Ultimate transformation: How will automation technologies disrupt the tourism industry?

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Robots have arrived ...

Source: http://vignette4.wikia.nocookie.net/starwars/images/c/c8/Counterparts.jpg

Application of robots, AI and automation technologies:

- Manufacturing
Application of robots, AI and automation technologies:

- Warehousing, supply and logistics

![Image of warehouse robot](http://spectrum.ieee.org/automaton/robotics/industrial-robots/german-warehouse-robots-taskie-picking-tasks)

Application of robots, AI and automation technologies:

- Agriculture

![Image of agricultural robot](http://sparc-robotics.eu/wp-content/uploads/2014/05/polni-robot-amazona-boredb-44e031.jpg)

Application of robots, AI and automation technologies:

- Transportation / Self-driving cars

![Image of self-driving car](http://www.google.com/selfdrivingcar/images/home-where.jpg)

Application of robots, AI and automation technologies:

- Medicine

![Image of medical robot](http://vignette3.wikia.nocookie.net/robotics/images/2/21/Medical_robot.jpg/revision/latest?cb=20140602041221)
Application of robots, AI and automation technologies:

• Warfare


Application of robots, AI and automation technologies:

• Legal services

http://www.kurzweilai.net/will-ai-replace-judges-and-lawyers

Application of robots, AI and automation technologies:

• Households


Application of robots, AI and automation technologies:

• Swimming pools

Application of robots, AI and automation technologies:

- Guards

Application of robots, AI and automation technologies:

- Information provision in service industries

Application of robots, AI and automation technologies:

- Search engines
Application of robots, AI and automation technologies:

- Social media chatbots
  
  ![Image of chatbot](http://static3.businessinsider.com/image/581cd80d46e27a2e008b4cf3-1920/fintech-ecosystem-diagram.png)

Application of robots, AI and automation technologies:

- Finance
  
  ![Image of fintech ecosystem](http://static3.businessinsider.com/image/581cd80d46e27a2e008b4cf3-1920/fintech-ecosystem-diagram.png)

Application of robots, AI and automation technologies:

- E-commerce
  
  ![Image of Amazon](https://www.amazon.com)

Application of robots, AI and automation technologies:

- Sex services

  ![Image of sex services](https://www.shutterstock.com)

Credit: Willyam Bradberry | Shutterstock
What about tourism and hospitality?

Application of robots, AI and automation technologies:

• Hotels
Application of robots, AI and automation technologies:

• **Hotels**

![Hotel Image](http://www.h-n-h.jp/assets/images/facility_img_01.jpg)

Photo credit: Stanislav Ivanov

Application of robots, AI and automation technologies:

• **Restaurant**

![Restaurant Image](https://www.masato.com/)

Photo credit: Stanislav Ivanov

Application of robots, AI and automation technologies:

• **Restaurants**

![Restaurant Image](https://www.masato.com/)

Photo credit: Katerina Berezina

Application of robots, AI and automation technologies:

• **Restaurants**

![Restaurant Image](https://www.masato.com/)

Photo credit: Katerina Berezina
Application of robots, AI and automation technologies:

- Meetings and events


Application of robots, AI and automation technologies:

- Meetings and events


Application of robots, AI and automation technologies:

- Theme and amusement parks

Photo credit: Stanislav Ivanov

Application of robots, AI and automation technologies:

- Airports and other transport stations

Photo credit: Nicolaus Kund

Photo credit: Stanislav Ivanov
Application of robots, AI and automation technologies:

- **Travel agencies and Tourist information centres**

[Photo credit: Stanislav Ivanov](https://stanislavivanov.com)

Application of robots, AI and automation technologies:

- **Museums and art galleries**

[https://www.nytimes.com/2017/03/14/arts/design/museums-experiment-with-robots-as-guides.html?_r=0](https://www.nytimes.com/2017/03/14/arts/design/museums-experiment-with-robots-as-guides.html?_r=0)

Application of robots, AI and automation technologies:

- **Digital assistants**

[Introducing *echo show*]

Now Alexa can show you things

[Stanislav Ivanov](https://stanislavivanov.com)

Application of robots, AI and automation technologies:

- **Chatbots**

[https://media.licdn.com/media/AAEAAQAAAAAAAAA_AAAAJDgwY2M2MTMxLmN2ZTU2MDKOCmMDZXW5YWzZGQWAE5mNg.png](https://media.licdn.com/media/AAEAAQAAAAAAAAA_AAAAJDgwY2M2MTMxLmN2ZTU2MDKOCmMDZXW5YWzZGQWAE5mNg.png)
Adoption of robots and service automation in tourism

- Car rental

Five simple steps to Zipcar freedom:

1. **Join**: Apply online. Once approved, we’ll send you a Zipcard to access vehicles worldwide.
2. **Reserve**: Find a Zipcar near you and reserve it for the time you need, whether it’s for as little as one hour or as long as 7 days.
3. **Unlock**: When it’s time for your reservation, unlock your car using your Zipcard. The keys are inside the car.
4. **Drive**: Take your Zipcar wherever you want for the time you reserved. Extend it in the mobile app or by text message if needed.
5. **Return**: Drop off your Zipcar in the designated parking spot. Lock up with the app or your Zipcard, and you’re done!

http://www.zipcar.com/how

In robots we trust!

