AN OVERVIEW OF INFORMATION TECHNOLOGY IN THE TOURISM INDUSTRY

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Abstract

Tourism is an important sector in the economy contributing around 10% to worldwide GDP, projected to rise to nearly 11% by 2014 (World Tourism Council (2004). Tourism was one of the first sectors to embrace Information Technology (IT). IT is crucial to the tourism industry and its success. IT has bought with it a number of changes and challenges that affect business and tourism. IT developments that have taken place with respect to the tourism industry are overviewed in this paper. Challenges they pose for the sector and tourism operators generally are also identified.

Introduction

Tourism has a significant economic impact at an international, domestic and regional level. This impact is underlined by statistical evidence (World Travel and Tourism Council, 2004; World Tourism Organisation, 1999) demonstrating the significance of tourism in terms of GDP, employment and economic development.

The tourism industry can be seen as one of the first business sectors where business functions are almost exclusively using information and communications technologies (ICT) (Garzotto et al. 2004). Information Technology (IT) and ICT has played an important role in the development of tourism. Computerised reservations Systems (CRS) were among the first applications of IT worldwide.

The industry is one of the more successful areas of e-commerce because it is largely consumer oriented and since services and the provision of information is at its centre. Werthner & Klein (1999) suggest tourism is a hybrid industry since even though it is dominated by the provision of information, essentially it is about a physical product. This requires the 'seamless integration of information and physical service, with flexible configurations of the physical and the informational parts" (Werthner & Klein, 1999, p. 257).

ICT facilitates this integration and enables customisation of tourism products to suit the needs of individuals. Due to changes in consumer behaviour of the tourist the market is becoming more segmented with each potential consumer belonging to a number of market segments simultaneously. Tourist operators need to be aware of these changes and be equipped to respond, or better still, take a proactive approach.

The challenge for the tourism operator is the provision of accurate, localised data, increasingly via IT, whilst maintaining a relationship with the tourist. Rather than being just transaction based longer term relationships need to be fostered and IT can play a role in this relationship building.

This paper overviews ICT/IT developments in the industry and considers the response of various players to the challenges that these developments bring.

An overview of the industry

The Australian tourist industry is characterised, as is the case in most other economies, by two tiers. Tier 1 players dominate, for example, the hotel sector. They are few in number, being global players well versed in strategy, management practices and information management systems which tends to be centralised. Tier 2 players on the other hand tend to be small and medium tourism enterprises (SMTEs). SMTEs are characterised by lower levels of resources generally, including financial resources as well as technical expertise and tend to focus on operational issues rather than taking a strategic view. In Australia, they also tend to be located in regional and rural areas (Sharma, Carson & DeLacy 2000, p. 159).

The following diagram depicts the groups of players involved in the industry.
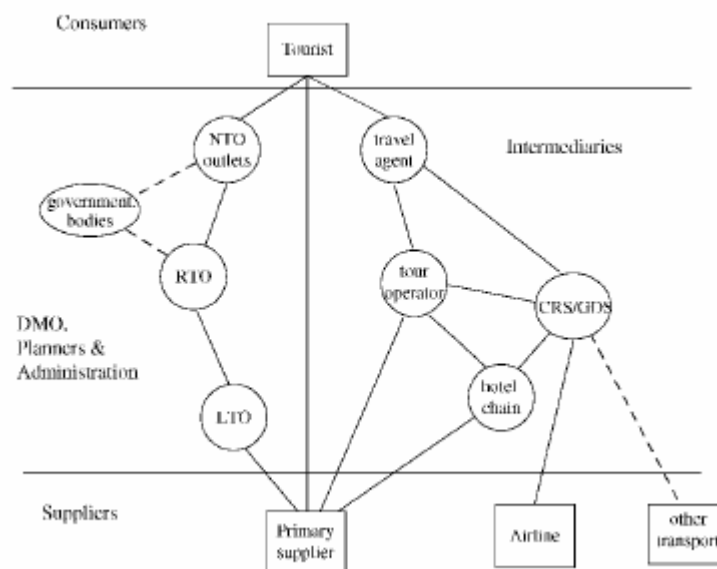

Figure 1 – Overview of players involved in tourist industry.
(Werthner & Klein, 1999, p. 257).

