Why Web Services and Grid Computing will Turn the Travel Industry on Its Head – and Why that's a Good Thing!

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The Nature of the Travel Industry

Global travel and tourism – one of the world's largest "industries" – generates $4.7 trillion in revenue annually, employs 207 million people either directly and indirectly, and supports hundreds of thousands of businesses[1]. Despite the fact that travel "drives" over 30% of all e-commerce transactions[2], the first few waves of the Internet revolution have hardly washed the surface of the supply-side of this ubiquitous, pervasive sector.

It's the next wave of the Internet – what some have called the Fourth Wave[3] – that, like a *tsunami* will shake-up this conservative, slow-to-change phenomenon with enormous benefits and implications (both positive and negative depending, of course, on where you sit right now!).

The Fourth Wave encompasses a number of trends whose interactions are truly synergistic including: the move from hard-coded applications to lightweight services delivered over the web; acceptance of fully open standards for data exchange and interoperability; introduction of effective security systems, use of secure micro-payment technologies and peer to peer, distributed networks.

Within this wave, it is the widespread use of "*web services*" (defined as loosely coupled components that communicate via XML interfaces), combined with a "*grid computing model"* (in which every user and his access device is both a client and a server and is both a provider and consumer of information), that will cause a revolutionary upheaval in the way this industry is structured and business conducted.

Why is Travel and Tourism So Likely to be Impacted by the Fourth Wave?

Looking at the supply-side of travel and tourism, we can see 10 good reasons why Travel and Tourism provides such fertile ground for the application of distributed, peer-to-peer, web services-based solutions:

1. The dominant feature of travel and tourism is supply-side fragmentation. Literally hundreds of thousands of enterprises are involved in providing the various elements associated with overnight travel. Travel/tourism providers are so geographically scattered and numerous that no one technology vendor or distribution channel can dominate.

2. These providers are also characterised by extreme heterogeneity and diversity in terms of focus, size and sophistication.

3. The vast majority are classed as small, medium or micro-sized, SME's or SMB's. In Europe, some 99% of enterprises employ less than 10 persons. As the vast majority do not have services that can be purchased online, they are still in a digital sense "invisible" and excluded from e-commerce.

4. Within each sub sector and destination, providers actively compete with one another. Cooperation and collaboration only occurs when attempting to reach distant markets

[1] WTTC
[2] Phocus Wright
[3] *Web Services: Computing's Fourth Wave*, Frank Moss, Bowstreet Software Inc.

and build business volumes to a destination. Autonomy, self-sufficiency and choice are the values and qualities prized by providers.

5. Providers are dependent on a multiplicity of intermediaries and the distribution chain is long and expensive. They are required to distribute their perishable, time-specific inventory via multiple channels and “brands”, managed by intermediaries using a variety of technologies and platforms each requiring seprate interfaces.

6. Take-up of sophisticated electronic systems is slow. Most providers will only have dial-up connections. They will not want to join exchanges that rely on private networks or have their data exposed to potential competitors.

7. Providers have neither the financial resources nor the time to manage multiple systems. Fiercely independent, competitive entrepreneurs, they want control over their own inventory management, sales and content.

8. As a result of the volume and fragmentation of both the providers and intermediaries, the industry is awash with thousands of legacy applications that would be costly, if not possible to dismantle and replace.

9. The sector is particularly vulnerable to the ravages of commoditisation and operates on paper-thin margins. Reducing distribution costs, which can exceed 25% of turnover, provides the best opportunity to improve the bottom line and highlights the importance and advantage of selling directly to the end user.

10. Each provider is embedded in a larger network of suppliers from which it procures the goods and services necessary for operations and a community network of hosts (public and private agencies responsible for helping and benefiting from the economic activity of tourism at the destination).

On the demand side, there are also a number of powerful factors at work which will encourage the speedy take up of “web service” technologies over the next decade.

