

Smart hospitality Academy

Methodology for trainers in smart hospitality

Methodologies / guidelines – Methodological framework for implementation

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Worked out by	Stasys Paulauskas Aleksandras Paulauskas Ruta Pels Pavel Smulsky Silva Blazulioniene Robertas Kavolius Xenia Chronopoulou Nasos Karachalios Marivi Gracia
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Input:

[Strategic Self-Management Institute](#): 1-2, 3.2, 3.1, 4-7, 8.1, 8.6 chapters, ssi@eksponente.lt

[Creative Future Ideas](#): 8.4 chapter, silva.blazulioniene@gmail.com

[Eesti People to People](#): 8.2 chapter, ruta.pels@mail.ru

[Tenerife Job Training S.L.](#): 3.3, 8.3 chapters, marivi@tenerifejobtraining.com

[IDEC](#): 8.5 chapter, nasos@idec.gr



Strategic Self-manager
Institute



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Summary

Methodology for trainers in smart hospitality “Smart hospitality Academy”. Intellectual output 2.

Smart hospitality Academy is an advanced sample of how the highest smart approach could be applied to nowadays one of the most challenged fields of tourism service and education. Facing economic stagnation, climate change, migration, wars and serial pandemic, especially nowadays COVID-19 hospitality business service meets giant troubles and needs innovative approaches and changes. European Innovation Union suggestions to use scientific innovations are the most actual and applicable in the hospitality sector. In this case Lithuanian, Estonian, Greek, and Spanish adult learning developers initiated this learning methodology for trainers under Erasmus+ project support. The methodology consists of smart hospitality business service and learning essence, structure, links discovering and positioning on historic qualitative trends from Past, through Nowadays and Future. Applied Circular Economy 3.0 approach enabled specific quality leaps of physical, economic, green, sustainable, and smart growth of tourism entities, to form smart tourism principles and advanced innovation of overall service cycle innovation steps: marketing, communication, accommodation, catering, wellness, and local transportation. Trainers were armed with clear education and Self-Improvement virtual models enabled to apply its flexibility in the learning process depending on the situation and target groups. The content of SH learning presented as a transition from academic scholastic to virtual self-improvement. The form of SH education is presented in face-to-face, blended learning and virtual self-education. Practical part of the programme consists of 24 academic hours course, which consist of 6 SH learning modules: marketing innovation, communication innovation, accommodation innovation, catering innovation, wellness innovation, local transportation innovation. The toolboxes with large best practice materials, simulators and self-assessment tools lets trainers to arrange advanced learning and self-improvement courses on Smart hospitality.

Introduction

"Smart Hospitality" is Erasmus+ strategic partnership project created by partners from Lithuania, Estonia, Greece, and Spain involved in adult education. Coordinator is Strategic Self-Management Institute research and training organisation from Lithuania.

Partners stand on the brink of technological revolution that will fundamentally alter the way we live and work. A new type of customer - the digital native - will be the main user of hospitality services. Consumers can afford access to the digital world - ordering a cab, booking a flight, buying a product, making a payment, listening to music, or playing a game - any of these can now be done remotely. Hospitality sector is forced to be flexible and dynamic and is turning into a field where digital skills are a must. In the modern workplace, digital skills are highly valued; in the future, digital skills will be vital.

Last research revealed that in employers' opinion employees need stronger digital skills and knowledge about smart technologies. A lot of trainers working with adult learners in the hospitality sector, are not aware how to develop digital competencies. "Smart Hospitality Academy" is the training program, which will help develop adult trainers' knowledge about smart technologies, internet of Things, and other innovations in the hospitality sector.

This Methodology can be used as a practical instrument in the work of adult educators in project partners' and other stakeholders' organisations and disseminated to a wider audience. The strategic plan of this project is to increase use of project outputs and outcomes after completion of the project.

In this report are presented Intellectual output O2 as results of activity „Methodology for trainers in smart hospitality "Smart Hospitality Academy" as Methodologies / guidelines – Methodological framework for implementation. The output consists of learning methodology and learning materials, which will be prepared in English, Lithuanian, Estonian, Spanish, and Greek languages. Collected smart hospitality best practice attached to this report as additional learning materials in English.

1. Smart hospitality genesis

Hospitality is a human feature and ability for „friendly and generous reception and entertainment of guests, visitors, or strangers and relating to or denoting the business of entertaining clients, conference delegates, or other official visitors“. ¹ Depending on context and application this term have various qualitative meanings, colours, and shades. In the tourism service case, we made focus on the most important for European Community and Global world an intellectual quality, expressed as **Smart Hospitality**. This choice needs some deeper explanation.

1.1. Extremely needs to growth

In the second decade of XXI century global economy met challenges of stagnation and slowing down of progress, which indicate reduction of temp of work productivity qualitative growth in many countries². Economic stagnation realises attraction of large communities such as USA, EU, starts decentralisation and destruction processes (Brexit, etc.), activates confrontation between countries, migration flows as well as rises danger for global peace. There is only one civilised way to stop stagnation and destruction – to turn growth of work productivity in accelerating mode by sustainable innovations.

As always, resolution of the global economic growth cycle is related to necessary changes in technologies and social relations. At least two social groups of people keep resistance to the progress. Less educated employees and traditional business holders push brakes of progress, because first of them do not want to lose manual working places and second try to keep their own business and income. Neither employees nor businessmen are not directly interested in innovating their own business.

Rise of human demands from biogenic to level of health and security required to change Economic paradigm to Sustainable development, which means to consider economic, ecologic, and social priorities with responsibility against nowadays and future generations. GDP indicator needs to be replaced by the most appropriate full-range life span and happiness index.

Significant component of global economic conflict is energy. Nowadays there is evident growth conflict between combustion and not combusting energy technologies. Combusting energy is guilty of negative impact on environment and human health through cancerogenous pollution.

Civilisation is faced with global warming danger, which requires a change in overall approach to relations between Humanity and the environment.

Faced with stagnation and destruction challenges European Union's second decade comprises strategic methodologies, programmes, and tools, which are targeted to increase growth and competitiveness of the EU in the global market. The Lisbon strategy for last decade and current European Union strategy

¹ <https://www.google.lt/search?q=hospitality+definition&ie=UTF-8&oe=>

² <http://www.eksponente.lt/S-Paulauskas-Towards-EU-Strategic-Self-Management.pdf>

EU2020³ is targeted to become a smart, **sustainable, and inclusive growing** community, which uses innovations as a sustainable development engine. These are not buzzwords, because they have deep sense and should be used as methodological tools of growth. However, there is a lack of understanding of the holistic system and structure of EU growth methodology in qualitative and time scales.

However, the state of Circular economy (CE) concept development is draft and partial enough because it accents only two circles – loops of material and energy resource flow.⁴ These loops can’t be excluded from loops of other business resources, like time (human, communication, etc.), finance, legislation, knowledge and other. Practical implementation of CE solutions requires to consider also other business cycles. As an analogy: not a disease, but a person needs to be treated. Circularity is a global feature of the Universe, life, and business.

1.2. Smartness as highest principle of economy

Smartness quality born from natural features of world and business circularity and finalise highest level of conceptualisation and action. Traditionally, a circular economy⁵ is a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling. This is in contrast to a **linear economy** which is a 'take, make, dispose' model of production.