(note – NTO, RTO and LTO represent tourist organisations on a national, regional and local level)

INFORMATION TECHNOLOGY (IT) AND THE TOURISM SECTOR

Traditional technologies

Inter-organisational systems (IOS) represent one use of IT and allow the transfer of information across organization boundaries. In the past electronic data interchange (EDI) and electronic funds transfer (EFT) have been the technologies to enter into IOS. The standards required for EDI and the high set up costs have tended to act as a barrier for Small and Medium Enterprises (SMEs) to enter into IOS.

Tourism is dominated by the need to provide fast and accurate information to the consumer. The first step to achieve this goal of a one-stop service is via global distribution systems (GDS), a form of IOS. GDS evolved from computer reservation systems and enable the aggregation of information from airlines which enables travel agents (as information brokers) and tourists to 'make reservations and order other services in a single marketplace' (Joo, 2002, p. 60). Examples of GDS are Sabre, Galileo, Amadeus and Worldspan.

There is increasing debate concerning the long term viability of the large GDSs (Squires 2005). The systems themselves are dated, based on 1960s architecture and code, never intended for use with the Internet and as proprietary legacy systems are difficult to interface with existing modern computer and network architectures (Dogac et al. 2004; Squires 2005)

Chains of hotels (tier 1 players) generally have in place integration of the Property Management System (PMS) with the corporate Central Reservation System (CRS) and GDS. CRS integration allows for individual properties to benefit from the extensive reach of the chains marketing network and to allow for cross selling amongst properties within the chain. GDS integration allows chain properties to extend their reach beyond that of their chain marketing network. This interoperability of systems is an example of collaboration around IT (known as collaborative commerce), especially the CRS which has been the most commonly used Wide Area Network (WAN) application in hotels (Brooks, 1999). This extends insofar as some independent hotels link to a GDS such as Sabre.

Interoperable systems already exist in chains, but do not exist amongst independent hotels. Independents appear to resort to subscription to affiliate reservation networks that allow non-chain properties to participate as overflow facilities (Kasavana & Brooks 2001) rather than network amongst themselves. In this way "independents (are able) to maintain their individuality and distinctive methodology, while still benefiting from the economies of scale that an affiliation with a larger group of like-minded properties can offer" (Travel Impact Newswire, edition 81, 1 December 2004, p.3). Softwares that are available to facilitate such sharing of information as well as the Internet and the semantic web are means by which this can be achieved.

The Internet and tourism

The Internet is especially relevant to tourism since it enables knowledge about the consumer or tourist to be gathered, as well as vice versa. This gives 'rise both to global visibility of destinations and a global merging of market segments' (Werthner & Klein, 1999, p. 258).

The use of web-based tourist information systems has grown significantly. In 1996, 3.1 million consumers used these systems and this jumped to 33.8 million consumers in 1998. It was predicted that by 2008, 30% of the whole tourism business will be Internet based (Garzotto et al. 2004).

Travel revenues on the Internet have consistently ranked highly in comparison with other goods and services (Kadison, et al., 1998). The reasons cited for this prominence relate to the richness and currency of information provided online and the

breadth of the audience as well as the intensity of competition and the emergence of new players with countless web sites supported by efficient transaction support.

Online technologies within the tourism industry have significantly impacted on communications, transactions and relationships between the various industry operators and with the customer, as well as between regulators and operators (Galloway, Mochrie & Deakins, 2004; Sharma, Carson & DeLacy, 2000; Sheldon, 1998; Werthner & Klein 1999; World Tourism Organisation 1999).

Clayton and Criscuolo (2002) argue that technology behind the modern information society, particularly by way of the Internet, has bought about four key changes for the way in which business is conducted. These changes, which apply equally to the tourism sector, are:

1. the ability to turn ideas into marketable innovation for a wide range of customers, with reduced buyer search costs and costs of access to markets;
2. increased speed to market and access to new product offerings via the Internet;
3. changed processes and the sharing of information within and between organisations; and
4. a shift in the balance of power between suppliers and customers due to the increased availability of information.

The issues raised above point to the benefits emanating from IT, especially the Internet.

The first two factors have been discussed elsewhere. It is the third and fourth that will be considered here. The third point outlined above essentially makes 'vertical disintegration' of the value chain easier as the integration of electronic processes within and between firms is easier to achieve. This integration can take many forms, to its full extent collaborative commerce (c-commerce), and mean that 'it may no longer be necessary for a firm to own a process in order to control it' (Clayton & Criscuolo 2002, p. 62). This control may rather be achieved via the establishment of relationships between organisations. This is associated with various forms of collaboration or business networks that may emerge.