Consumer markets are fragmenting into segments of one with each individual expecting higher degrees of personal service tailored to their preferred style and mode of travel.
In addition, the travelling consumer is highly fickle and “event driven”. A trip is triggered by a purpose or intent (to visit the sales team; to attend a conference; to go to a wedding; have a weekend break playing golf; or a romantic getaway with partner; or take the annual trip to a favourite cottage by the sea…). Thus the profile of the user changes according to the trip’s dimension, focus and rhythm. Each trip is a unique mosaic of supply elements that are experienced by the consumer as a highly subjective, holistic and intangible mental construct called *fantasies* prior to consumption and *memories* afterwards.

Since the consumer is often seeking diversity of experience, travel and tourism providers have few opportunities for building relationships and brand loyalty through repeat purchases. To aggravate matters further, providers are selling just one element of what is a composite trip experience. In travel and tourism, the so-called “Promiscuous Consumer”[4] is faced with, and often required to use, a plethora of travel sites (portals and others) and is merely a mouse click away from alternative information and booking sources. *Only those providers that can supply the customer with relevant, dependable, and practical content and tools for achieving the task they are undertaking at the time (searching, comparing, selecting, booking, confirming, changing, itinerary building etc.) and in a format appropriate to the access device being used at the time will be seen as providing value.* **What small business can develop and operate this range of functionality and content by itself**?

[4] *Promiscuous Consumers: Invisible Brands*, Michael Bayler and David Stoughton, Capstone Press, 2002

Despite travel's apparent dominance of the e-commerce realm, the business and academic literature is replete with evidence of customer dissatisfaction – look to book ratios hover at 2%; in on-line retail 75% of respondents abandoned their shopping cart without making a purchase; 4 out of 5 visitors never return to a web site; 43% of bookings fall through because of bad design; 37% turn away because they don't know whom or how to call for help; 32% are concerned about credit card security; and 25% are unable to ensure the accuracy and reliability of their reservation

Thus the *demand factors* that will drive providers towards "web services" may be summarized as:

1. The need to cater to the consumer's total trip as a means of demonstrating value, relevance and meaning. In other words, transport carriers and hotels in particular, will need and want to sell a variety of destination services (events, attractions, tours) and ancillary services (books, insurance, weather, finance, news) in order to satisfy their information hungry prospects. Brand loyalty will be built on managing and delivering on the total experience, not just one piece of it.

2. The need to access and offer a broader, richer range of web-based functionality that supports consumers in their trip planning and purchasing tasks; and

3. The need to be visible and accessible in as many places, channels and formats as possible (i.e., by phone, on the company intranet, corporate web site or third-party agency portal, via wireless phone or PDA, on the back of an airline seat in tantalising digital video, on the TV in the hotel room).

The Structure of Tourism at the End of the 20th Century

The sheer magnitude of suppliers, intermediaries, distribution channels and consumer segments has bred enormous complexity, disfunctionality and inefficiency into the current "system".

Providers fall into one of three categories:

1. Large global and national "bricks and mortar" companies, chains and consortia that have achieved economies of scale and varying degrees of vertical integration in order to be in a position to supply all aspects of a leisure trip or capture the loyalty of a business traveller making frequent and similarly motivated business trips. Corporate examples include BA, Accor, Cendant, Airtours, Hertz etc. Each of these has invested heavily in IT systems to support all aspects of their business.

2. Equally large systems providers and electronic intermediaries that supply a rich blend of content, technical functionality and connectivity – platforms and infrastructures – that are used largely by the first category of provider. Examples include the Global Distribution Systems (GDS) such as Galileo and Sabre, switching companies such as Wizcom and Pegasus and the online agencies of Expedia, Travelocity *et alia*. Corporates in both categories appear to be obsessed with growth, mergers and acquisitions. Cendant has recently purchased Galileo and Cheaptickets and intends to launch its own Internet Travel Portal; Sabre announced in mid February its intent to aquire 100% ownership of Travelocity; Expedia is championing its Merchant Model - a new name for an old, and supposed beleagured business concept the Tour Operator!

3. The rest! Hundreds of thousands of small to medium-sized enterprises located throughout the globe that offer both direct travel-related services (accommodation, dining, transport, recreation and entertainment) and ancillary services (insurance, software, content, finance, weather, news, maps etc.)