**Why robots?**

- Robots could work 24/7
- Robots could implement various tasks and expand their scope with software and hardware upgrades
- Robots could provide constant or improving quality of their work
- Robots could fulfil their work correctly and in a timely manner
- Robots could do routine work repeatedly
- Robots do not complain, get ill, go on strikes, spread rumors, discriminate, quit their job without notice, show negative emotions, shirk from work

**Why not robots?**

- Robots lack creativity
- Robots will not be any time soon completely independent of human supervision
- Robots lack personal approach
- Robots can orientate in structured situations (at least for the moment)
- Robots may (will) be perceived as threat by human employees (e.g. Neo-Luddism movement)
How will RAISA technologies disrupt the tourism industry?

**OPERATIONS**

**Impacts of RAISA technologies**

**Operations**
- *Service is delivered by* a robot, computer programme, a kiosk, a vending machine or another non-human agent
- *Increased service capacity* of tourism companies – more customers can be served simultaneously and for a particular period of time > *increased productivity*
- *Easier scheduling and planning of operations* – robots work 24/7, they do not get ill, complain, shirk from work, etc.
Impacts of RAISA technologies

**Operations**

- **Reengineering of service delivery processes** – new processes, activities, procedures, controls, new service operations manuals
- **Increased role of the customer in the service delivery** > prosumer (=“producer” + “consumer”) > co-creation of value
- **Improved environmental sustainability** of operations – reduced use of resources, reduced waste, elimination of unnecessary activities, etc.
- **Decreased flexibility of the service delivery system**

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**Types of robots to use the facilities of service companies**

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Stationary</th>
<th>Mobile (wheeled, legged, flying, underwater)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Front desk robots</td>
<td>Security robots</td>
</tr>
<tr>
<td></td>
<td>Robot chef/Cooking robots</td>
<td>Robot guides</td>
</tr>
<tr>
<td></td>
<td>Robot baristas</td>
<td>Robot waiters</td>
</tr>
<tr>
<td></td>
<td>Robot bartenders</td>
<td>Companion/sex robots</td>
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<tr>
<td></td>
<td>Shoe shine machines</td>
<td>Pet robots</td>
</tr>
<tr>
<td></td>
<td>ATMs</td>
<td>Robotic luggage carts</td>
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<tr>
<td></td>
<td>Concierge service robots</td>
<td>Room service deliver robots</td>
</tr>
<tr>
<td></td>
<td>Security robots</td>
<td>Robotic vacuum cleaners</td>
</tr>
<tr>
<td></td>
<td>Massage robots</td>
<td>Robotic lawn mowers</td>
</tr>
<tr>
<td>Customer</td>
<td>(Customers are unlikely to bring stationary robots to hospitality industries, in most situations, apart from extended stay facilities)</td>
<td>Robotic pool cleaners</td>
</tr>
<tr>
<td></td>
<td>Companion/sex robots</td>
<td>Delivery drones</td>
</tr>
<tr>
<td></td>
<td>Pet robots</td>
<td>Entertainment robots</td>
</tr>
<tr>
<td></td>
<td>Concierge service robots</td>
<td>General service robots</td>
</tr>
</tbody>
</table>

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**Robot-friendly/robot-inclusive environment (1)**

- Tan, Mohan & Watanabe (2016) develop a theoretical framework for robot-inclusive environments which includes two spectra: *level of autonomy of a mobile robot* and *robot-inclusiveness of the environment* in which the robot operates.
- The authors define the robot-inclusiveness as how much the design of the environment takes into account the robot therein, i.e. whether it helps the robot fulfil its tasks.

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How will RAISA technologies disrupt the tourism industry?

**HOSPITALITY FACILITIES DESIGN**
Robot-friendly/robot-inclusive environment (2)

- The design of the premises where the robot needs to operate in, their cleanliness, tidiness, signage, lightning, noise, physical barriers (e.g. doors, doorsteps, stairs), presence of people and dynamic of the environment, presence/lack of predetermined routes for robot movement, presence/lack of (artificial) landmarks and sensors to help robot navigation, etc., all determine the degree to which the environment assists the robot fulfil its tasks – e.g. to deliver the food to the hotel room, to cut the grass in the garden, or to accompany the passengers to the airport gate.