The fourth point demonstrates the extra choice available to the buyer – therefore shifting the 'balance of power' to them since they can research their purchase and compare the offerings of competitors. The tourist has more choice when buying travel products also because of the options provided by on-line travel agents and direct marketing by airlines. Increasingly tourists are becoming more computer savvy and are expecting to be able to experience the destination 'virtually'. The advent of intermediaries such as distressed web sites online means that tourists are willing to delay making their reservations online and are more price conscious.

Other changes in the way they consumers behave – preferring to take shorter holidays with decisions made more spontaneously – have the effect of placing more pressure on tourist operators who need to be more flexible in their offerings and in the way they relate to the market.

Benefits of the Internet

Benefits from IT, particularly the Internet for tourism, are substantial. These benefits are no longer dependent on proprietary information systems as has been the past experience, since the Internet is a commonly available technology.

Dogac, *et al,* (2004) considers the Internet provides many advantages to players in the tourism industry. Some of these benefits are:

- enhanced level of collaboration between tourism operators, for example, between travel agencies and service providers;
- pre-arrangements with respective suppliers no longer necessary;
- web service discovery will identify alternatives, enabling holiday packages to be constructed;
- greater negotiation of service to be purchased and customization of services/activities; and
- generally greater levels of interoperability with internal and external applications.

Whether these benefits have come to pass remains to be seen. Their realisation requires a new approach to be adopted by operators in the industry, particularly for SMTEs. The question is whether they recognise these potential spin-offs and are able to take advantage of them. They all point to the need for greater levels of IT adoption to be more flexible and responsive to the market, or collaboration with other players to achieve a 'one-stop' planning and booking experience desired by the tourist.
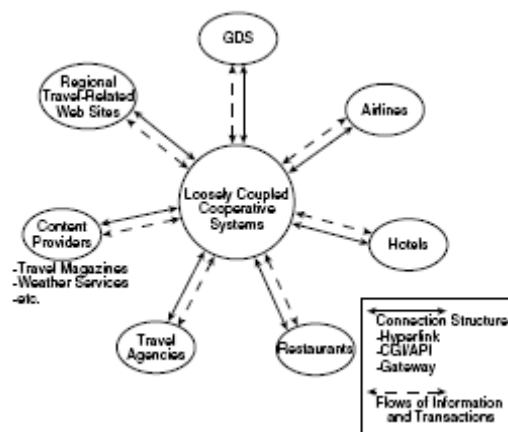

Figure 2 – Framework depicting tourist operators and potential interplay of IT between operators (Joo, 2002, p. 61)

As the above diagram indicates (Figure 2), many businesses or tourism operators are loosely connected over the internet so as to endeavour to serve the tourist's needs, providing the seamless integration of information necessary to plan and book a travel experience. Potentially the Internet overcomes the barriers SMTEs especially have experienced re accessing GDS and CRM, yet it is considered more progress is needed in this regard. This is because it enables individual tourist operators to link their web sites and present a complete 'virtual tourism experience' (Palmer & McCole, 2000, p.

200). Gonzalez et al., (2004) suggests a coming together of or cooperation amongst small players is required to generate 'coherent heterogeneity' – differentiation amongst the players in the midst of providing an integrated tourist offering.

Issues raised by the Internet

The internet has resulted in a proliferation of many ineffective html document based web sites (Palmer & McCole, 2000) with small and medium tourist enterprises (SMTEs) possessing inadequate skills and insufficient resources to conduct web site effectively. A Yahoo search reveals in excess of 250,000 tourist oriented websites. This exponential growth in the number of tourist related web sites means a 'lack of notoriety in a saturated market' (Gonzalez et. al., 2004, p.2). The internet reduces distribution costs as intermediaries commissions are eliminated, however this is frustrated by the emergence of intermediaries, the squeeze on price, yield and revenue and the homogeneity of web sites.

It is not clear that individual SMTEs are able to use this business intelligence, or recognise its value. If so, information may be lost and not acted upon. A sharing of information, either in a centralised or in a more collaborative manner would assist in the use this 'asset' of information and knowledge.

The internet is a commonly available technology, however awareness of its functionality and resources and expertise to take advantage of this functionality is required. It is observed that many SMTEs either are not aware of this or do not possess or have ready access to resources need to make the most of the opportunities potentially available.

