SYSTEMIC THINKING AND AUGMENTED REALITY: COMPLEXITY MANAGEMENT IN THE TOURISM INDUSTRY

September 14-15, 2018

Kalamata, GREECE.

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Tourism

Tourism

➤ Tourism has become one of the biggest industries in the world and can be deemed as an economic sector (Baggio, 2013).

➤ It is an industry that is growing rapidly internationally and regionally, and has a direct impact on economic, environmental and social aspects (Sinclair-Maragh & Gursoy, 2016).

➤ Tourism has become a driving force in sustainable development, encouraging many developing countries to promote tourism policies (World Tourism Organization [UNWTO], 2013).

Tourism

➤ Tourism has various positive influences on economic growth which can contribute to the creation of job opportunities, generate income for local people and motivate them to increase their production (Brouder, 2012).

Negative impacts

Tourism plays a significant role in CO_2 emissions by using transportation, accommodation and other facilities which make tourism one of the important contributors to climate change (Egilmez & Tatari, 2012; Law et al., 2012).
The presence of tourists in a destination leads to higher production of solid and liquid waste, which can cause serious problems for destinations that lack a suitable infrastructure.

Tourism Stakeholders

- Tourists
- Tour Operators/Travel Agencies/Tourist Offices
- Tourism employees, professionals and consultants
- Local Residents
- NGOs
- Accommodation
- Museums
- Libraries
- Monuments
- Archeological sites
- Municipalities/Local Authorities
- Post offices
- Banks
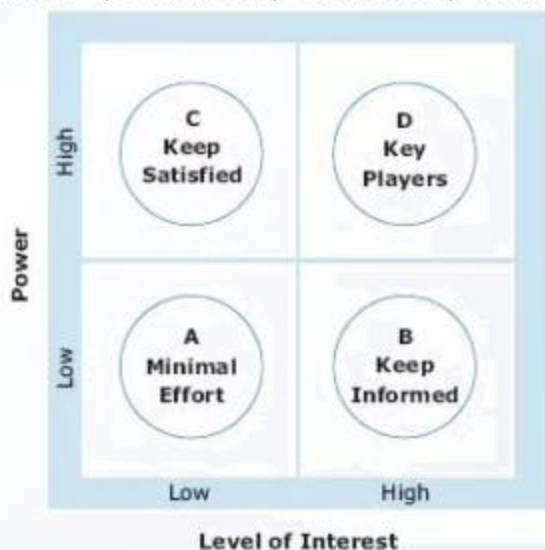- Eating
- Amusement
- Calendar of Events
- etc.

Important: Not all the stakeholders have equal power and interest in a particular tourism project.

Therefore: Planners have to identify the most important stakeholders in tourism development so that they can devise an appropriate communication strategy.
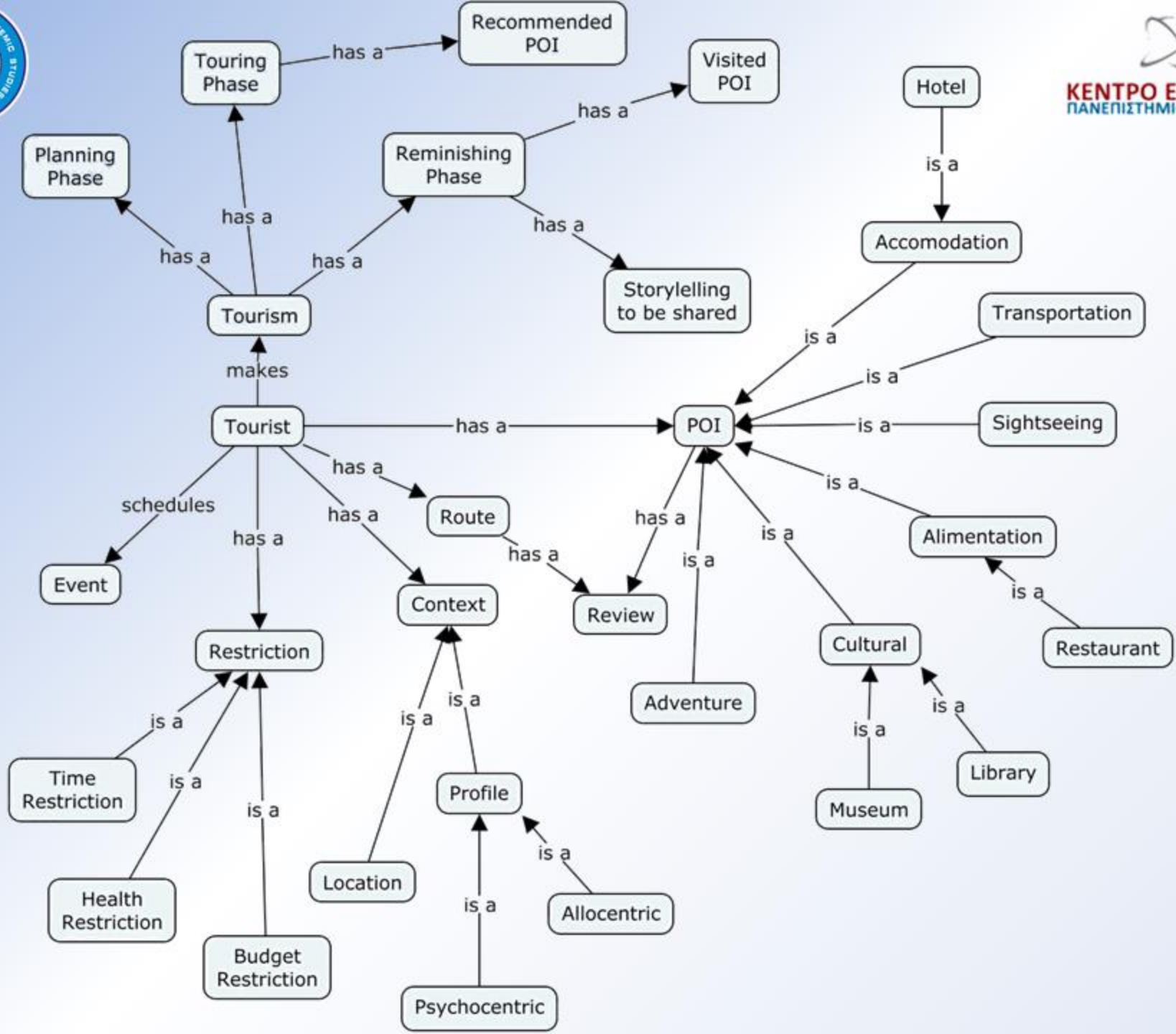
Definition of stakeholder mapping/analysis