The Old Rule Book

The large corporates have grown to dominate the skyline by successfully following a rule book that is now obsolete and that reads, more or less, as follows:

- Big is better, size matters;
- Top-down "command and control systems" and cultures, enforced by standardised policies and procedures, ensure consistency and stability;
- Reduce transaction costs by owning as much of the supply chain as possible;
- Use market share and demand volumes to squeeze providers;
- Focus on promoting the superior qualities of your brand through "creative corporate speak" – the commercial equivalent to political spin and liberally funded marketing and PR;
- Content is King – acquire it as cheaply as possible to attract browsers and make them stick
- Use critical mass and buying power to dominate distribution channels and offer only the products you can control or acquire at discounted rates;
- Invest heavily in technology for competitive advantage and put the fear of god into the hearts and minds of potential competitors by boasting how much you have spent; and
- When in trouble, drop your prices, lay off people, live off your capital reserves and or borrowing power to out last your competition

Most of the corporate activity that forms the stuff of analyst reports, business commentary and industry news occurs in category 1 and 2 enterprises. Similarly, all the major vendors of IT solutions – booking engines, yield management, ERP, content management, customer relationship and knowledge management – have confined their attentions to this group of players, focusing exclusively on Fortune 500 enterprises (size does matter – to grow big you had better keep their company!) Yet of the $4.3 trillion in value assigned to the travel industry as a whole, these big players collectively handle just 23% of the total[5]. The remaining $3.3 trillion of travel business (comprising mostly destination-related services offered by SMEs) is waiting and ready for affordable, flexible, practical solutions that can connect them to a global market of demanding, capricious and valuable consumers hungry for the new, the unusual, the unique and boutique.

Peering Through the Hype – What are Web Services About and Who is Involved?

While the concept of Web services has captured the imagination of the hardcore programming community for at least three years, they are only now beginning to attract attention from the general IT and business media. This is largely because every major "player" in the IT world (Microsoft, IBM, Hewlett Packard, Sun Microsystems, BEA) are all aggressively pursuing and promoting their own web services strategy. A space does not permit a thorough examination of the topic here, readers are referred to three major sources and links to further information: **www.ecademy.com**; **www.stencilgoup.com** and www-106.ibm.com/developerworks/webservices/library and **http://msdn.microsoft.com/library/techart/webservicesessentials.htm**

DestiCorp's definition of Web Services is as follows:

> *web services are encapsulated, loosely coupled, contracted software functions, offered via standard protocols.*

Encapsulated means the implementation of the function is never seen from the outside. *Loosely coupled* means a change in the implementation of one function does not require change to the invoking function. *Contracted Software Functions* means there are publicly available descriptions of the function, its behaviour, input/output parameters (XML), how to bind to it and the contractual terms and conditions for its (re)use. *Standard protocols* are

[5] Figures cited by Expedia (Simon Breakwell) at various Eye for Travel Conferences.

W3C's TCP/IP, HTTP and SOAP. The global repository for the publication of web services is the UDDI registry, maintained by IBM and Microsoft.[6]

Web Services will permit the repackaging of existing digital assets (e.g. business processes defined in program code) so they can be wired into other applications. Even legacy code (COBOL, RPG etc) can be 'wrapped' as a web service. This brings about three profound implications:

a) Organisations can develop applications by 'wiring' Web Services together (that are proven, well tested and from trusted sources) thereby decreasing development costs and time to market;

b) Organisations can derive revenue from existing (proven and well tested) code by deploying its business processes to partners in a seamless automated fashion: and

c) a technology shift in computing can occur whereby business solutions are constructed from distributed, co-operative application components or services that dramatically reduce and simplify development to enable companies to focus on delivering services relating to their main business, rather than code production.

To understand how web services and grid computing will change the structure of Travel and Tourism, it is necessary to look at this sector in a different way. The traditional, linear, mechanistic worldview that envisions supply chains and the need to own, command and control all the productive units necessary to create and distribute a product is being replaced by more organic, fluid, amorphous and often transitory structures based on alliances, partnerships and collaboration. [7]According to Gartner[8]:

> *"The prevailing model of competition in the Internet Economy is more like a web of inter-relationships than the hierarchical, command-and-control model of the Industrial Economy. Unlike the value chain, which rewarded exclusivity, the Internet economy is inclusive and has low barriers to entry. Just like an ecosystem in nature, activity in the Internet Economy is self-organising. The process of natural selection takes place around profit to companies and value to customers"*

The end result of widespread deployment of web services and the service-oriented, web-based architectures on which they are based will be new ways of working and a very different corporate landscape.