Really, the World is a circular and developing system. Everything has the beginning and the end. In time scale a circle is a qualitative leap (Fig. 1.1). Life is going on a qualitative spiral. Circular model of any reality is a virtual Leap. Virtualics is methodology of virtual modelling of reality. (S. Paulauskas)

Linear acceptance of the circular world is simplification and reduces opportunities to use it in practice. So, circularity is a measure of efficiency of modelling of reality and practical action. So, **as more of circularity, as more reality, as better.**

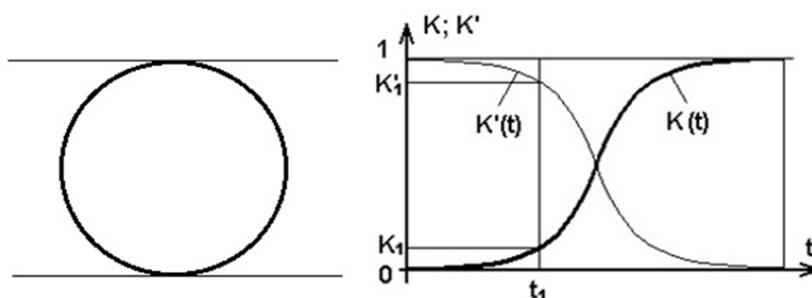


Fig. 1.1. Illustration of circle and its projection in time scale. (S. Paulauskas)

³ [EUROPE 2020 A European strategy for smart, sustainable, and inclusive growth](https://ec.europa.eu/euro-2020-2020-a-european-strategy-for-smart-sustainable-and-inclusive-growth/),

⁴ https://www.ltvk.lt/file/zurnalai/10_12_Paulauskas.pdf

⁵ http://ec.europa.eu/environment/green-growth/index_en.htm

Where: $K'(t)$ – Linear economy quality; $K(t)$ – Circular economy quality, $K(t)=1-K'(t)$

Circular economy as business activity firstly is smart because it is grounded on a feed-back loop activity cycle. Businessmen are involved in such a cycle as innovators, interested to increase profitability of business. Limiting of CE sense to energy and materials is reduction of growth opportunities. All business resources could and should be reduced according to the sense of economic efficiency principle.

Deepening into the sense of Circular economy gives opportunity to see its internal qualitative loops as historic paradigms of human economic activity (Fig. 1.2). Circular thinking is a cultural phenomenon. As a more developed society and person, his ability to expand circularity loops is increasing.

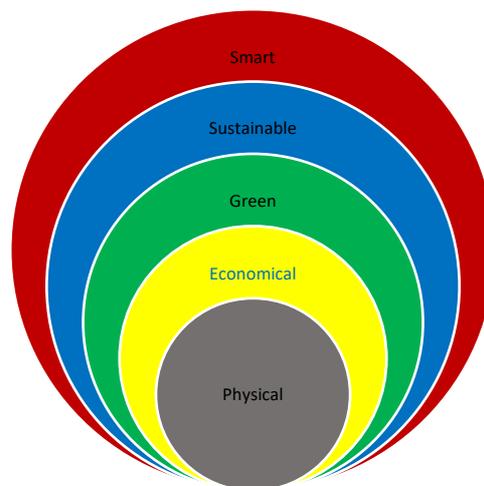


Fig. 1.2. Circularity expansion loops (S. Paulauskas, 2017)

The historical path from Linear economy to Circular economy goes through steps: Physical, Economical, Environmental (Green), Sustainable and Smart (Fig. 1.3).

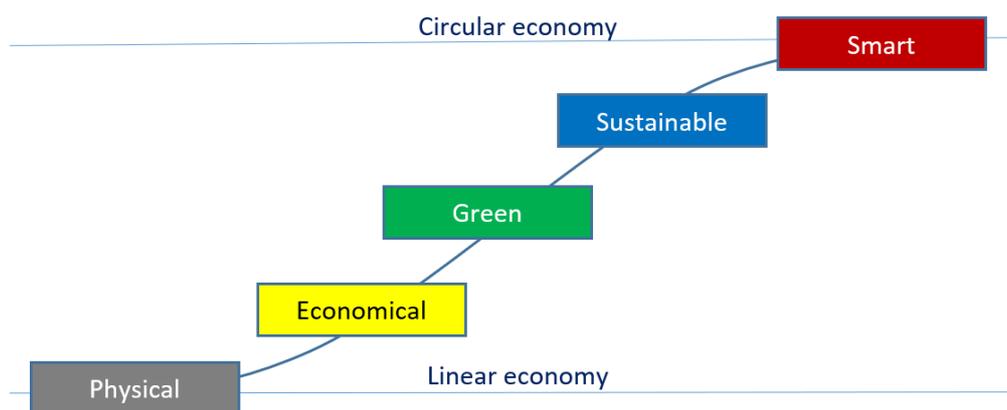


Fig. 1.3. Qualitative leap of economy paradigms (S. Paulauskas, 2017)

From ancient times physical deals with material things during production of other things have not unified methodological frames. Only individual human smartness was a handbook for economic activity in Subsistence farming. Economic theories occurred some hundreds of years ago to change the physical

language of economy to an economical language of value and large system of quantitative, qualitative micro and macroeconomic indicators. The Environmental or ecological and Green economy paradigm occurred in the end of last century as antithesis to the polluting economy. Sustainable development paradigm synthesised economic, environmental, and social priorities with responsibility against future generations. Smart growth paradigm was declared in the EU2020 strategy as the official strategic methodology of European community in the current decade.

One of the most significant features of growth loops is spreading of business resources (Table 1.1) For physical level materials and energy are main resources of business. The Economic paradigm adds to them office and manual work. Green growth is impossible without clean technologies. Sustainable growth requires health technologies. Artificial intelligence is necessary for smart quality of circular economy.

Table 1.1. Used business resources by paradigms. (S. Paulauskas. 2018)

Paradigm	Physical	Economic	Green	Sustainable	Smart
Resources	Materials and energy	Office and manual work	Clean technologies	Health technologies	Smart technologies
Applications	Production and consumption	Marketing	Wind, solar, electricity, smart houses, modular load, etc.	Wellness, gene enginery, organ regeneration	Artificial intelligence, robotics virtual reality
Indicators	No	Economic	Ecologic Economic	Responsibility Social Ecologic Economic	Happiness of people
Fed-back	long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling	Profit	Climate change	Life span of people	Happiness
Finances	EU, State	Business	Business	Business	Business

Different economic paradigms form different understandings of economic growth. Here is the reason for some misunderstanding between people and overall countries with different economy paradigms, including scientists and developers. European community takes care of common understanding of the current paradigm through strategic documents, which are obligatory for all actors in the EU. Achieving the highest Smart growth methodology is the main benefit of the Circular economy.

1.3. Physical growth relicts

Physical thinking of the world as diversity of things and acting persons is the oldest and easiest life’s paradigm. It has undoubtful advantage – possibility to verify everything by 5 human senses⁶. At a

⁶ Vision, hearing, touch, taste, and smell.

physical level tourism service provider deals with hotels, restaurants, SPA, rooms, visitors, kV and kW of energy, kg or tons of food, waste, etc.

Physical economy and its main form Subsistence farming dominates from ancient times as the easiest business activity. However, it requires unlimited knowledge about each physical thing, which takes time to assure creation and permanent maintenance of physical systems related to business service. Consequently, physical methodology requires large technical, manual, and not standardised work, large companies, and a big number of employees.