Stakeholder mapping/analysis is the process of understanding the stakeholders. It identifies stakeholder expectations and power and helps business planners in understanding political priorities (Johnson, Scholes, and Whittington, 2006).

Stakeholder map:

		Level of Interest	
		Low	**High**
Power	**High**	C Keep Satisfied	D Key Players
	Low	A Minimal Effort	B Keep Informed

(Johnson, Scholes, and Whittington, 2006)

Tourism ontology

Tourism industry complexity & variety engineering

Tourism industry complexity & Systems Thinking

The high quality maintenance of a destination requires:

The observation and control of the activities and elements of the place.

This can be a difficult task since tourism destinations:

- Are complex systems,
- Have numerous interactions between the sectors operating within the destinations,
- There are multiple stakeholders, with varied and at times conflicting interests.

The complexity of the problems in tourism systems emerges from:

- The variety of interests of the different stakeholders
- The dynamic and non-linear nature of the interactions between the different components of the systems.

# Tourism industry complexity & Systems Thinking

What we need

A holistic, well-managed and systematic plan
in order
to develop and promote the destination as a whole
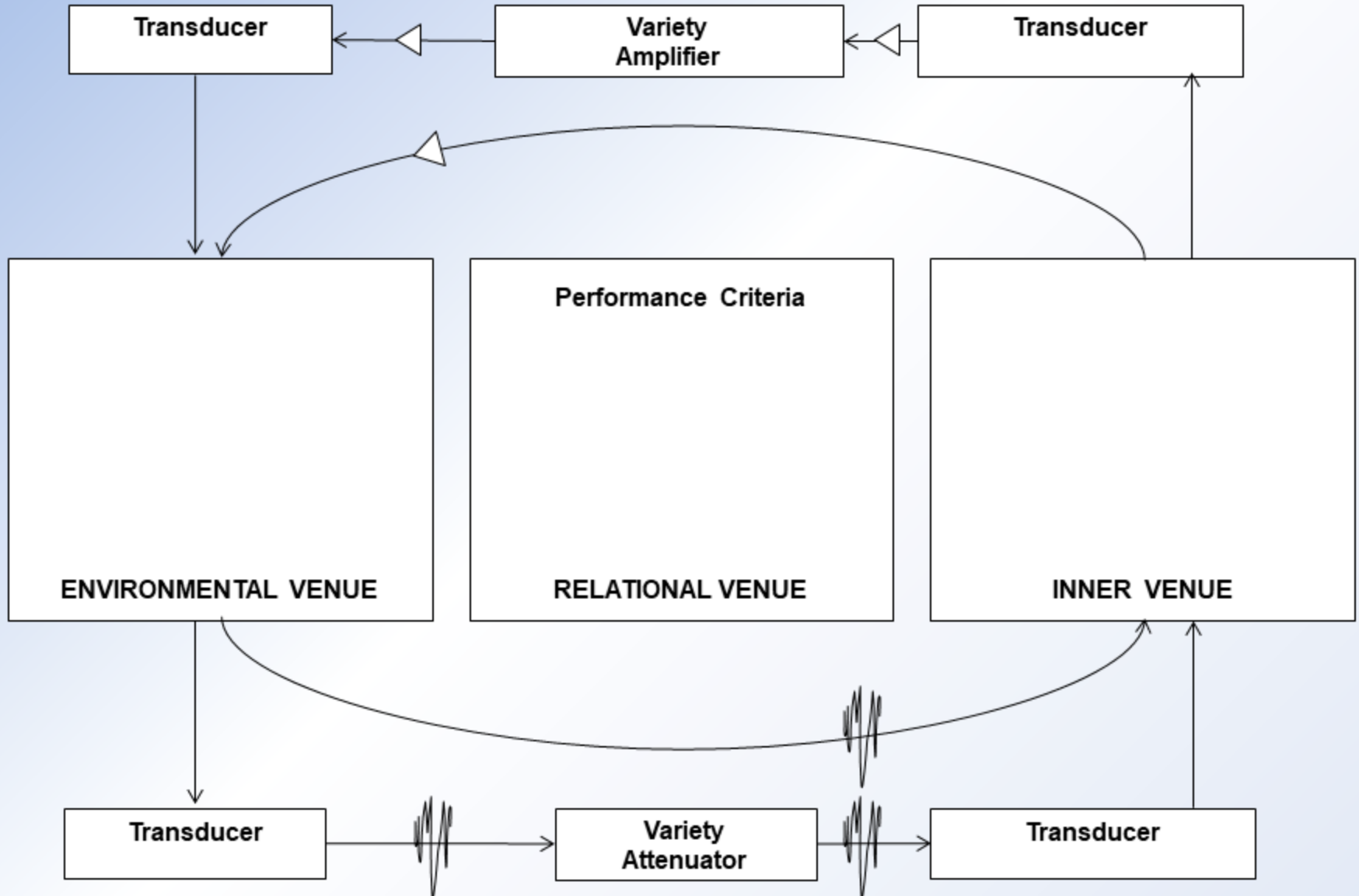and to ensure its sustainability.

