industry. For example, a hotel can create a mash-up application by combining the API provided freely by eventful.com (http://api.eventful.com/community/success) and the API of an interactive map (e.g. by GoogleMaps) in order to enrich its website with a search engine enabling website users to search and locate on a map information about cultural events taking place nearby the hotel location. It should be highlighted that although the development of such inter-firm collaborations is not equivalent to an electronic data interchange (EDI) project, such partnerships still enhance interdependencies across independent organizations as well as they are accompanied by a high level of business processes transformation. Several examples of such types of applications can be given.

Tele Atlas (http://www.teleatlas.com) is one of the world's leading provider of digital maps and dynamic content that powers some of the world's most essential navigation and location-based services. To develop such services, Tele Atlas has formed the most extensive network by partnering with many government partners and industry pioneers in the portable navigation, the internet and the automotive sector (e.g Google, Yahoo, deCarta, Map24, Multimap, Mapsolute, ESRI, National Geographic, CompassCom etc.) Tele Atlas delivers a richer consumer experience as a result of innovations ranging from dynamic content to voice recognition that help users arrive at their destinations more quickly, easily, safely, and efficiently, and help them locate the people and places they seek while they are in route. Tele Atlas continuously studies changes in the mapping industry to ensure that their partners have access to the best digital map content possible, so that collaborative products are built with unprecedented rich and accurate content. To meet those "find-centric" demands of a new "mapping era", Tele Atlas collaborate, communicate and interact with their partners, through three major web-based applications; PartnerLink^{SM}, DeveloperLink^{SM} and ContentLink^{SM}. PartnerLink^{SM} (http://partnerlink.teleatlas.com/index.htm) provides a comprehensive and ever-expanding suite of sales and marketing tools, networking opportunities, information and technical support. DeveloperLink^{SM} (https://developerlink.teleatlas.com/index.cfm?ses=1) is a free online resource for developers of Internet, mobile, and other next-generation digital map applications. Its service iclude the provision of sample data, technical tools, and business resources to help developers reduce time to market and increase their potential for success. Members gain access to Tele Atlas' peerless database of geographic content, and to the world's largest community of geographic application developers. Tele Atlas ContentLink^{SM} (http://contentlink.teleatlas.com/login.htm) is a unique Web-based program that links qualified application developers with providers of specialized content and that provides both parties with the technologies they need ion order to improve the quality and marketability of their products. Through Tele Atlas ContentLink^{SM}, both content providers and application developers are able to capture more customers, minimize costs, streamline their processes, simplify data management and improve their data quality.

3.2.5 Level 5: Types of web map services' exploitation reflecting 'Business Scope Redefinition'

According to Venkatraman (1994) the highest level of IT exploitation refers to the use of IT for transforming the business model and strategy of the firm (i.e. business scope redefinition). Similarly, Vidgen et al. (2004) referred to the stage of web service exploitation named as business reconfiguration and which represents the use of web services aiming to transform the enterprise. Similarly, firms can use web map services for transforming their business model by developing and selling online tools and applications that combine mapping services. Such possibilities are enormous given the rise of mash-up technologies nowadays. Such examples may refer to the development and sale of map services to others, unbundling and rebundling mapping services. Similarly to the previous level, a high degree of business re-configuration is required.

MapBuilder (http://www.mapbuilder.net) is one example of a web map services that is powered by mash-up technologies LLC, (http://mashuptecnologies.net) and that reflects the bundling and sale of web map services. The company offers a mash-up development tool based on web 2.0, AJAX, PHP and mySQL technologies, which can be used for building customised Google and Yahoo maps without any knowledge of the Google/Yahoo Maps API and JavaScript. MapBuilder is a GUI (Graphical User Interface)-driven map maker that provides a decent visual interface for the map building process with geocoding and import features based on freely-available internet mapping technologies such as Google™ Maps, Yahoo!™ Maps etc. MapBuilder also allows users to export and publish their customized maps on their own websites. OpenStreetMap (OSM-http://www.openstreetmap.org) is a collaborative project inspired by Wiki-based sites that aims to create a free editable map of the world. The maps are created by using data captured by portable GPS devices and uploaded by internet users. Any user can export and/or embed on other websites (by using XML, Javascript and other similar technologies) aerial photography and other free OSM resources.

Mobizity is an interesting example showing how firms can exploit web map services for transforming their business model by creating bundles of mapping services and then rebundling them for reselling them. Mobizity's major product is the Wikitude AR Travel Guide (http://www.mobilizy.com/wikitude.php), which is a mobile travel guide with augmented reality functionality based on (multimedia) user-generated-content provided by Wikipedia and Panoramio. In this vein, Wikitude AR Travel Guide is a platform enabling users of mobile phones to search, identify and read location-based content of Wikipedia and Panoramio. In other words, Mobizity has created an open mobile software stack by combining web services from different firms (including the web mapping services of GoogleMaps) that allows users: to search landmarks in their surroundings and view them on a map, on a list, and on an augmented reality (AR) camera view; and to see an annotated landscape, mountain names, landmark descriptions and read interesting stories. Thus, the Wikitude AR Travel Guide is an ideal (collaboratively built open software) travel itinerary planning tool or a mobile tourist guide that any destination organisation, heritage sites operator and/or firm may be interested to get and integrate it into its services and business models.

4 CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

The aim of this paper was to analyze the functionality of web map services and then identify their different levels and types of exploitation within the tourism industry. The paper has also contributed to the literature by showing how the social networking and the social intelligence of web 2.0 tools can further enhance the functionality of web map services. Web map services were regarded and analyzed as web services and in this vein, Venkatraman's (1994) framework on IT – induced business transformation was adapted for analyzing and discussing the impact of five major types-levels of web map service exploitations on the business operations and models of tourism firms. In short, web map services were demonstrated to crucially impact the internal and external design of business operations by fostering and instilling the collaboration of tourism firms with other external partners.

However, this transformation and distributed nature of these applications raises three immediate concerns: organizational changes, performance level and security. Business transformation (internally and externally driven) creates challenges regarding the role, the responsibility and the management practices of staff and function-based departments, while it also empowers customers to get engaged within business processes and so, be regarded as service co-providers (co-marketers, co-designers and co-creators). Future studies are required in order to further investigate how firms manage these organizational changed fostered by such web service enabled business transformation. Moreover, a web services based application could slow down to an unacceptable level if there is insufficient bandwidth or insufficient server capacity at any of the nodes and connections in the network of components that comprise the application. A failure of one component node could result in the application becoming unavailable. Security is a further issue, raising concerns about access control,

authentication, privacy, integrity and non-repudiation, as well as defenses against malicious attack (e.g. denial of service). In this vein, it is suggested that future research should look into how collaborative and inter-firm relationships that are based on the mash-up of web (and map) service applications are designed, developed and managed in order to ensure performance reliability and security. Moreover, future research should also investigate the ways in which soft issues (such as trust and commitment) are built and managed amongst firms-partners of web service based applications.

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Tourism services support industry development and the delivery of guest experiences, and some of these are missing from the NAICS classification. To ensure you have a complete picture of the tourism industry in BC, this chapter will cover both the NAICS travel services activities and some additional tourism services. First, weâ€™ll review the components of travel services as identified under NAICS, exploring the function of each area and ways they interact: Travel agencies. Online travel agencies (OTAs).