A New Rule Book

In a collaborative, networked economy, new rules apply:

- Small is beautiful: being fleet of foot is more important than being big;
- Customer (not content) is king; the customer is placed back in the driver's seat pulling towards them the goods and services they need to complete a task, fulfil a dream etc[9].
- Companies are increasingly defined by the services they offer and processes they perform than by a specific set of products;

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[6] Leon Benjamin, co-founder of DestiCorp author of *Web Services in the Context of Digital Oil & Gas* and other articles on ecademy.com

[7] For a more in-depth exploration of the move to an organic "paradigm", review *Shifting Sands: The Tourism Ecosystem in Transition* at www.desticorp.com/resources.

[8] *Collaborative Commerce*, papers presented by Bruce Bond and Yvonne Genovase, Gartner Symposium, ITXPO 2000.

[9] For more thoughts on how the customer will be able to pull services towards them see *Dancing with the Customer: The Next Copernican Revolution* on www,desticorp.com

- Companies focus on their core competency – what they are really good at – and outsource the rest;
- To meet the complex, multi-faceted aspects of consumer demand and their need for services to be delivered in an integrated, seamless way, companies create dynamic, fluid and temporary partnerships with other companies that provide complementary service offerings;
- Agility and adaptiveness are the arbiters of success. Corporations switch from being "make and sell" organisations to "sense and respond" organisations whose entire structure is tuned to their customers's expressions of need;
- Top down, command and control structures are replaced with flatter structures and employees are "empowered" to serve;
- Leaders also serve by creating the conditions for customer care – they set the overall direction and operational rules and enable employees to chose the "best" method of service delivery;
- Time horizons are extended – instead of the focus on quarterly results, companies devise meaningful measures of customer value over much longer periods.

A New Corporate Landscape

The combination of liberating technologies with use of a new rule book will result in a different business landscape. Instead of power being invested in a relatively small number of very large, vertically integrated organisations, we expect to see a much more dynamic, fluid web of corporate relationships that form, act, dissolve and re-form with enormous speed and flexibility and subject to market demand. Wealth will become more evenly distributed among a much larger number of smaller, more agile enterprises that occupy specific niches in the marketplace and that adapt and evolve quickly and radically according to external conditions. Elsewhere, we have argued that the value chain associated with tourism is better described as a "tourism ecosystem" [10] . Following full scale deployment of the technologies associated with the Fourth Wave of computing, DestiCorp foresees the emergence of five types of corporate "species" in the tourism ecosystem.

A. **The Individual Web Service Provider** – this forms the basic building block of the ecosystem. Equivalent to the atom or the cell, the web service can comprise either a *unit of information* (description of a provider's facility, a piece of copy describing a place, a video clip) or *unit of functionality* (such as a message to initiate a credit reference check, a currency conversion service, issuance of a booking reference number) or a *unit of content* - combination of content and functionality. Both are wrapped in XML and available over the web. Some companies, such as Sabre or an airline, may offer multiple web services by disaggregating and repurposing meaningful units of code and functionality. The vast majority will offer one or two (eg a self catering holiday cottage, airport taxi service, currency conversion service, a search engine, or credit card checking and processing service)

B. **Brokers** (sometimes known as intermediaries) will aggregate individual services for distribution to customers and their agents. They add value by facilitating easier choice and comparison (helping the customer match their unique needs with the most appropriate supplier) and adding relevant knowledge and expertise. Brokers will tend to be supply-oriented and need to build a critical mass of content in order to offer their customers choice and substance. They will differentiate according to their focus:

   - ***Element-focused Brokers*** will aggregate specific trip elements. For example, AndBook.com – that syndicates hotel content from several hotel companies; Opodo or Orbitz that syndicate airline fares; WorldRes and All-Hotels that aggregate content from a broad range of accommodation suppliers. They offer users choice, convenience, guaranteed quality and will be used when the primary purchase focus is on one element e.g., get me a cheap flight to Frankfurt tomorrow; or find me a five star hotel in Phoenix for 3

[10] *Shifting Sands: The Tourism Ecosystem in Transition*, Anna Pollock , www.desticorp.com/resources

nights on March 22nd and when either saving time or money and the consumers' primary motivators.