For these benefits and others to be achieved however, and so full exploitation of web services, 'it is necessary to introduce semantics to web services'(Dogac et al. 2004, p. 22). The semantic web which is an extension of the World Wide Web, is designed to bring structure and meaning to the vast array of information available on the World Wide Web. In bringing this structure, the web creates knowledge which is readily accessible by both humans and machines (eg software agents, artificial intelligence) (Berners-Lee, Hendler & Lassila 2001). The structure imposed by semantic webs is achieved through the imposition of an ontology to give meaning to information. The ontologies created by semantic web users allow machines to process and "understand" this information by specifying 'standard terms and machine readable definitions' (Heflin & Huhns 2003, p. 30) which allows the automation of web document processing. These issues however go beyond the scope of this paper.

Intermediaries

Collaboration around the Internet is a way for tourist operators, such as hotels, to deal with excess capacity and increase occupancy rates quickly. This already occurs within many chains and is evident in the participation in intermediaries or distressed websites such as needitnow.com, Travelocity.com; whatif.com and others. Three reasons have been identified for this change in the distribution of hotel rooms:

- a lack of understanding of hoteliers of how the Internet and online distribution works;

- hospitality lags other tourism sectors in adopting the Internet as a distribution medium. Hotels were unprepared to deal with boom in online bargain hunting and bookings;

- exploitation by intermediaries of the situation following 9/11 as hoteliers looking to increase revenues via increased occupancy relied on intermediaries to promote their product.

Starkov (2002, p. 3) estimates that by 2010 around 18-18% of revenues for hotels will come from hotel bookings made on the Internet, compared to the current 8 – 10% of revenues. The active role of these intermediaries may be viewed as a positive development for the industry. Online bookings are more cost effective, tend to attract more affluent customers and reduce reliance on more expensive distribution channels. Room occupancy rises as vacancies are effectively 'sold' online at short notice. However a closer analysis of the impact of this reveals a loss of control by tourist operators and a tradeoff between occupancy rates at the expense of yield and the associated RevPAR.

Yield represents the return to the business resulting from its operations. RevPAR represents the revenue achieved per available room. The aim of a hotelier is to maximise yield and RevPAR. It is clear that selling rooms via distressed websites at a cheaper rate increases occupancy but has a negative impact on the other indices. The long term impact is brand erosion in terms of quality following downward pressure on room rates.

Starkov (2002) suggests that by 2005 around 54% of hotel online bookings will be direct sales reflecting a greater role of online intermediaries in the reservation process. Hoteliers, 'have difficulty maintaining market share and finding the right formula to deal with online discounters and intermediaries' Starkov (2002, p. 1), demonstrating a lack of internet strategy and ineffective e-Distribution approaches. Hotels need to transfer their direct sales expertise to the web environment.

Realisation of the need to develop a direct web distribution strategy is critical as hoteliers seek to deal successfully with online intermediaries. Distressed web sites have a role to play in distribution, however should not be the only web distribution channel. If a hotel has not developed a direct web distribution plan it will only appear on the internet via distressed web sites which as discussed erodes its quality. A total online distribution strategy therefore is needed with a direct-to-consumer distribution model at the centre of the strategy, such as adopted by the airline industry. 'The question isn't whether you should use the Internet or traditional methods to compete; it's how you could use *both* to your greatest strategic advantage' (Porter, 2001, p. 61).

IT and collaboration – business networks

Increasingly business network behaviour is becoming more prominent in research and is of interest to the tourism industry. A sharing of information, either in a centralised or more collaborative way, would assist in maximization of the value of information

and knowledge. Scholars have identified the need for greater collaboration in the industry (Piccoli, 2004; Joo, 2002; Palmer & McCole, 2000; Werthner & Klein, 1999a), recognising the need to exploit technologies to become more responsive to the market.