When the environment is more robot-inclusive, then the same task can be performed by a less intelligent robot and vice versa: an environment that is not robot-friendly would require a more intelligent robot to navigate through it.

Key considerations in robot-friendly facilities design for service companies

- External physical accessibility of the premises
- Internal physical accessibility of the premises
- Digital map of facilities for robot navigation
- Landing pads for drones
- Shape and surface materials used for the pool
- Safety and security issues
- Recognition of staff, guests, delivery service, and others
- Power-related issues
- Rental facilities for robots
- Repair facilities for robots
- Liability insurance for robots

Robot-friendliness of hospitality facilities will be a new competitive advantage for travel, tourism and hospitality companies!
How will RAISA technologies disrupt the tourism industry?

HUMAN RESOURCE MANAGEMENT

Impacts of RAISA technologies

Human resource management

- RAISA would save employees’ time from performing tedious and repetitive tasks, which they could use for other more creative and revenue generating activities.
- Enhancing, rather than replacing the employees
- RAISA would solve some the problems with hiring and firing of employees, especially the seasonal ones.
- Sometimes RAISA would require reorganisation of companies – new departments, job positions, communication links between them

Changes in the number of employees in the various departments > zero-employee properties (Central hostel in Varna, Bulgaria)

Resistance of employees – perceive RAISA as threat for their job positions

Changes in the required skills of employees – communication, social, technical skills > required changes in the curricula of the tourism and hospitality programmes in HEIs

MARKETING
Impacts of RAISA technologies

Product and service quality

• Changed customer expectations about the tourism/hospitality product > redefinition of the scope of the product of a tourist company – e.g. should a hotel company be able to provide robot repair service? Or a sex robot?

• RAISA could enhance the perceived service quality through new attractive and interactive ways of service delivery, communicating and engaging with customers:
  ▫ Robots, chatbots, service kiosks could communicate in different languages and do this 24/7
  ▫ RAISA can create value for the customers by making the service deliver process funny and entertaining

Impacts of RAISA technologies

Product and service quality

• Division of tourism/hospitality companies into two main large groups – ‘high-tech’ vs ‘high-touch’ companies with various shades of gray in between them

• Automated pricing
  • Personalised pricing – perfect price discrimination
  • Lower prices for mass ‘high-tech’ products
  • Higher prices for exclusive ‘high-touch’ products
Impacts of RAISA technologies

Distribution

- Predictive analytics
- Automated allocation of available capacity by distribution channel > intelligent channel managers
- Distribution via digital voice assistants (Amazon Echo)

Communications, image, positioning

- The company that adopts RAISA would boast positive word-of-mouth due to its image of an innovative high-tech company.
- The company may also suffer negative publicity - it may be perceived as a company that puts profits before humans
- Automated communications with customers – chatbots, voice assistants, robots

Financial management

- Labour costs savings – RAISA work 24/7 and may serve numerous customers simultaneously.
- Increased sales – customers’ curiosity in seeing the robots, 24/7 availability

How will RAISA technologies disrupt the tourism industry?

FINANCIAL MANAGEMENT
Impacts of RAISA technologies

**Financial management**

Financial costs, associated with RAISA (1)
- **Acquisition costs** – e.g. for purchasing a robot or kiosk, for purchasing a chatbot/payment for its development.
- **Installation costs** – might be virtually zero for a chatbot.
- **Maintenance costs** – electricity consumption of the robot/kiosk, spare parts, periodic maintenance, repair works, etc. They will be zero for a chatbot.

Financial costs, associated with RAISA (2)
- **Software update costs**.
- **Costs for adapting the premises to facilitate robot’s mobility** – e.g. removing any barriers for robot’s movement within a hotel.
- **Costs for hiring specialists** to operate and maintain the robots/kiosks/chatbots.
- **Costs for staff training**.
- **Robot-as-a-service (RaaS) as a way to control costs**.

How will RAISA technologies disrupt the tourism industry?

**SUPPLY CHAIN MANAGEMENT**

- Integration of the information systems of suppliers and travel, tourism and hospitality companies
- Automated orders
What factors determine the impact of RAISA technologies on travel, tourism and hospitality companies?

Factors determining the impacts of RAISA

- Company characteristics / culture
- Market positioning of the company
- Relative labour and technology costs, relative labour and RAISA productivity
- Degree of technological complexity / Technological characteristics of RAISA solutions
- Safety characteristics of RAISA
- Customers’ readiness and willingness to be served by a robot, willingness to pay for robot-delivered services
- Employee’s readiness and willingness to work with a robot
- Cultural characteristics of both customers and service providers

Cultural characteristics of society

Robots have arrived and are here to stay.

Prepare ...
References and further reading


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