- ***Destination-focused Brokers:*** as their name implies aggregate a variety of content for a specific place (country, region, community or resort). Examples are numerous and include: Jersey.com, Tiscover.co.uk; Visitwales.com etc. They will also focus on providing services to their members or constituent suppliers in order to access their content and inventory. They will supplement their inventories with rich editorial and interpretive content to aid a consumer's destination choice and appreciation. Since virtually all leisure travel takes place at a destination, these Brokers become additionally important to the customer post arrival and engage in the longest "dance with the customer".[11] This affords them the opportunity to develop a more important role in the

- ***Thematic or Activity-focused Brokers:*** aggregate content around a specific topic e.g., walking, cycling, garden viewing, farm holidays, adventure etc. These Brokers – many of which are currently no more than directory publishers – will prosper to the extent that they offer relevant knowledge, advice and expertise to add value (e.g., travellers' tips, independent reviews etc) prior to departure and build and facilitate the exchange of information and reviews among customers.

C. Channel Managers/Distributors: will provide conduits to customers and their agents and will include iTV channels delivered into the home, airline, hotel, office; web portals (wireless and otherwise), Call Centres, print media, kiosks etc

D. **Affinity Agents or Life Agents:** These are the enterprises that are closest to the consumer and focus all their energy on serving the consumer. It is a symbiotic relationship. They exist to save the customer time and or money and draw down from the web those products and services that the customer needs to solve a problem, complete a task, or meet an objective. In return, the customer entrusts the agent with a substantial amount of personal detail (their personal profile) and encourages the agent to learn more about themselves and their preferences through the act of serving them.

We call them *Affinity Agents* because we suspect they will attract users who have some form of affinity with each other. For example, they may focus on a *market segment* ("yuppies", or retirees in the CD economic group); *special interest groups* (such as antique enthusiasts, ramblers, skiers, motor racing *enthusiasts, Harley Davidson owners), or could be associated with a profession* (e.g., lawyers or nurses) or belong to a similar church. We call them *Life Agents* because they will take care of all aspects of Life – from romance (dating agency), buying a house and organising one's personal financial affairs, personal shopping, pension planning, raising children, helping take care of older parents.

They will offer their member enormous convenience and savings due to their ability to procure in bulk, trawl the web for opportunities, compile user reviews from peers etc. While they do not yet exist in large number, several business pundits and visionaries have forecast their emergence including Farncome and Camrass, authors of *The Atomic Corporation*[12] and Hagel and Singer in *Net Worth* back in 1999. [13]

Customers won't have the time, the patience, or the ability to work out the best deals with information buyers on their own (nor will vendors have time to haggle, customer by

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[11] See: *Dancing with Your Customer: The Next Copernican Revolution,* Anna Pollock in www.desticorp.com/resources

[12] *The Atomic Corporation: A Rational Proposal for Uncertain Times*, Roger Camrass and Martin Farncombe, Capstone 2001

[13] *NetWorth: Shaping Markets When Customers Make the Rules*, John Hagel III and Marc Singer, Havard Business School Press

customer). In order for consumers to strike the best bargain with vendors, they'll need a trusted third party – a kind of personal agent, information intermediary, or infomediary – to aggregate their information with that of other consumers and to use the combined market power to negotiate with vendors on their behalf….we argue that companies playing the infomediary role will become the custodians, agents and brokers of customer information. [14]

E. **Network Providers** will create and supply the infrastructural glue that binds all participants together and will enable trade to occur in a safe, secure and efficient manner. Over time, all content and functionality (software tools) used by the acts in the tourism ecosystem will be supplied as XML wrapped "web services" that can be invoked and used over the Internet, assembled to create higher order applications and perform tasks. The Network Provider is a neutral agency that provides all the services necessary to connect buyers and sellers in a secure, reliable, managed fashion. [15]These services include Security (authentication, authorisation, encryption), Directory, Messaging, Orchestration, Billing & Metering, Quality Assurance) Note: network providers in this model equate to "Context Providers" identified in Don Tapscott's [16]original anatomy of Business Webs and, in his view, are destined to achieve the lion's share of the spoils.