This collaboration is made possible by the spawning of online technologies, IT being a critical driver of integration and co-operation (Joo, 2002). This integration though requires internal integration of processes and systems as well as externally with other organisations and this has acted to impede co-operation in the past. Figure 3 shows the interplay around the Internet in the tourism industry.
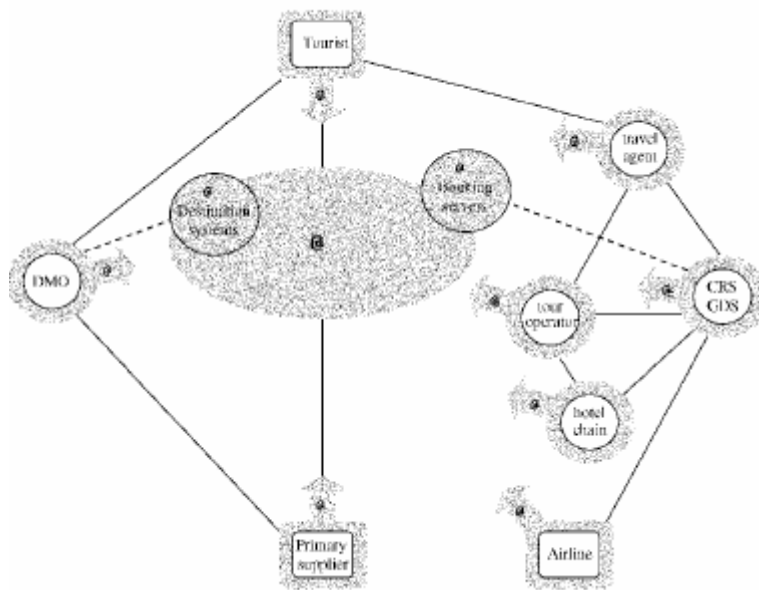

Figure 3 - Current and future position of online services
Werthner & Klein, 1999, p. 259

Examples of the IT Developments in the Tourism Sector

Internet Forums

An Internet forum is 'an online facility that provides local businesses with an internet portal using the locale, or an industry particular to the locale, as the unique selling point, or common brand' (Galloway, Mochrie & Deakins 2004, p. 250). This acts as an anchor providing more of a profile to entice visitors to the web site that represents the location or destination.

Galloway, Mochrie & Deakins (2004) have examined how the development of internet-based virtual business forums assists tourist operators in rural areas. Whilst studies have identified the benefits of the use of Internet amongst SMTEs in such rural and regional areas, these authors argue that there is little evidence to suggest that this is being converted into action.

Reasons cited for a lower uptake of the Internet in more remote reasons are several and are discussed in a number of papers (Thomas, Sparkes, Brooksbank & Williams 2002; Huggins & Izushi 2002; Leatherman 2000; Gray & Juhler 2000; Martin & McKeown 1993). Yet the Internet offers the potential to overcome the disadvantages that remote locations raise. Impediments to SMTE adoption of e-commerce need to be revisited and addressed to encourage the use of IT and to seek to reduce the impact of the digital divide.

By developing a strategic approach that adopts a clear identity focusing on the destination and its features encapsulated in an integrated website, the forum concept has significant merit with respect to regional tourist destinations.

The Internet as a facilitator of collaboration

In their study Palmer & McCole (2000) examine independent businesses with unique resource locators (URLs) located in one region. They then followed links out of those sites to identify the extent to which such sites were linked. Little evidence was found to show the use of websites for cooperative tourism in the study area. They concluded there was a lack of cooperative initiatives between tourist operators in the region of interest. This study is of interest since lessons can be learned for consideration in other regions to promote tourist destinations.

The Internet and Cultural Tourism – the MEDINA project

Cultural tourism is a good example of the way in which online technologies have been influential as its emergence has been fostered by the Internet. Cultural tourism focuses on the presentation of an areas cultural heritage, ranging from environmental attractions through historical, artistic, archaeological and folkloric components. A specific example of this form of tourism is the MEDINA (Mediterranean by Internet access) project started in 2002, due for completion in 2005, which established a cultural web portal for fourteen Mediterranean countries (Garzotto et al. 2004) Access to the portal by a tourist is achieved through mobile devices (e.g. personal digital assistants or smartphones) and allows the tourist to make informed decisions concerning cultural sights. The emergence of artificial intelligence and mobile computing, have empowered the consumer of tourism services. Mobile devices are increasingly being used by tourists as electronic personal tour guides (Zipf 2002).

Future Research

Future research and analysis of IT developments and adoption and use in the tourism industry is required. This is especially the case amongst SMTEs in Australia, given that IT strategy is centrally determined amongst tier 1 players. The authors in the future will replicate the Palmer & McCole (2000) study, initially with respect to the Hervey Bay tourist region located in Queensland. Also industry forums as described

in this paper will be considered and trialled in same region. Since these forums are an example of collaboration around IT, of particular interest for more remote tourist destinations, the findings will have implications for tourism in rural and regional Australia.

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