Searching for business growth opportunities with the help of physical methodology takes a huge amount of time for identification, collection of data and writing if reports, which consist mostly of inventory of existing features. Physical level research has a sense of analysis of investigating subjects by dividing into different parts, structuring. The synthesis is being understood as the definition of most frequent links between internal structural parts and external elements. The physical books are large and take time for practical use.

Nowadays physical books are rather useful for practical businessmen, who’s time is very expensive and busy. Short online and mobile applications and knowledge, e-self-assessment tools, e-calculators, and e-learning surroundings are more appropriate for business compared to large technical books.

Physical methodology is grounded on an unchanging physical World model (Metaphysics) and does not use time scale, which does not give opportunity to model change tendencies and forecast the future. At the physical stage innovations have a sense of inventions and casual events. Not reliable intuitive imagining does not allow to forecast the future.

Physical paradigm slows qualitative growth of business and humanity. That is the reason why higher developed countries shifted to higher economy paradigms.

1.4. Economic growth brakes

Large micro, macro and number of special economic theories and methodologies serve human action, business, and life in the level of Economic paradigm. Quantitative business parameters such as income, expenditures, turnover, balance, profitability, property, etc. are everyday language of each kind of business, including SMEs.

Market research is grounded on special 4 and many-P methodologies. Large data bases of unified micro and macro indicators enable us to not only investigate and improve everyday business parameters but use change trends to forecast the future. So, the economical paradigm opens opportunities to change approach to innovations because of extrapolation of historical economic tendencies. Innovations are not casual events now but results of professional innovation activities.

However, the economic paradigm is aged now and cannot serve developed countries, because it was appropriate for the first – biogenic level of human demands (A. Maslow). Economics is a handbook for hungry society (S. Paulauskas). Raising the level of Safety and Health demands people start to take care of the environment.

Small and medium-sized enterprises (SMEs) represent 99% of all businesses in the EU⁷. The definition of an SME is important to access to finance and EU support programmes targeted specifically at these enterprises (Table 1.2).

The main factors determining whether an enterprise is an SME are:

- staff headcount
- either turnover or balance sheet total

Table 1.2. Small and medium-sized enterprises (SMEs) are defined in the [EU recommendation 2003/361](#).

Company category	Staff headcount	Turnover or	Balance sheet total
Medium-sized	< 250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10 m	≤ € 10 m
Micro	< 10	≤ € 2 m	≤ € 2 m

These ceilings apply to the figures for individual firms only. A firm that is part of a larger group may need to include staff headcount/turnover/balance sheet data from that group too.

Future belongs to virtualized smart business. In historic time scale number of employees in enterprise is reducing in reason of two main factors:

- Increasing work productivity by replacing hard manual work with technical devices and robots.
- Improvement of strategic Self-Management skills gives opportunity for each person and a family to establish their own business and SME.

Unlimited economic growth became inappropriate due to pollution of the environment, air, water, global warming, and climate change. Large businesses frequently make enormous impacts on social self-regulation mechanisms such as politics, science, and culture, which results with inequality, poverty, wars, etc.

Economical glossary is not enough to self-manage efficiently and responsibly. So, Green antithesis to economics occurred, which required adding ecological priorities to economic parameters.

1.5. Green growth antithesis

Activation of ecological and environmental priorities is antithesis to Economic paradigm and business culture. Green growth⁸ is a term to describe a path of economic growth that uses natural resources in a

⁷ http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_it

⁸ http://ec.europa.eu/environment/green-growth/index_en.htm

sustainable manner. It is used globally to provide an alternative concept to typical industrial economic growth. Special quality of Clean Technologies is forming seeking to replace polluted production and services.

„**Clean technology** refers to any process, product, or service that reduces negative environmental impacts through significant [energy efficiency](#) improvements, the sustainable use of resources, or environmental protection activities. Clean technology includes a broad range of technology related to [recycling](#), [renewable energy](#) ([wind power](#), [solar power](#), [biomass](#), [hydropower](#), [biofuels](#), etc.), [information technology](#), [green transportation](#), [electric motors](#), [green chemistry](#), [lighting](#), [Greywater](#), and more. [Environmental finance](#) is a method by which new clean technology projects that have proven that they are "additional" or "beyond business as usual" can obtain financing through the generation of [carbon credits](#). A project that is developed with concern for climate change mitigation (such as a [Kyoto Clean Development Mechanism](#) project) is also known as a [carbon project](#).”⁹

Significant role and part of green growth is related to renewable energy, which historically replaced fossil fuel – primary energy sources as wood, coal, oil, gas, nuclear. (Fig. 1.4)

It is important to state that **renewable energy** means only rational use of natural resources stating their recovering character. E. g. the combusted wood, straw, waste, biogas recovers if used quarantining recovery limits. The Environmental paradigm accepts combustion of natural resources and waste appropriate for environmental criteria.

Significant technological and organisational changes occur in the maritime economy. Despite modularization of traditional ship design, construction, load and transportation operations, transit to containers and ro-ro, introduction of driverless fleet and electric engines, general trends of traditional maritime business do not show growing trends. Electro mobility and stop of combusting allows us to avoid oil, gas, and coal transportation by Seas. In the future maritime logistics are waiting for its killers – 3D printers and Nano technologies, which allow to avoid physical transportation of goods, replacing it with local production with help of the internet.

However, there are new areas of unlimited sustainable growth opportunities discovered and successfully used in Blue growth¹⁰ fields:

1. Aquaculture
- 2. Coastal and Sea tourism**
3. Marine biotechnologies
4. Seabed mining
5. Offshore energy

Whether it is the OECD¹¹ or the EU's very own reporting, the consensus is that the ocean represents an enormous opportunity for Europe's economy. This economy unites human activities such as shipping and transportation, fishing, and energy, in addition to a multitude of natural benefits like CO₂ absorption.

⁹ https://en.wikipedia.org/wiki/Clean_technology

¹⁰ https://ec.europa.eu/maritimeaffairs/policy/blue_growth_en

¹¹ OECD - The Organisation for Economic Co-operation and Development

Within this is the realization of our dependence on a healthy ocean and its biodiversity to support further biotechnologies innovation in addition to the large carbon-friendly aquaculture. In short, as new technologies emerge, the exploitation of the oceans becomes easier and more important. This economic activity further depends on the knowledge capacity the EU can support.

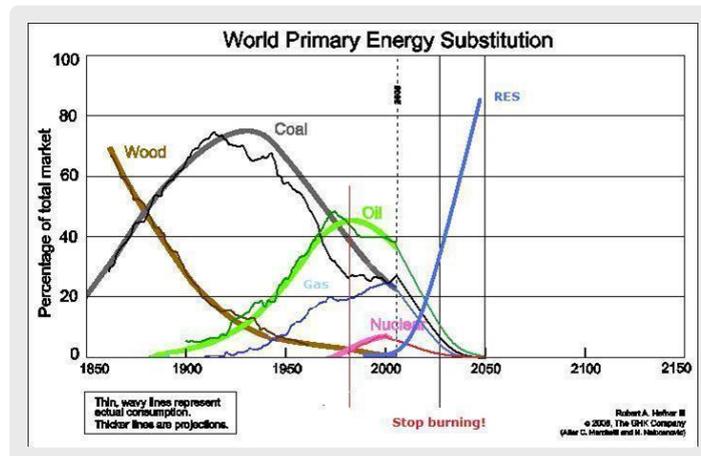


Fig. 1.4. Global Energy transition by primary resources (Forecast by S. Paulauskas, 2006)

This manifests itself in a variety of ways including maritime spatial planning to ensure the efficient management of sea activities. This means reinforcing several satellite and spatial surveillance programs such as the EMSA¹². Whether it is monitoring human activity such as shipping channels or meteorological shifts, the efficacy of the Blue Economy will increase the demand on accurate information. The push for greater surveillance demands clear and effective legislation to ensure the appropriate sharing and usage of the information. In addition to this, the EU must consider the investment that such programs require and the options that are available to bolster their activities.