Who Will Seed the New Ecosystem and How?

Natural ecosystems evolve through ecological succession either gradually – in response to relatively minor changes in the environment – or relatively quickly, due to a catastrophic external event (such as a volcanic eruption).

External forces stimulating changes within the tourism ecosystem include customer dissatisfaction (declining sales/arrivals) or real external crises (e.g., act of war, disease, currency fluctuations).

Internal Forces include system failure (i.e. when internal systems cease to work, when profit margins erode, labour shortages and high staff turnover necessitate new approaches, or when distribution costs soar etc.) or when existing organisations "mutate" – someone has a bright idea and runs with it.

In either case, it tends to be individual action or choice of response that makes the difference. Nature shows us that evolution generally occurs as the sum total of millions of discrete, individual choices and experiments made at the cellular and, possibly, sub cellular level.

So reader, it's up to you!

- ***Tourism Service Providers*** will start by examining all the services they offer and disaggregate them into coherent units of either content or functionality or both and ensure that data structures, syntax and semantics conform to existing industry standards (eg published by the Open Travel Alliance, HITIS etc.)

- ***Brokers/ Intermediaries*** will start by encouraging Service Providers to convert their offerings into web services based on standards developing within the sector. They will enter into a dialogue with providers to better understand their needs and issues.

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[14] *NetWorth: Shaping Markets When Customers Make the Rules*, John Hagel III and Marc Singer, Havard Business School Press
[15] *Vitiris and the Web Services Ecosystem*, Killdara.com, whitepaper, 2001
[16] *Digital Capital: Harnessing the Power of Business Webs*, Don Tapscott, David Ticoll, Alex Lowy, Havard Business School Press

- ***Distributors*** will start by actively listening to their intermediary and provider customers and help them reach their customers and sustain a relationship across multiple channels.

- ***Life/Affinity Agents*** – we believe this "species" exists in today's tourism ecosystem in embryonic form only. As consumers are their primary focus and attention as well as their source of revenue (consumers will increasingly be willing to pay to save time and hassle), they are most likely to evolve from consumer-oriented clubs or professional associations or corporate intranets. Independent traditional travel agencies with a large customer base may survive by diversifying and offering a broader range of services.

- ***Network Providers*** – well who are you? We know you are "out there" –either in embryonic form, or are about to be created. Are you a technology supplier with ambition to serve a vertical sector; a GDS that wants to unleash the power of the 77% of the industry your cumbersome legacy systems cannot now serve; or are you a credit card company with an existing client base of both merchants and card using consumers. Or are you a smart investor, untrammelled by conventional thinking? Note: network providers in this model equate to the "Context Providers" identified in Don Tapscott's[17] original anatomy of a Business Web and, in his view, are destined to achieve the lion's share of the spoils.

- ***Consumers*** –we are all and each a consumer and we're in the driver's seat. Many of us are fed up and disenchanted with the reality of online travel planning. Some are willing to pledge allegiance – even if just for the afternoon (!) – to a service provider that appears both genuinely willing and able to help us plan and experience that perfect trip away.

Given the radical nature of change, its speed, pervasiveness and depth, it is impossible to predict with precision what shape the emerging landscape will adopt – and who would want to? Better to jump into the fray, experiment, succeed, fail, learn and most of all play and let the outcomes emerge!

Anna Pollock is CEO of DestiCorp – a strategic consultancy that helps executives, entrepreneurs and individuals make some sense of the commercial world in which they operate in order to ignite innovative insights, dare to do bold things and know they are not alone. She may be contacted at: **anna@desticorp.com**

[17] *Digital Capital: Harnessing the Power of Business Webs*, Don Tapscott, David Ticoll, Alex Lowy, Havard Business School Press