Methodology

Systems thinking and a holistic approach is the most appropriate methodology to promote understanding of tourism and tourism systems on the grounds that the components of tourism interact with each other and offer the same end product as attraction and experience for tourists.

Simulation Modeling (SD or AB) may be used to capture and analyze the dynamic and complex nature of systems.
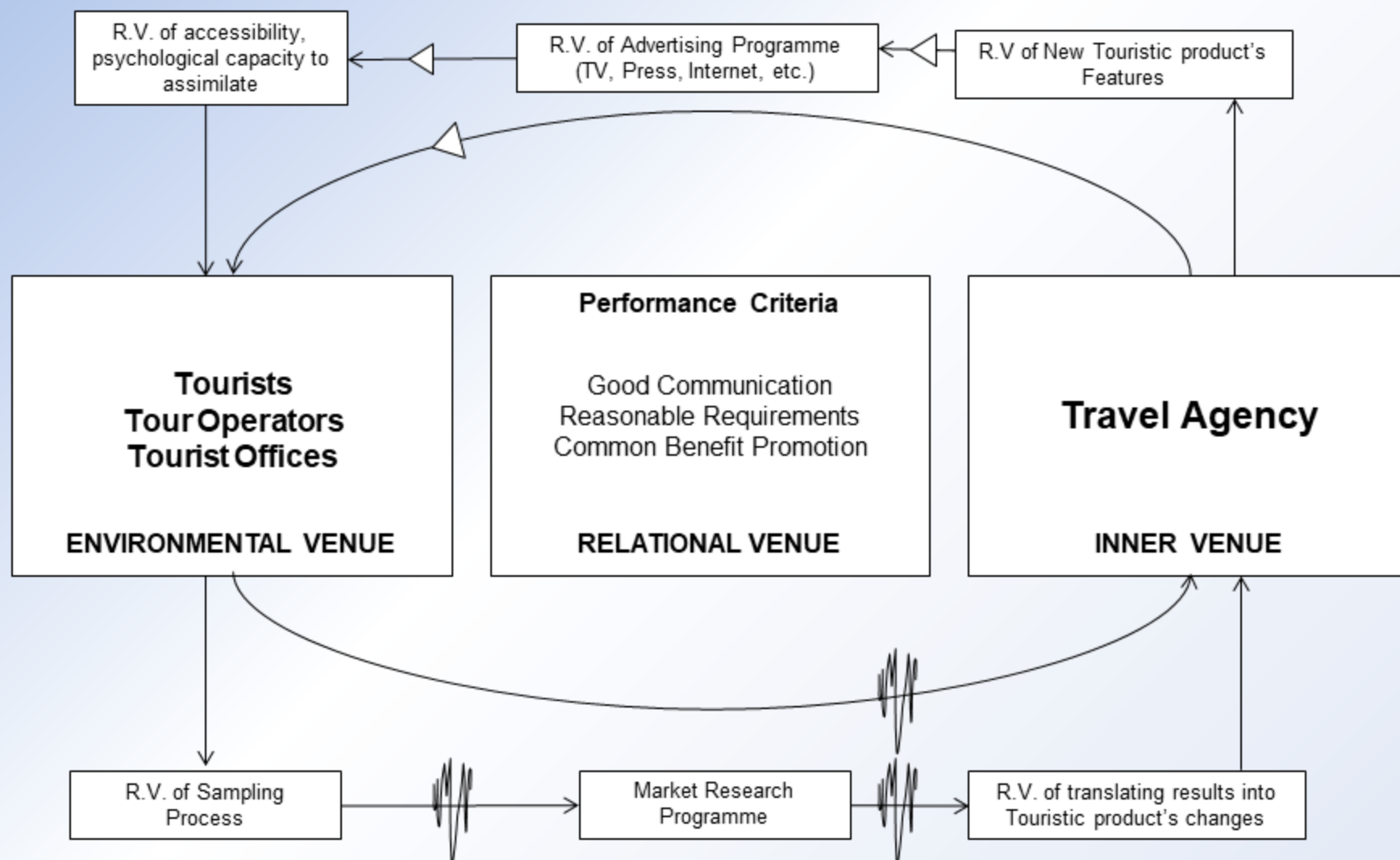
Variety engineering
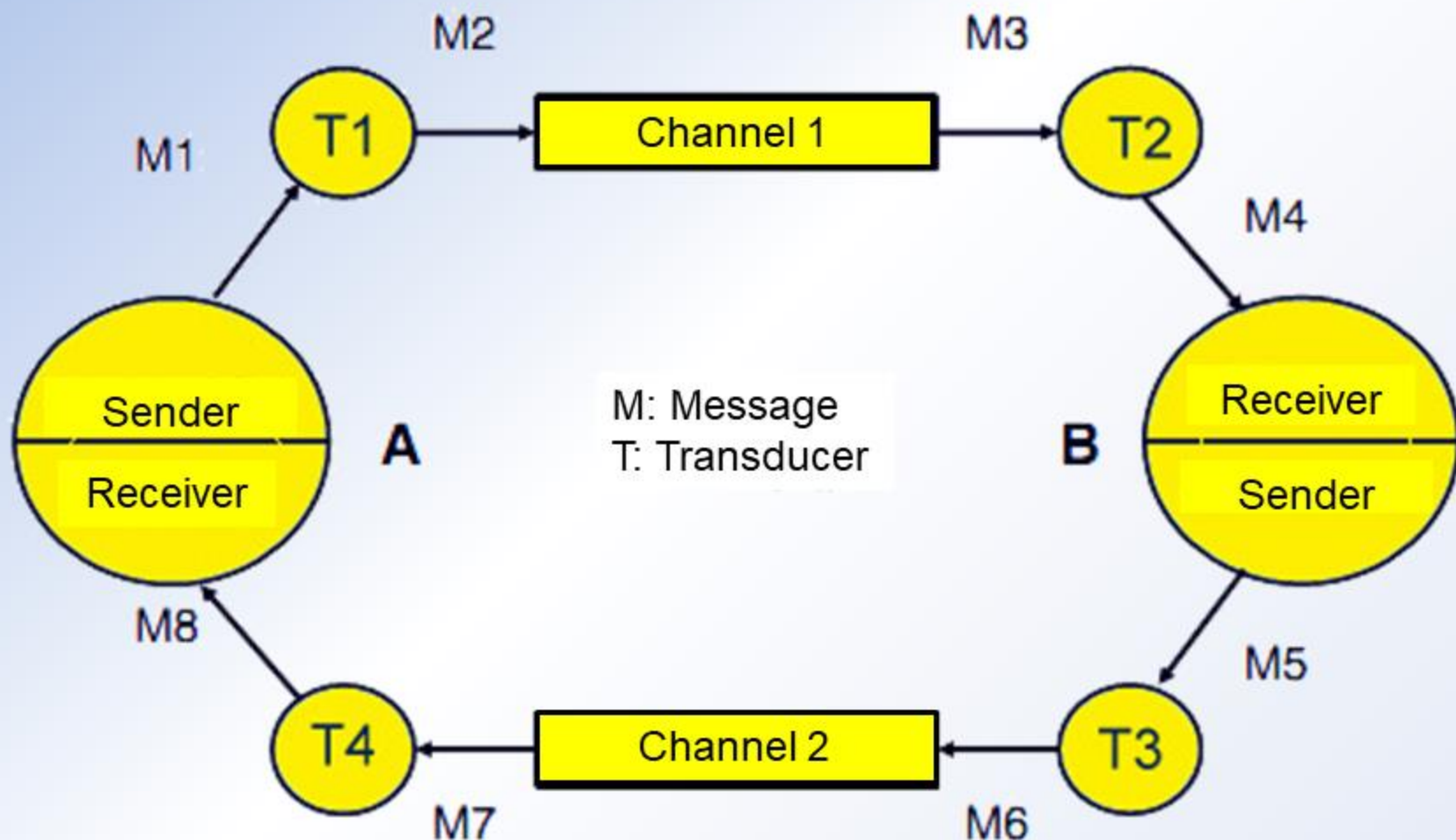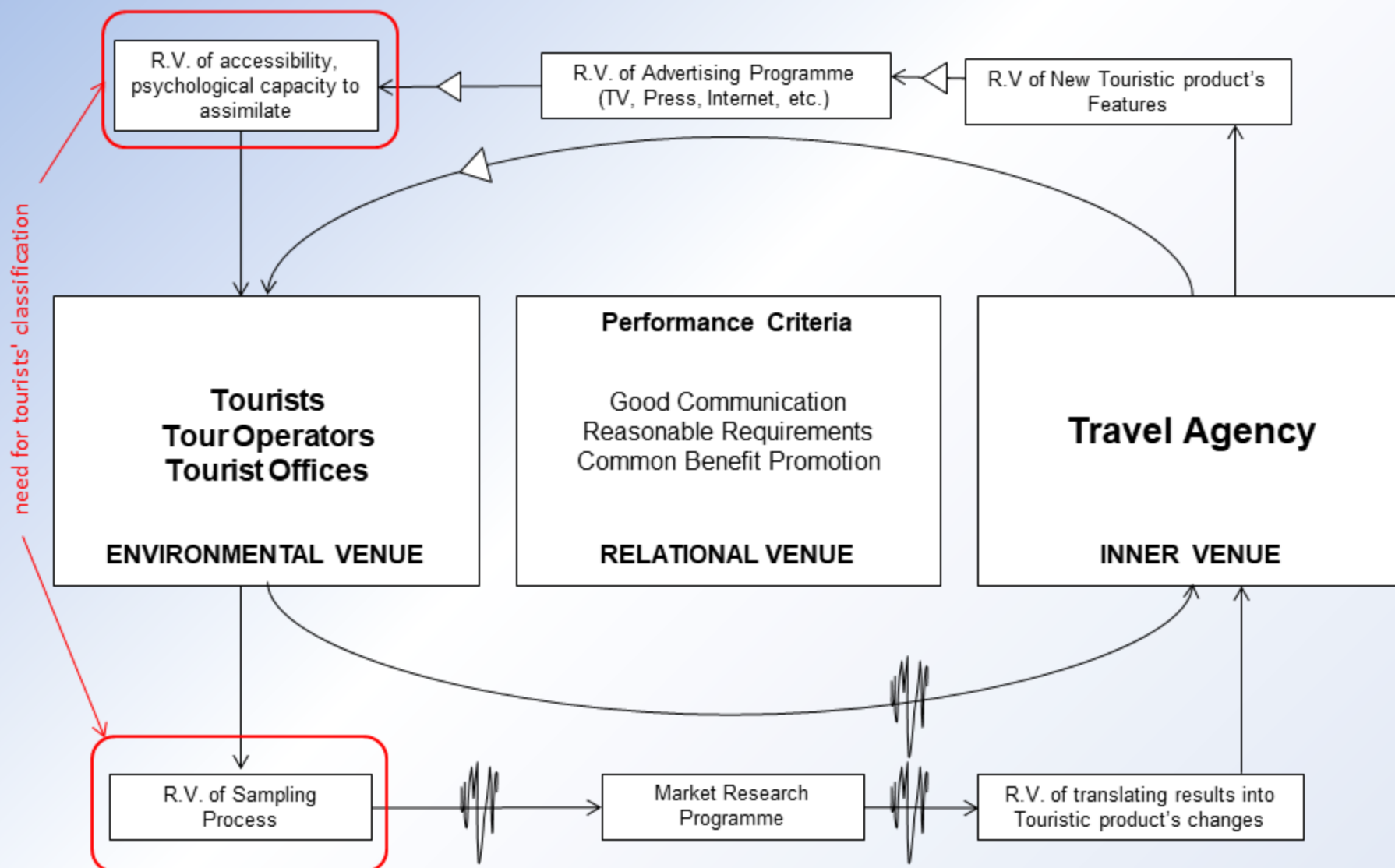
Variety engineering (Modified from Beer 1985)