1.6. Sustainable development paradigm

Weak points of Green growth as antithesis to Economic growth is limiting the character of business. Environmental requirements push business to choose ecological resources, equipment, and technologies, which increase expenses and sometimes make business not profitable. Ecological innovations are acknowledged as a common benefit and require financial support from the society and EU funds, dedicated to most green innovations.

The environmental paradigm paradox is that people need green environment not for environment itself but for human’s wellness, full-range life span and happiness. According to the World Health Organisation combusting related pollution reduces human’s lifespan by 17-20%. So, the next – Sustainable development paradigm also adds social needs, taking responsibility against current and future generations (Fig. 1.5).

¹² EMSA - European Maritime Safety Agency

Sustainable development is the first horizontal principle of European Community nowadays. Each activity and each project in the EU firstly must be examined on adequacy to sustainable development approach. However, the term “sustainable” has no united common understanding. Each country explains it depending on their own understanding and business culture.

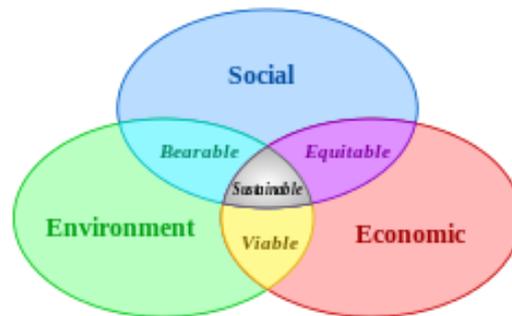


Fig. 1.5. Illustration of sustainable development priorities

Direct sense of English term „sustain” is “*maintain, hold, keep, retain, preserve, support, etc.*”.¹³ So, “sustainable development” is not a casual but purposeful approach to development. It provides modelling, forecasting, planning, monitoring, and harmonising of development processes.

Sustainable energy should assure not avoiding pollution and environment, but safe and healthy life conditions for humans. Combustion of waste, biomass, biogas is not sustainable, because they make danger for humans by combustible and polluting character of such energy production and use.

Raised human safety and health demands leads to transition to non-combusting sustainable energy solutions, which are safe for humans and environment:

1. Wind energy
2. Solar energy
3. Smart houses
4. Electric driverless transport

Every business service and technologies must be examined on appropriateness to sustainability criteria. So, further innovations must fit requirements of sustainability.

UN sustainable development paradigm¹⁴ adopts not every technical and social novelties, but only those, which meet criteria of Sustainable development:

1. Economic criteria: Growth of work productivity – less manual work
2. Ecologic criteria: Less pollution – cleaner environment
3. Social criteria: Longer full valued life span of people

¹³ Paulauskas S., Paulauskas A. The virtualics and strategic Self-Management as tools for sustainable development. / Technological and economic development of economy, Baltic Journal on Sustainability. 2008. 14(1): 76–88.

¹⁴ <http://www.un.org/sustainabledevelopment/sustainable-development-goals/#>

4. Responsibility: To take responsibility against next generations

Sustainable innovation methodology enables *a priori* separation of old – outgoing technologies and new – perspective technical and organisational solutions. It gives the right way to save investments only into advanced innovations. Each new strategy of growth should be grounded on ongoing Sustainable Innovations solutions. Any investment into an outgoing deal is risky.

As a resource of sustainable growth synthesising a special group of wellness means and methods named as Health technologies. “**Health technology** is defined by the [World Health Organization](https://www.who.int/) as the “application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives”.¹⁵ This includes the pharmaceuticals, devices, procedures and organizational systems used in health care.”¹⁵

1.7. Smart growth strategy

According to EU2020 A European strategy for **smart**, sustainable, and inclusive growth, Smart growth is developing an economy based on knowledge and innovation.

Smartness is human feature and skill, which is used seeking to characterise technical and organisational systems, having some analogies with working of human self-regulation system¹⁶.

After stages of Production and Services nowadays a new quality of human activity occurs – Innovation. The Innovation Union¹⁷ is one of the seven flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth.

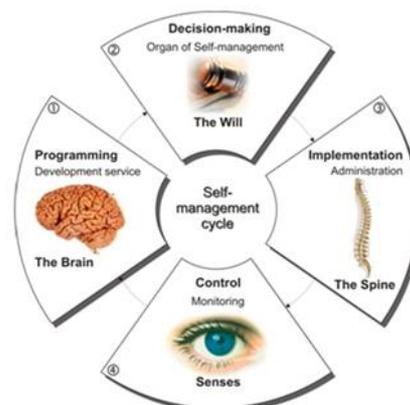


Fig. 1.6. Human Self-Management Cycle (S. Paulauskas)

¹⁵ https://en.wikipedia.org/wiki/Health_technology

¹⁶ Paulauskas, S., Paulauskas A. (2008). The virtualics and strategic Self-Management as tools for sustainable development, Technological and economic development of economy, Baltic journal on sustainability, Vilnius Gediminas Technical university. 2008. 14(1): –P.76–88.

¹⁷ http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=intro

It's necessary to state that depending on culture level the term „innovation,, same time is used in the sense of a noun or a verb. In the first case innovation is being understood as an invention, new thing, technological or social novelty. At second hand, innovation is being understood as the process of creation and implementation of novelties, higher synthetic quality of human beings and the state of the Universe (S. Paulauskas).

Discovered human intelligence loop gives opportunity to use it as artificial intelligence in self-arranging feed-back based robotic and other systems. In near future smart cars, smart freezers, smart ships will become natural in human life as part of the internet of things.

Analogy of human Self-Management cycle is being applied now in social organisations, in which the brain's function is being operated by specially created innovation services (Fig. 1.6). Pure democracy is application of human Self-Management system to a social organisation, which allows preventing problems through exceeding permanent innovation activity.

Innovation provides real benefits for us as citizens, consumers, and workers. It speeds up and improves the way we conceive, develop, produce, and access new products, industrial processes, and services. It is the key not only to creating more jobs, building a greener society, and improving our quality of life, but also to maintaining our competitiveness in the global market.

The Innovation Union plan contains over thirty actions points, with the aim to do three things:

- make Europe into a world-class science performer.
- remove obstacles to innovation – like expensive patenting, market fragmentation, slow standard-setting, and skills shortages – which currently prevent ideas getting quickly to market; and
- revolutionise the way public and private sectors work together, notably through Innovation Partnerships between the European institutions, national and regional authorities, and business.

2. Tourism business sustainable innovation

We completely agree that the concept of circular economy is new enough, a variety of authors place different senses into this approach, technical issues frequently dominate over economical, finally discrete innovation solutions in tourism business are still too general to become motives and means for business everyday actions and sustainable development. The CE innovation was not sufficiently positioned in nowadays World and EU growth challenges, there are no defined connections with EU 2020 strategy for smart, sustainable, and inclusive growth, same as in the overall system of EU strategic initiatives.

Compilation of existing information on the internet as well as supplied by project partners (mapped in WP3) analysed giving priority rather to Circular economy technical sense and less often to tourism SMEs **business innovation support with help of circular economy tools**, what is the main subject of project CIRTOINNO.

Necessary for Self-assessment virtual tool (iSAT) creation qualitative scale „Linear – Circular economy” finally not formed for model as “0-1” transition process. CE 1.00 and CE 2.00 are mentioned as steps towards the Circular economy, but the sense, definition, and main clear principle when CE will finally be formed are not defined. So, why was the necessity to deep into the overall scope of the CE phenomenon and to define the value of maximum circularity.

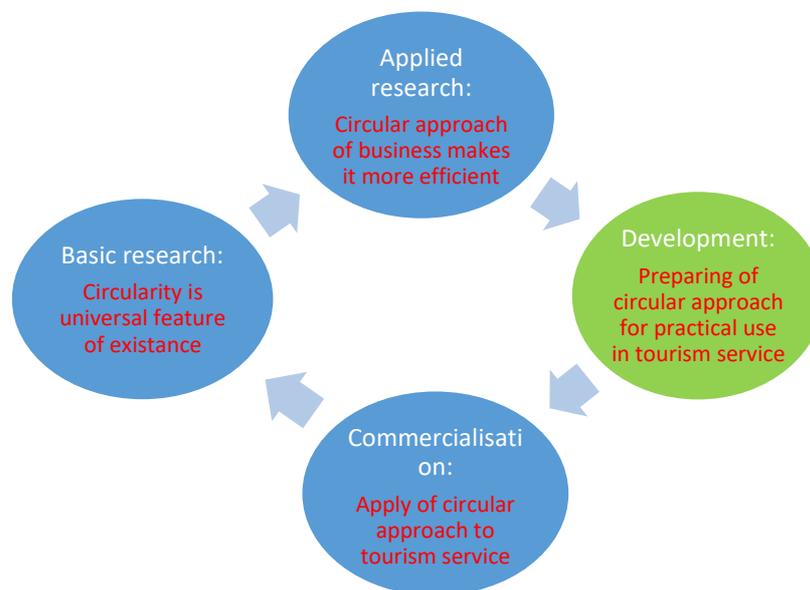


Fig. 2.1. Tourism SMEs innovation cycle (S. Paulauskas, 2017)

Fortunately, through extrapolation of CE cultural development trends the final stop of CE was defined by use of the EU smart growth concept. Smartness is grounded on the highest level of circularity when previous human or artificial intelligence in self-regulating cycles work as feed-back loops. In nowadays practice of such innovations as smart houses, smart cars, smart devices, etc. fixed the highest level of circularity. We named this smart level of CE as CE 3.00. (S. Paulauskas)

As each innovation cycle, circular economy innovation cycle of tourism SME consists of 4 stages: basic research, applied research, development, and commercialisation. Discovered in basic research stage circularity as a universal feature of an existence was examined and tried to apply in everyday business as a more efficient approach (Fig. 2.1). Sustainable innovation of tourist service requires scope of business, technical and social changes, considering sustainability criteria. Considering circular qualitative growth character of any social activity, tourism service business is being modelled as repeating a smart cyclic feed-back process, operating in dependence on such cycle of tourism service consumption.

2.1. Tourism business cycle

Tourism business service cycle is being constructed on the base of primary tourism service consumption cycle (Table 2.1).

Table 2.1. Tourism service provision and consumption dialectics

Actors of tourism service/consumption	Tourism SME	Consumer of tourism services
Tourism service/consumption actions	Tourism business cycle activities	Tourism consumption cycle activities
1. Tourism market	1. Marketing – research and formation of the business	1. Searching for information on tourism services
2. Planning	2. Planning of the services	2. Planning of a consumption
3. Booking	3. Booking	3. Booking
4. Transportation	4. Travel opportunities provision	4. Travel to/from service location
5. Implementation:	5. Providing services	5. Consuming services
5.1. Communication	5.1. Communication	5.1. Communication
5.2. Accommodation service	5.2. Accommodation service	5.2. Accommodation service
5.3. Catering	5.3. Catering	5.3. Catering
5.4. Wellness	5.4. Wellness	5.4. Wellness
5.5. Local transportation	5.5. Local transportation	5.5. Local transportation
6. Utilisation	6. Utilisation of the waste of the service and updating of experience	6. Souvenirs, memories, impressions, new knowledge
7. Feed-back	7. Further planning	7. Further planning
8. Improving	8. Improving services	8. Rise of demands

Simplified tourism service business cycle consists of 6 stages: marketing, communication, accommodation, catering, wellness, and local transportation (Fig. 2.2).

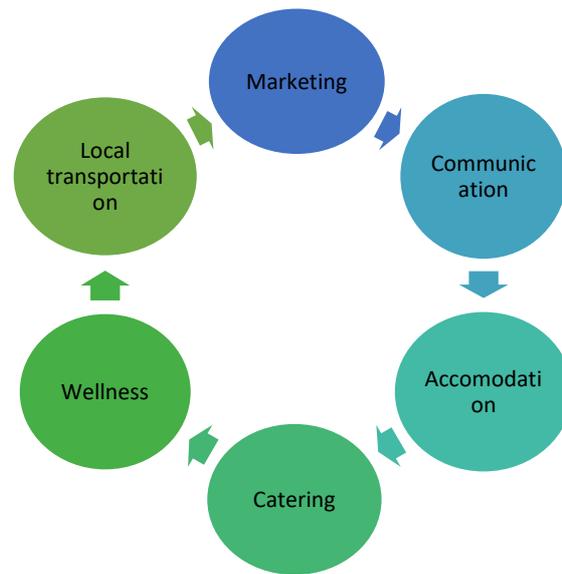


Fig. 2.2. Simplified tourism service cycle (S. Paulauskas 2017)

2.2. Tourism business growth

As in any business there exists quantitative and qualitative growth in the tourism sector.

- **Quantitative growth** means an increase in the number of visitors, income, and market geography.
- **Qualitative growth** shows positive changes in rates and relative indicators, such as work productivity, profitability, etc.

Work productivity is the most important indicator of progress. It shows which amount of income was generated by one employee. In tourism business is a lot of manual work, which could be replaced by equipment/robots, smart solutions, and virtual informational systems. Employees should switch from manual work to more qualified jobs. Permanent increasing of staff salaries pushes employers to search for means for automation of manual work at first.

Reduction of low qualified manual work is a global change of Humanity occupation. In the short period employees should be involved in the service innovation process through requalification for high-tech work with smart systems. Further robotization and virtualisation requires to create political and social conditions for providing payment to all citizens Universal Basic Income or Dividend¹⁸.

Work profitability shows overall efficiency of SMEs tourism business. At first, transition to green, blue, or smart growth requires investments, which allows to increase service efficiency through the rise of attractiveness of service thanks to better environment and health quality of service.

¹⁸ The European New Deal. <https://diem25.org/end/>

2.3. Tourism business service expenses

Detailed analysis of tourism service enabled to recognise and divide all expenses of Economic growth into 4 relative groups according to means of their impact into business growth (Fig. 2.3):

1. **Office expenses.** Reduction of office expenses is possible through virtualisation of communication and globalisation of marketing. For this achievement the accommodation, catering, wellness, and local transportation should be managed by smart automotive and robotic systems.
2. **Manual work.** Manual work reduction will be a result of automation and robotization of accommodation, catering, wellness, and local transportation.
3. **Energy.** Energy costs will become lower with reduction of office and manual work costs through automation and robotization of accommodation, catering, wellness, and local transportation. Qualitative process of transition from unsustainable to sustainable – not combusting energy has evident ecological value for reduction of pollution and impact into climate change and human’s health. Decentralisation of energy supply and achievement of autonomous energy quality enables avoid electricity networks, and energy losses in their costs.
4. **Materials.** Material costs will become lower with reduction of office and manual work costs through automation and robotization of accommodation, catering, wellness, and local transportation.

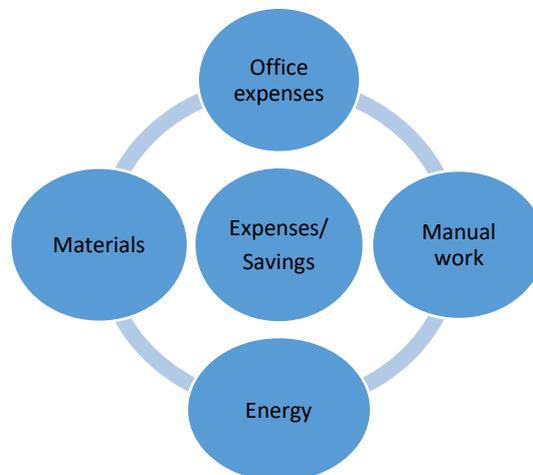


Fig. 2.3. Main kinds of tourism service expenses/savings (S. Paulauskas 2017)

Reduction of Energy and material costs leads to increasing business profitability and this is in direct interest of tourism service business. Reduction of staff costs, transition from manual to high-tech job leads to qualitative growth, which has an impact into social and global development processes and progress. Green, sustainable, and smart growth require appropriate Clean technologies, Health technologies and Smart technologies, which became nowadays tools for developing tourism service business.

3. Tourism business smart innovation

Circular economy innovation ideas cover all stages of the tourism business cycle starting from marketing and finishing with utilisation.

3.1. Global transition of tourism innovation

Tourism – is traveling with the purpose of information, wellness, and entertainment. The demand for travel is grounded on geographical deconcentration of tourism sources in different continents, regions, and countries. Informational character of tourism forms two main tourism directions: physical and virtual. Covering tourist demands is very expensive for tourists and for the planet. Tourists spend a lot of money. Planet meets problems related to air and water pollution by travelling and accommodation. During last year’s risk of travel to some exotic countries became evident due to local climate disasters and terrorism.

Internet technologies are developing in the direction of virtual transmission to all 5 human senses: eyesight, hearing, touch, smell and taste. First two of them are implemented easily through TV, radio, movies, etc. Scientists are still working on transferring other senses. And they have success on that.

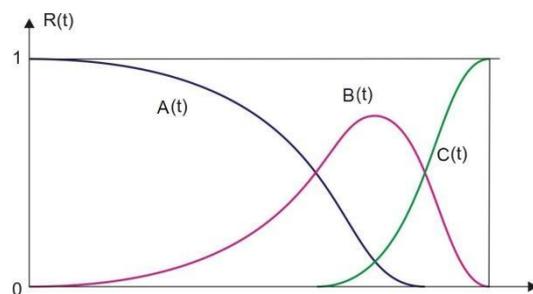


Fig. 3.1. Tourism qualitative transition trichotomy (S. Paulauskas, 2017)

Transition from physical to virtual tourism is going through trichotomy (Fig. 3.1): A) Physical tourism is wellbeing (thesis); B) Physical tourism is too polluting and risky for travellers; C) Virtual tourism allows to achieve all tourist demands avoiding travel and pollution of the environment.

3.2. Tourism innovation virtual model

Nowadays tourism is mostly an economic $K_r'(t)$ phenomenon, a wide field of tourism business is related to travel, accommodation, catering and SPA (Fig. 3.2). Large marketing tools are used for attracting travellers and visitors in all countries. Due to the transition from biogenic to safety and health demands (A. Maslow) humans start taking care of saving the environment and stopping climate change. Economical paradigm is being replaced by Sustainable development paradigm $K_r(t)$.

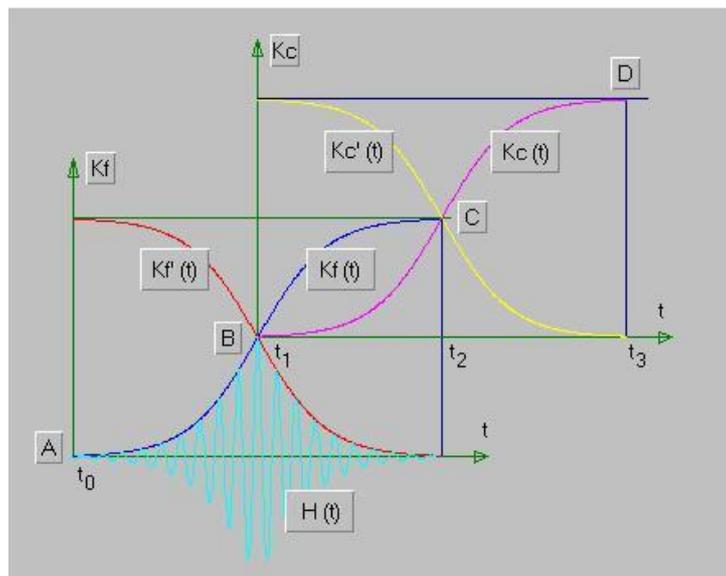


Fig. 3.2. Virtual model of tourism innovation (S. Paulauskas, 2017)

The contradiction $H(t)$ between economic and sustainable approaches will increase accordingly resonance sinusoid. In not far future the physical $K_c'(t)$ tourism will start to be replaced by virtual tourism $K_c(t)$. Each informational demand could be covered through the internet, avoiding expensive, polluting, and dangerous travel. Global virtual networks enable sitting at home to experience video and voice information from each place of our planet. Scientists are developing adapter how smell, touch and taste also could be transferred from vishing location¹⁹. This future will come soon.

3.3. Virtual tourism technologies and devices



Fig. 3.3. Virtual reality headset.

Virtual reality (VR) is a digital environment that people can access and explore by using special headsets and hardware.

¹⁹ <https://www.youtube.com/watch?v=YxFXjKn1LxQ&feature=youtu.be&app=desktop>

There are different kinds of Virtual Reality experiences, but the base principle applies to all. Users equipped with VR headsets see a specially designed scenery and they can explore or interact with this environment in various ways.

Once you have your headset on, you are transported to another world or environment. The possibilities are endless; it can be a travel destination, a famous museum, a fantasy world, a sci-fi setting, or a moment in history. That is the beauty and enticement of Virtual Reality; you get the chance to explore places that you only imagined until now.

The content used to construct a virtual environment, can be either a fully computer-generated medium, or a 360 filming of a real place. People interact with the virtual environment by using various controllers and dedicated hardware. The immersive feeling in VR is mostly created by using sight and sound, yet, in some cases, smell and tactile stimuli may be added as well.

The public knows about Virtual Reality mostly in connection to the gaming industry, but also many businesses have adopted this technology. As the cost for VR equipment is starting to subside, we may see this technology rise in popularity.

Examples in 2017 and 2020: <https://www.youtube.com/watch?v=td4OePhMCg>,
<https://www.youtube.com/watch?v=TdA7Vsvq4Qk>

Augmented reality (AR) is intended to enhance the physical environment of the end user via devices such as smartphones and tablets. Some applications within the hotel sector include offering in-house interactive elements (such as maps and points of interest), providing a digital history of the property, and supplying guests with relevant information when they are located within certain areas of the hotel (such as a menu if they happen to enter a restaurant). AR is a technology that overlays computer generated content on a real-world environment.



Fig. 3.4. Augmented reality view on mobile phone screen.

Most AR applications run on smartphones, tablets, special headsets, and other types of displays. Using these devices, people can see and interact with various types of digital content that show in the surrounding environment.

To better grasp the concept, imagine a real room, an empty one. Using an augmented reality application, a virtual character can be placed in this room. For the naked eye, the room is still empty,

but once you use a pair of AR glasses, or other AR hardware, you can see the virtual character and even interact with it.

AR is quite versatile in terms of content; it can handle text, pictures, animations, movies, 3D graphics and games. To position virtual objects in a real environment, Augmented Reality generally uses GPS, location markers, beacons, or cameras.

The difference between VR and AR is that virtual reality uses a very artificial environment, whereas Augmented Reality overlays digital content on the existing environment.

Augmented Reality is successfully used in different areas: commerce and marketing, architecture, museums and theme parks, visitor centres, education and training, industrial design, entertainment and tourism, the medical field.

Examples of augmented reality in hotels: <https://www.youtube.com/watch?v=D9AyvDAPflg>,
https://www.youtube.com/watch?v=H_VxlcdP0Kk

In a **Mixed Reality** (MR) the least confusing definition of Mixed Reality would be the merging of real and virtual environments, to produce new environments, a place where physical and digital objects coexist in real time.

Let us try to make things even less confusing. Imagine a real room with a wooden desk and a chair in it. Let us say we design some digital walls that look like old castle walls, a medieval throne, and a stone table. We place these virtual elements in the room, overlying them on the real objects. Using a special headset, we will see that our room has changed. Instead of the real walls, we have medieval walls, instead of a normal chair, there is a throne and instead of the wood table, we see a stone one.

MR uses our real environment, but the environment can be significantly transformed by adding digital objects that are anchored to the real ones.

The difference between Mixed Reality and Virtual Reality is that MR uses a real environment and overlays digital content on the physical world, whereas VR is a fully digital environment. More about mixed reality https://www.youtube.com/watch?v=P_I873tL3jw



Fig.3.5. Mixed reality demonstration.

Extended Reality (XR) is an umbrella term that covers all the various technologies that enhance our senses, whether they are providing additional information about the actual world or creating totally unreal, simulated worlds for us to experience.

XR, as it’s also called, is an umbrella term that includes technologies such as Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), either to provide more information about our actual environment to enhance our senses, or else to create completely artificial experiences. Extended Reality is an idea that has been around for a long time.



Fig. 3.6. Extended reality scheme.

While Extended Reality is still in its early phase, it is already growing explosively, so that by 2022, sales of XR technology could surpass \$200 billion. A recent Forbes article describes some of the ways in which various types of XR technology could radically transform our lives and work. In the future, for example, you may do a lot of your shopping with XR apps, which enable you to see how a new couch or chair would look in your living room. In addition, you might work in an XR-powered virtual office environment, in which your co-worker at the next desk might be thousands of miles away. In addition, according to Live Science, AR-enabled contact lenses that display information right in front of your eyes someday might take the place of phone and computer screens. Telecommunications researchers predict that the advent of 5G wireless networks, which will make it possible to transmit vast amounts of data quicker, will help make XR even more powerful and sophisticated.

Examples of extended reality: <https://www.youtube.com/watch?v=6XyavI7y-FI>,
<https://www.youtube.com/watch?v=NCE5PgMUskU>

4. Smart principles of tourism SMEs innovation

Smart quality of innovation of tourism SMEs business requires to understand and follow the number of the best theoretical principles, raised from great EU strategic growth initiatives and documents.

4.1. Dialectic

Tourism service providers and consumers are two opposites, but always united parts of communication. Frequently, the consumer looks like a passive side seeking for impressions and convenience.

Service provider is an active side, and he leads on organising and assuring the best communication and satisfaction of the consumer. No secret, that businessman seeks to earn profit from his service.

The principle of dialectic means the balance between service provider and consumer. Disruption of such balance from one or other side reduces efficiency and quality of the service.

4.2. Sustainability

Tourism SMEs innovations should be in accordance with sustainable development criteria:

1. Economics – should result in higher work productivity and reduce manual work of tourism service users and providers.
2. Ecologic – not polluting the environment.
3. Social – should result in longer full-range life span and happiness of tourism service providers and users.
4. Responsibility – no leave problems for people around and next generations.

4.3. Complexity

Tourism services should provide and assure covering all complex of consumer needs, which are obligatory during tourism service cycle:

1. Communication – exchange of information between service provider and consumer during overall service cycle.
2. Accommodation – to assure hotel service.
3. Catering – to assure meals and drinks.
4. Wellness – to assure opportunities for SPA.
5. Local transportation – to assure opportunities of choice of convenient transportation in service location.

4.4. Holistic

Considering A. Maslow’s human demand growth pyramid holistic approach requires to consider and create opportunities to satisfy all level needs of tourism service consumers:

1. Biogenic – needs on meal and water.
2. Safety and health – avoidance of risk for body and mind.
3. Communication – assure wishes and contacts with other people.
4. Self-esteem – to prevent disturbing of achieved self-assessment level.
5. Self-expression – opportunities for expression of a creativeness.

4.5. Smartness

Considering different quality levels of business growth, SME should give priority to higher ones:

1. Physical growth – increasing technical facilities to give service for a bigger number of visitors and higher complexity of service.
2. Economic growth – increasing work productivity and profitability through automatization and virtualisation of business service.
3. Green growth – introduction of clean technologies seeking to reduce pollution of the environment and expenses related to waste treatment and recycling.
4. Sustainable growth – introduction of health and secure for employees and consumers work conditions.
5. Smart growth – assuring of permanent growth through introduction of cyclically operating technical and social Self-Management systems including software, artificial intelligence, and innovation service.

4.6. Applicability

CE solutions must be applicable, based on:

1. Technical implementability – must exist technical solutions of an innovation considering hardware and software equipment.
2. Practical use – must be applied in business practice of some places of the World.
3. Interest of consumers – consumers must be interested in an innovation considering tourism service scope and elements, price, and delivery conditions.
4. Interest of SMEs – tourism service providers SME must be interested in innovation, considering profitability of business, and covering other demands of businessmen.
5. Interest and legislation of a society – European community or/and a State must be interested, and EU/local legislation must be friendly for innovation.

5. Smart hospitality innovation solutions and applications suitable for tourism business

Innovation is the bridge between the past and the future. In this investigation the past is a linear economy, and the future is a circular economy. Absolutely necessary to forecast and provide how tourism SME will look in the quality of the circular economy. Nobody knows and cannot forecast the future exactly. However, use of existing development trends and advanced practical applications gives opportunity to talk about circular economy solutions and applications in the tourism sector.

5.1. Global marketing

Globalisation of tourism enlarges geography of visitors and unification of services. Tourism globalisation is related to the transition of physical booking to large internet marketing and booking networks, such as booking.com, hotels.com, etc. Holders of such networks keep close direct links to consumers and realise promotion and feed-back loops on tourism service through polls of visitors on matter of satisfaction of received services.

Participation in global tourism marketing and booking networks allows to increase work productivity, reduce local marketing operation, office expenses and qualified manual work. Transition of competition to the global market raises the needs of tourism service provided to be in line with nowadays innovations and service culture.

Application: Marketing services operated by a global tourism service network.



5.2. Virtual communication

Computer, internet, mobile phones are rapidly changing communication between tourism service providers and consumers. Face-to-face booking of tourism service is replaced by use of computers, emails, and internet pages. The communication service is transforming into virtual self-service, which allows to avoid some office work and office expenses. There are not any doubts that in the nearest future any face-to-face communication between service providers and consumers will be avoided.

Application: Face-to-face contact-less booking and self-service of a customer through internet (PC or smartphone).



5.3. Smart accommodation services

Accommodation is one of the main parts of tourism service. Accommodation service needs significant manual work related to cleaning of apartment and bedroom, replacement of materials and bedclothes. Assurance of lighting, heating, cooling, ventilation, and other conditions is a big challenge to employees of a hotel.

So, new or energy efficient buildings, equipment, smart loops of circular self-regulation must become unavoidable features of each building. Room, furniture, equipment, shower, etc. must be convenient for consumers and not require large manual work from employees. Use of energy and materials should be reduced by smart innovations. There is only one option in the visible future – to be smart accommodation.

Application:

- A++ energy buildings and equipment.
- Own electricity production.
- Wind, solar, hydro energy.
- Smart heat pump heating.
- Smart ventilation system.
- Smart climate control.
- Person recognizing lock.
- Smart lighting system.
- Tweaking glass panels.
- Smart cleaning system, dirt free surfaces.
- Smart adjustable bed.
- Automatic roll sheet change.
- No garbage.
- No waste.
- No wastewater.
- Heat from wastewater returns to the heating system.



5.4. Smart catering

Provision of catering services in hotels and its restaurant is an obligatory component of whole tourist services. Special attention should be paid to planning a meal according to individual needs. Convenient buffet has a weak side related to up to 40% of waste food. Virtual booking systems enable book catering according to personal needs and requests of visitors.

Easy communication by the internet should give opportunity to reduce food waste amounts. Scientific research on the Human genome creates further opportunities for food service individualisation according to the very specific needs of a concrete guest. Use of automatic drink preparing equipment and 3D print food solutions in hotel rooms could avoid necessity to have expensive restaurants and breakfast rooms.

Application:

- Food supply on individual pre-orders.
- Meal processed with 3D printer.
- No food wastes.
- No waste cooking oil.



5.5. Smart wellness

Health monitoring and support devices in rooms and special SPA, sport and wellness procedures become obligatory part of the whole tourist service. This assures an increasing income of service providers due to additional services. Also, this requires taking care of automation of lighting, heating, cooling, and water supply. Traditional use of paper, towels, cosmetic materials should be replaced with electronic solutions. Waste and heat should be taken off from water, which should be cleaned and reused. SPA visitor emergency and trauma prevention equipment should be used in SPA.

Application:

- Smart toilet with bidet and dryer.
- Smart shower with dryer.
- Smart bathhouse.
- Water taps with dryer.
- Dirt free surfaces.

- Health monitoring with wristwatches.



5.6. Smart local transportation

Tourism service providers could earn some attractiveness and additional income by proposing for visitor’s local transportation mean: bicycles, rollers, wheelchairs, bus shuttles, etc. All combusting transport means should be replaced by natural or electric vehicles. Driverless transportation outside and inside a hotel is the most appropriate from the point of view of a circular economy, especially for people with special needs.

Application:

- Smart care system for guests with special needs.
- Free of charge smart transportation outside and inside of the hotel.
- Faces recognising elevators.
- Electric driver less vehicles.
- Dirt free surfaces of cars.



It’s necessary to mention that innovation flow is permanent, so the self-assessment tool will be constantly updated.

6. Benefits of smart hospitality innovation for tourism business and society

Circular economy, same as other European innovation initiatives and strategies, is not a buzzword. They are targeted to decide global and local development problems. At the same time circular economy gives direct additional profit for tourism SMEs through increasing service complexity, saving of materials, energy and indirect – through increasing the benefit for society. Anyway, tourism SMEs earn many times through circular loops of innovations.

6.1. Rise of work productivity

Work productivity is one of main economic indicators of progress and development of a society. It shows efficiency of human work, which economic value is created by one employee or worker. Stagnation of work productivity growth results in destruction and crisis in a society. So, only increasingly growing productivity is an indicator of wellbeing of a society.

Talking about increasing work productivity it is necessary to state that higher work productivity not necessarily results in total exclusion of people from job places. Humans are operating two kinds of jobs: manual and intellectual. First of them is hard, mostly physical and it is not desired by humans, being done mainly for salary. On the other hand, the price for manual work permanently is increasing. Naturally, this not desired manual work is being replaced by machines, robots, and virtual systems.

6.2. Increase of high-tech jobs

Intellectual work is desired and related to highest human demands – self-esteem and self-expressions, which are constantly increasing.

So, raising work productivity is freeing people from hard manual work and creates opportunities for high-tech intellectual jobs. Humans should seek to increase their intellectual abilities to fit high-tech jobs through permanent self-improvement. No other ways exist.

Tourism business nowadays uses a lot of manual work on assuring clean rooms, beds, SPA, and healthy catering. Automation and robotization of tourism services result in reduction of manual work demand, workplaces. However, the need for high-tech jobs related to innovations of tourist service will create new high intelligence workplaces.

6.3. Growing business profitability

It's not a secret that business historically is dedicated to profit, and this can't be taken from SMEs purpose. However, European Community declares itself as a social market. It means that not only economic, but social capital also is a value of interaction of service providers and consumers.

Social market orientation gives businessmen market opportunities to attract more visitors and earn additional income. Seeking to increase service complexity SME could assure the catering during all day, SPA, local transportation opportunities and other.

6.4. Increasing social responsibility

Socially responsible business brings new features into social market activities. Because socially responsible businessmen earn not direct additional income, but an increase of self-esteem for doing good deals, which anyway returns to them sooner or later.

6.5. Cleaner environment

Cleaner environment and reduced climate change become undisclosed good deals for the planet. Large tourist flows, and huge amounts of energy, food and other materials are related to enormous amounts of waste and pollution of the environment. Circular economic ecological benefit is evident and not doubtful.

Tourism SMEs can take part in great ecologic initiatives and help to make our planes more acceptable for life.

6.6. Longer life span of people

Cleaner environment, safer food, healthier tourism services result in the most important indicator of human wellbeing – full-range life span and wellness. According to the World Health Organisation, combustion related pollution of the environment reduces human life span by 17-20%. So, humans could live 20 years longer if combusting and polluting the environment would be stopped.

7. