e-tourism / history and challenges

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**e-tourism**

History and Challenges

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Based on numerous contributions of many colleagues and friends

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**Outline**

- Tourism
- Short history of e-tourism
- Reflection
- Some future issues

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Werthner, 2016
Tourism

- Tourism huge industry, and steadily growing in 2020 estimated 1.6 Bn intern. arrivals
- World-wide networked industry
- In Europe 1.3 Mio enterprises, 95% very small
- Few big players and complicated value chain
- World-wide demand (but different context, „non-frequent“ users)
- Product/service is complex (bundle), emotional and confidence good

Tourism (stated already in 94/95)

- information business
- (future) is electronic
- structural change

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e-Tourism

- Travel and tourism a major domain in e-commerce/e-business
- IT of strategic importance for the tourism / travel industry
  - reciprocal relationship

- IT already important in the 60s (CRS/GDS - Computerized Reservation Systems / Global Distribution Systems: Start/Amadeus, Sabre, Galileo, Worldspan)

- Systems restricted to few and strong players (e.g., airlines, CRS/GDS, tour operators, travel agents‘ and hotel chains)
- Expensive technology, proprietary protocols, limited band width

- IT with CRS/GDS changed tourism => mass tourism

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Werthner, 2016
e-Tourism

- **e-tourism:**
  - Design, Implementation and Application of IT / e-commerce solutions in the travel and tourism industry
  - Analysis (of the impact) of the respective technical / economic processes and market structures
  - **Practically:** everything that happens electronically in the travel and tourism industry

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Short History: Early Beginning

- In tourism “outside” CRS/GDS it started in the late 80s
- Fast evolving electronic consumer market in the 80s (with PCs)
- First “electronic” tourism destinations, with connected PCs via telephone lines, content distribution to Minitel / France, Teletext, and CRS/GDS – in early 90s
- **No Web,** Internet not used, proprietary protocols
- First system: TIS (Tirol Information System), Austria, 1989
The Web Start

- Starting with simple online presence in 1995 / 96
- Tourism one of the first sectors “moving” to the Web
- Early forecasts
  - Enormous growth
  - Transparent markets and decreasing prices
  - Free / open market access, suppliers with direct link to consumers
  - More democratic structures – benefits for smaller companies
  - Flexible cooperation between different suppliers
  - Lower transaction costs (search, negotiation, settlement)
  - Simpler and more interactive systems for users
- Web is a strategic issue (at that time an academic statement)

Excursus: Early e-tourism Research Topics
European Research Program (1998)

- Interfaces for different context (non frequent users)
  - Intelligent Interface
- Different data sources with different formats and semantics
  - Interoperability, metadata models
- Distributed systems from planning to distribution
  - Mediated software / service architectures
- Merge TV, Web and mobile
  - New multimedia frameworks / applications

- Active research and development since early beginning
  - Analytical as well as constructive and applied
  - Challenge: combination of different disciplines and methods
The Take Off

- Tourism “really” electronic in late 90s
- Traditional players (TA, TO) were reluctant
- E-commerce facilitated consumer trends
  - More and shorter stays
  - Late decision
  - More personalized services with consumer integration and empowerment
- E-services developed from pure online presence over booking systems to consumer integration
- Today: well developed business landscape, high “penetration” on supply side and high user numbers
- Many new players

Several Generations in Few Years

- Goal: Establish Online Presence
- Goal: Customer Acquisition
- Goal: Customer Retention
- Goal: Customer Integration
- Goal: Customer Persuasion

1995 - 2015
Innovation

- In essence from outside, with two types:
  - Copying (or extending) existing services and players
    - Travel agents / tour operators (expedia)
    - Domain specific transaction / booking support - (bookings, airline systems)
  - New services
    - New market forms / negotiation / auctions (priceline, e-bay)
    - Search and compare (Google, trivago, checkfelix)
    - Community / user integration (tripadvisor, facebook)
    - Exchange / sharing (Airbnb)
Innovation – 2

- Disruptive innovation following a platform strategy
- Platform:
  - Technology & service opened for broader independent “ecosystem” of users & companies creating network effect;
  - Benefit from innovations from others, also competitors
- Focus on market transaction, do not “own” product

- Paradox: destination organizations, initially innovation leader, lost their position, despite being “network” organizers

Summary

- From customer focused to customer driven / Users are content & service providers (prosumer and user empowerment)
- Already in 2001 Not just business, also fun
- “Informatization” of value chains, market efficiency increased
- Services became commodities – deconstruction of value chain
  - Complex structure (dynamic network structures)
- At the same time concentration trend – Winners take it all
- Web: Evolution of order and disorder
- Issue: not process reengineering, but network engineering
- Chance for small companies: digital divide (geography and size)
Future Developments

- Further network effects (multi-sided markets) / concentration
- Commoditization of services with always new services on top
- Further segmentation and personalization
- Bundling vs. unbundling issue
- Total customer care (along transaction phases and different customer life cycles) vs. "do it yourself"
- Platforms will prevail:
  - Also in the P2P (sharing) markets
- Competition between electronic players will lead to blurring boundaries and to
  - Breadth of offering (coverage of further products, choice)
  - Richer interaction / recommendations (emotional based, implicit)
  - ……

Research Issues

- Using concept of Digital infrastructure with 5 layers (Werthner et al., 2015):
  1. Individual
  2. Group / social
  3. Corporate / enterprise
  4. Network / industry
  5. Government / policy layer (more principles!)

- Both service and technology view
Research Issues – 2

1. Individual
   - Counseling, recommendation, persuasion and enjoyment
   - Mobility, context awareness and service proactivity
   - Switch-off button

2. Group / social
   - Group decision making, also with ad hoc groups
   - Sharing group experience
   - Collaborative and sharing markets

3. Corporate / enterprise
   - From performance analysis to action (incl. innovation)
   - Rapid software development and implementation
   - Multi-channel incl. social platforms

4. Network / industry
   - Technology/innovation diffusion models
   - Analysis of network structure and dynamics
   - Cross platform approaches

Recommender Systems

- **Problem**: Selecting and proposing a tourism product (hotel, destination) and related services / products

- **Complexity**:
  - **User**: preferences (constraints on products), travel means, travel party, personality
  - **Product complexity**: product / service might be fuzzy; the same product might serve different needs (example: one or two bedroom); product is a bundle
  - **Data and knowledge**: tourism information repository complex ("models the world") and heterogeneous (data structure), distributed
  - **User interface**: ease different needs (browsing, searching, playing) of non-frequent users, probably not knowing the product terminology

- **Some issues**
  - Personality and preferences
  - Bundling
  - Group experience
1. Personality Based Approach

- Tourism (holiday) product emotional / non “rational”, and non every day product
- Non frequent users -> problem with users’ product preferences
- In addition, users might not be aware (not explicitly given)
- Distinguish between the user’s product dependent attributes (preferences) and user specific characteristics (e.g., personality)
- Complex user profile with at least two layers
  - Personality – user (“longer lasting”)
  - Preferences – product

Personality

Starting points

- Framework by Gibson and Yiannakis
  - Comprises 17 tourist roles such as Sun lover, Action seeker, Organized mass tourist, Explorer, ...
- “Big 5” personality traits
  - Extraversion, agreeableness, conscientiousness, neuroticism, and openness
- Survey (1.000 participants) relates tourist roles to personalities
- (Delic et al., 2015) show relation between personality and roles (“Sun lovers are nervous”)
- Factor analysis led to 7 factors (profile patterns), e.g.:
  - Connected and sun loving
  - Educational
  - Seeker
  - Culture loving
  - ...........
**Personality Elicitation**

- (Berger et al., 2007) show relation between pictures and roles
- (Neidhardt et al., 2014) relate pictures, personality and roles

- Use pictures for identifying / eliciting user profiles
- Based on these profiles system can offer specific products

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**Picture-based Search**

![Picture-based Search Image]

Werthner, 2016
You are ...

> Toby
> The independent traveler

- You like:
  - traditions, history, famous places, back to the roots, explore the meaning of life, self-organized traveling, planning your own route.
  - open-minded, a seeker, philosophical, sentiment a thinker, flexible, curious.
- You don’t like:
  - packaged vacations, crowded parties, artificial places, unappealing places.

But

- One must align products to personality dimensions
- In our case:

5,000 Destinations, 350 Attributes

50,000 Textual Descriptions of Hotels

Giata 100,000 Hotels 400 Attributes

Experts

Touristic Object

Mapping

Werthner, 2016
Mapping

Different approaches
1. Experts (10 „independent“)
2. Machine learning from text to identify concepts, to be matched to profiles
   • 50.000 hotels with description: in total 210.000 from 67 TO
3. Machine learning using hotel attributes to be used for mapping
   • GIATA provides 100.000 hotels with 400 attributes (e.g., stars, …)

- Experts work well, but .....  
- Machine learning works well for sunlover, but not for seeker, ...

- **Proof of concept**: in event sector purchase rate of e-mail marketing campaign increased by 60% (A/B test with 50.000 users)

2. Bundling

- Experience depends on bundle of items (product and service)

- **Bundling is a hard task**
  - Bundle assembled from a huge set of (pre-defined) components
  - Components may serve different needs
  - Specific connection points between components / complex interfaces w.r.t. profiles, preferences, space and time
  - Domain knowledge that rules out invalid assemblies

- Task is to find a composition of components that is valid w.r.t. all applicable restrictions
Attributes on two levels:
- Components: location, arrival and departure date, category, price, etc
- Bundle: function of components’ attributes: total travel time period, price

Bundle solution:
- Optimal, or a satisfying one
- Backtracking

3. From Individuals to Groups

- Tourism is a group experience
- Group: aggregation on profiles (complex: personality and preference) or on recommendations
- Group model has to take in consideration
  - Individual level - individual characteristics of members (personality and preferences)
  - Group level with group characteristics & composition
  - Network structure of group
  - Group dynamics (e.g., emotional contagion & conformity)
- Group decisions are a result of a process, built during a group discussion process
  - Opportunistic behavior? May depend on personality
- Evaluation framework to cover different levels
  - No ground truth
Short Note on Research Approaches

- Multidisciplinary and interdisciplinary, with different methods / paradigm
  - In Computer Science: formal, engineering, science
  - Methods from application domain and other sciences (e.g., Psychology)
  - Applications needed – especially issue of data driven “paradigm”

- Banerjee and Ceri (2015) see move from T-shaped to Pi-shaped model
  - T-shaped: domain specialization (vertical axis) with horizontal knowledge (i.e. general and cross-disciplinary competences)
  - Pi-shaped – another vertical competence: specific mathematical, statistical, and computational abilities

Conclusions

- Several forecasts were wrong, some issues are still open, but many developments were foreseen
- IT changed tourism (not only structure, also, e.g., tourism experience, counseling process)
- Further disruptive innovation: technology & service waves
- Innovation from outside
- Further concentration as well as new services
- Complexity will not decrease (structures & technology)
- Importance of research with Π shaped model
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Deconstruction of Value Chain

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Deconstruction of Value Chain – 2

Several Generations in Few Years

Goal: Establish Online Presence
Air, Hotel, Car
- Sites launch
- Online bookings begin (few)
- Distressed inventory emails start

Goal: Customer Acquisition
Air
- Personalization
- Direct booking “hubs” emerge
Hotel, Car
- Launch “next generation” sites
Cruise, Tour
- Launch info / service sites

Goal: Customer Retention
Air, Hotel, Car
- Broker portal tenancy deals
- Improve customer care
Cruise, Tour
- Target specific customer segments

Goal: Customer Integration
All sectors
- Communities
- Ratings and Blogs
- Wikis
- “Web 2.0”


Werthner, 2016