Variety engineering (Modified from Beer 1985)

Variety engineering (Modified from Beer 1985)

need for tourists' classification

R.V. of accessibility, psychological capacity to assimilate

R.V. of Advertising Programme (TV, Press, Internet, etc.)

R.V of New Touristic product's Features

Tourists
Tour Operators
Tourist Offices

ENVIRONMENTAL VENUE

Performance Criteria

Good Communication
Reasonable Requirements
Common Benefit Promotion

RELATIONAL VENUE

Travel Agency

INNER VENUE

R.V. of Sampling Process

Market Research Programme

R.V. of translating results into Touristic product's changes

Tourists' classification

Tourist Typologies

• The classifications of tourists based on their behavior.

• Its number has grown over the years

• These typologies serve as guide to tourism business owners as to what products, services and facilities should be sold to certain tourists having the same behavior.

• Marketers and planners as well as managers of tourism businesses consider these typologies to guide their marketing, planning, development and management functions.

Importance of Typology

•Represents an attempt to increase our knowledge of consumer behavior in tourism.

•Can help marketers make important decisions on product development, pricing, promotional media and distribution channels.

•May form the basis of market segmentation techniques.

•Might potentially, help to predict future trends in tourist behavior.

Tourists' classification

Cohen (1972)

Institutionalized tourists :

• *The organized mass tourist* who buys a package holiday to a popular destination and largely prefers to travel around with a large group of other tourists.

• *The individual mass tourist* buys a looser package that allows more freedom.

Non-institutionalized tourists:

• *The explorer* makes his or her own travel arrangements and sets out, consciously, to avoid contact with other tourists.

• *The drifter* tries to become accepted, albeit temporarily, as part of the local community. Drifters have no planned itinerary and choose destinations and accommodation on a whim.

Tourists' classification

Plog (1977)

- directly linked personality traits with tourist behavior.
- divided people into -

1. Psychocentrics
   - Less adventurous, inward-looking people.
   - They tend to prefer the familiar and have a preference for resorts which are already popular.

2. Allocentrics
   - They are outward-looking people
   - They like to take risks and seek more adventurous holidays.

- suggested a number of intermediate categories such as

   1. near-psychocentrics,
   2. mod-centrics
   3. near-allocentrics

Tourists' classification

Perreault, Dorden and Dorden (1979)

1.*Budget travelers*
- medium incomes
- Looking for low-cost vacations

2.*Adventurous tourists*
- well educated and affluent
- with a preference for adventurous holidays

3.*Homebody tourists*
- cautious people who took holidays
- they do not discuss their vacation with other people
- they do not spend a lot of time planning it.

4.*Vacationers*
- a small group who spend a lot of time thinking about their next holiday
- they tend to be active people in lower paid jobs

5.*Moderates*
- They have a high predisposition to travel
- They are not interested in weekend breaks or sports.

Tourists' classification

Cohen (1979)

- *The recreational tourist*
    the emphasis is on physical recreation

- *The diversionary tourist*
    seeks ways of forgetting their everyday life at home

- *The experiential tourist*
    looks for authentic experiences

- *The experimental tourist*
    his main desire is to be in contact with local people

- *The existential tourist*
    wants to become totally immerse in the culture and lifestyles of the vacation destination.

Westvlaams Ekonomisch Studiebureau (1986)

1. Active sea lovers

2. Contact-minded holiday-makers

3. Nature viewers

4. Rest-seekers

5. Discoverers

6. Family-orientated sun and sea lovers

7. Traditionalists

Tourists' classification

Dalen (1989)

- *Modern materialists*
  - They like getting a tan, partying and are more concerned with drink than food

- *Modern idealists*
  - They like excitement and entertainment but want to be more intellectual than the modern materialists.
  - They do not want mass tourism or fixed itineraries.

- *Traditional idealists*
  - They demand quality, culture, heritage, famous places, peace and security.

- *Traditional materialists*
  - They look for special offers and low prices
  - They have a strong concern with personal security.

Tourists' classification

Gallup and American Express (1989)

1.Adventurers
- They are independent and confident
- They like to try new activities.

2.Worriers
- They worry about the stress of travel and their safety and security while on holiday.

3.Dreamers
- They are fascinated by the idea of travel
- They read and talk a lot about their travel experiences and different destinations.

4.Economizers
- They see travel as a routine opportunity for relaxation rather than as a special part of their life
- They want to enjoy holidays at the lowest possible price.

5.Indulgers
- They want to be pampered when they are on holiday.

Tourists' classification

Smith (1989)

1.Explorers

a small group who travel almost as anthropologists.

2.Elite tourists

experienced frequent travelers who like expensive tailor-made tours.

3.Off-beat tourists

aim to get away from other tourists.

4.Unusual tourists

make side trips from organized tours to experience local culture.

5.Incipient mass

tourists travel to established destinations where tourism is not yet totally dominant.

6.Mass tourists

expect the same things they are used to at home.

7.Charter tourists

have little or no interest in the destination itself providing that the holiday gives them the entertainment and standards of food and accommodation they expect.

Comparison of typologies

• Most of the typologies attempt to group tourists together on the basis of :

    1.Destinations

    2.Activities while on holiday

    3.Independent travel versus package holidays.

Tourist Market Segmentation

Type	Based on	Comments
Geographic	geographical factors (their location)	Widely used in tourism (Tour operators, Airlines, etc.) Identifies **WHERE** the market is
Demographic	demographic factors (Age, Sex, Ethnicity, Religion, Occupation, etc.)	Particularly popular in tourism Identifies **WHO** the market is
Socioeconomic	socioeconomic variables the JICNAR's classification	Joint Industry Committee for National Readership
Psychographic	the idea that the lifestyles, attitudes, opinions and personalities of people determine their behavior as consumers	Identifies **HOW** and **WHY** the targeted market buys (social class, Lifestyle, personality characteristics)
Behavioristic	Consumer - relationship with a particular product	Budget tour operators, airlines and hotel chains promote services to consumers whose main 'benefit sought' is economy.

Augmenting Reality

Tourism and Technology

"The tourism industry is currently in need of technology-based integrated value added services, which are highly dynamic and offer interactivity and entertainment."
(Garcia. Crespo)

Tourism and Technology

Tourists use mobile devices before, during and after their holidays to:

- retrieve geographic information
- mediate tourist sites
- share experiences in social networks

Most mobile phones:

- ✓ are already sold with GPS capability
- ✓ have the potential of becoming personalized tour guides
- ✓ have the ability to respond to a request for information about a particular object in the language and level of detail the tourist wants.

On returning from a trip, reminiscing ensues:

- ➢ travelers recall the highlights
- ➢ share trip information with relatives and friends
- ➢ they want to comment on places they have visited.

Hence,

There is a need to support creation of a personal electronic trip album

so that the traveler can

- ✓ relive and share memories
- ✓ increase tourism through this electronic variation of word of mouth.

Also, by adapting the book review model of Amazon and following feedback sites, tourists should have a <u>convenient method of sharing their thoughts with those planning a trip</u>.

Augmented Reality (AR)

AR is a visualization technique that superimposes computer generated data, such as text, video, graphics, GPS data and other multimedia formats, **on top of the real-world view**, as captured from the camera of a computer, a mobile phone or other devices **creating an environment in which real world and virtual world objects are presented together within a single display.**

✓ AR can augment one's view and transform it with the help of a computer or a mobile device, enhancing the user's perception of reality and of the surrounding environment.

✓ Within an AR-enhanced context, information becomes interactive and easily manipulated in a digital manner.

Augmented Reality (AR)

The **core idea** behind AR is overlaying computer generated graphics on top of the real world scenes to create a seamless spatially-registered environment.

The **main goal** of AR is providing applications and programs to the users that brings virtual information to their immediate surroundings and also to any indirect view of the real-world environment.
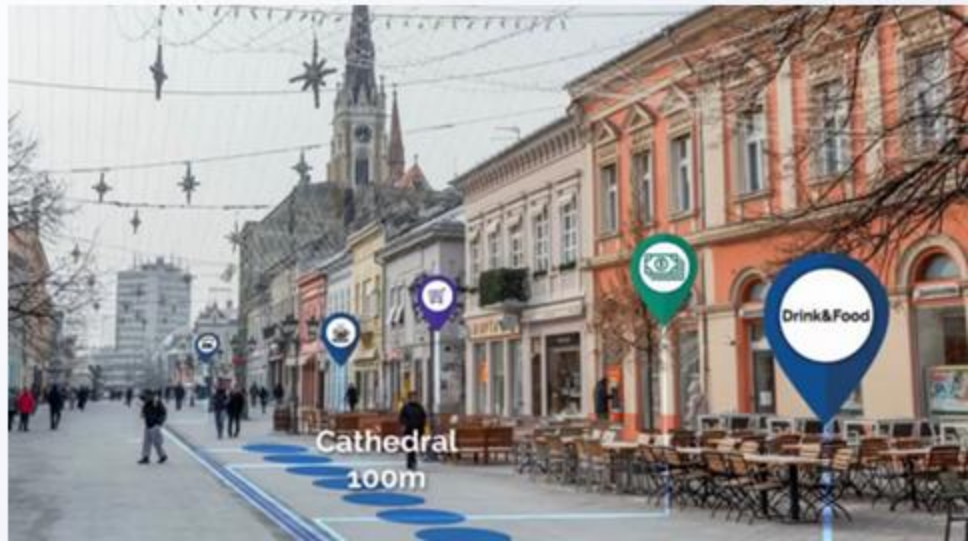
Augmented Reality (AR)

AR technology, among other fields, is also used within the **tourism sector**, aiming to improve the **tourist experience**.

The main characteristics of AR systems that are important in tourism application include:

      (a) Mixing physical environments and virtual information;

      (b) 3D reflection;

      (c) Real time interaction.

Augmented Reality (AR)

AR systems have the ability to:

(a) annotate neighboring environments for tourists

(b) navigate international tourist as an e-guide at museums

(c) augment city guides that deliver entirely novel experience for tourists

(d) send out the knowledge about heritage assets via specific AR application

(e) create location-aware itinerary for travel destinations.
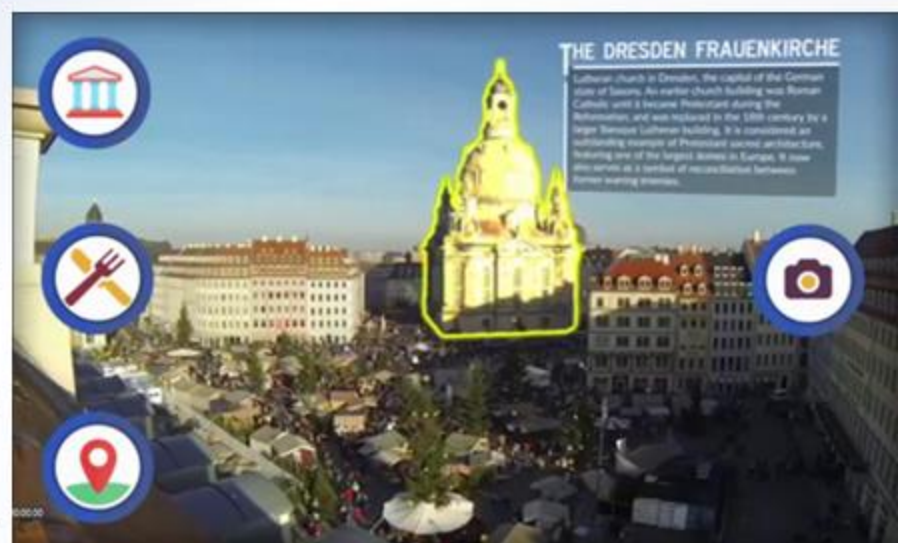
This way, AR systems:

- Can help tourists to re-live historic life and events
- They have the strengths of developing enjoyable holiday trips through the integration of AR gaming
- They provide opportunities for tourists to become familiar with unknown areas in an enjoyable and educational manner.

Augmented Reality (AR)

In addition, AR systems:

✓ Can aid tourist organizations and professionals towards reaching a wider audience by serving as the delivery technology of appealing multimedia content and mobile applications, **fine-tuned to various knowledge levels.**

✓ Can help tourists in accessing valuable information and improving their knowledge regarding a touristic attraction or a destination, while enhancing the tourist experience and offering increased levels of entertainment throughout the process.

✓ Are able to personalize the delivery of the multimedia content **according to the user's characteristics and the use context**, thus supporting their deployment for a number of scenarios.

Mobile Augmented Reality (MAR)

Mobile Augmented Reality (MAR) expands the set of services that AR offers to include a wide range of scenarios **in the rich diversity of the mobile environments.**

MAR starts with reality itself and then augments it by overlaying digital information on top of the real world.

Using a display, such as a mobile phone or a tablet, users may see a live view of the world surrounding them, augmented with digital annotations, graphics and other information superimposed upon it.

- It is very usable
- It enhances the traditional user experience while interacting with a mobile device.

Mobile Augmented Reality (MAR)

How it works:

In a typical GPS-based smartphone AR application for outdoor use, the user points the device towards the surrounding physical objects and is then able to see additional virtual information overlaid on top of the real world camera view through virtual annotations.

Although the type of content and amount of information within the virtual annotations varies amongst applications it may include:

- Video
- Images
- text
- symbols for different types of landmarks

Available data include

- descriptions of tourist attractions
- restaurants
- monuments

Augmented Reality (AR) -benefits in the Tourism and Hospitality industry

- Effective Planning and Suitable Management

- Effective Entertainment Tool

- Education Tool

- Virtual Attractions at Effective Cost

- Interactive Dining Experience

- Convenient Translation Capabilities

- Real Time and Reliable Navigation

- Booking Rooms

- Exploring the property

- Experience of Rich luxurious Restaurants

- Local attractions

- Marketing

- Hotel Management

Mobile Augmented Reality (MAR)

MAR applications:

- The potential for MAR in tourism
- They provide the opportunity to tourism organizations and destinations to provide a large amount of relevant tourist information in a different form than simply checking online sources or travel guides, thus enhancing the overall tourism experience.

From a business standpoint MAR:

- Can influence the marketing of travel destinations and reach more customers by enhancing their travel experiences.
- Are ideal tools for guiding tourists through unfamiliar environments and providing useful information about them.
- May assist destination-marketing organizations to gain competitive advantage through the use of advanced information technologies
- Can lead to strong destination branding and reach more tourists because of their advanced marketing-related capabilities.

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Χαρακτηριστικά σε πλατφόρμες Τουριστικών Εφαρμογών

Tourism Apps' Characteristics	Tourism Apps									
	3Dguides	Congregate	City Maps2Go	Tourias	mtrip	Map2app	Citymapper	izi.travel	stay.com	Locatify
2D and 3D menu	1	1	0	0	0	0	0	0	0	0
Ability to present nearby attractions	1	1	0	1	1	0	0	0	1	0
Beacon Support	0	1	0	0	0	0	0	0	0	0
Creation of location based on gamification features	1	1	0	0	0	0	0	1	0	1
Online and offline maps	1	1	1	0	1	1	0	1	1	1
Suggested routes	1	1	1	0	1	1	1	1	1	0
3D representations of attractions or entire areas	1	1	0	0	0	0	0	0	0	0
Reccomended attractions	1	1	1	0	0	1	1	1	1	0
social media integration	1	1	1	0	0	0	1	1	1	1
Use Augmented Reality on selected attractions	1	1	0	0	1	0	0	1	0	0
Create your own routes	1	1	1	1	1	1	1	1	1	1
Travel content for websites and apps (XML format)	0	0	0	1	1	1	1	1	0	0
SDK for integration	1	1	1	1	1	0	1	1	0	0
Calendar of events	0	1	0	0	1	0	0	0	0	0
Coupons & vouchers	0	1	0	0	1	0	0	0	0	1
Poush notifications-promote an event, a place, a special offer	0	1	0	0	1	0	0	0	0	1
Advertisements	0	1	0	0	1	0	0	0	0	1
Booking	0	0	0	0	1	0	0	0	0	0
Analytics	0	1	0	0	0	0	0	0	0	0
Third Party Culture Content	0	1	0	0	0	0	0	0	0	0
AudioGuides	0	1	0	0	0	1	0	1	0	1

Complexity management

However, **information overload** can occur when tourists are overwhelmed by the transmitted information regarding:
- historical sites
- museum exhibitions
- the pace of the navigation
- etc.

Information overload's effect further increases when the user considers the information:
- redundant or
- beyond her/his particular knowledge level.

In addition to information overload, issues like:
- environmental fuzziness
- geographical consciousness
- irrelevant information
- etc.

are factors which **increase the perceived complexity** of an individual tourist and leads to vast difference in the end tourism experience formed by the respective tourist.

Complexity management

Complexity management

A mobile AR application, being highly portable:
- ✓ Can function as a tourist guide that delivers information upon request
  - minimizing the effect of information overload
  - minimizing the effect of irrelevant information.
- ✓ Is particularly beneficial for:
  - museums
  - heritage sites
  - cities
  - tourist professionals

because it is possible to organize and transmit information in layers.

The information can also be organized according to the users' requests, which suggests that the **user's profile** may be used to organize the information according to the user's:
- knowledge level and interests
- Age
- Profession
- and so forth

Thus, tourists can get **customized** services **according to their preferences and expectations**, resulting in a much more memorable experience.

Complexity management

Within this context, mobile augmented reality (AR) technology is perceived as capable in:

- Narrowing the gap between the formation of pleasant experience and the issue of geographical consciousness
- Preventing tourists from information overload or irrelevant information by tailoring their needs and adjusting the settings of the applications they are using upon request

Thus

- transforming the way tourist interact with the destination
- acting as a **variety attenuator for all stakeholders**

Reducing the perceived complexity and maximizing the satisfaction gained from the tourists' visit and the services **tailored to the stakeholders' particular needs**.

This is the behavior of a **variety attenuator**.

Simulation Modeling

Simulation Modeling – Model Description

The model describes a tourist application diffusion process. Potential Users of the application are affected to install the application by advertising and word-of-mouth from Users - those who have installed the application. Acceptance driven by mouth-to-mouth propagation is like an epidemic. Potential Users come into contact with Users through social interactions. A fraction of these contacts results in the installation of the new application. Advertising causes a constant fraction of the potential user population to accept the product at any time.

Two User Profiles (User A and User B) are then created and the way the application is deployed depends on its supported features and the required features from the User profiles.

In any case, it is possible for each User, after a reasonable time, to reject the application and re-conduct a market survey.

Simulation Modeling – The Model

Simulation Modeling – The Model

Simulation Modeling – Model Run

Thank you
for yor attention

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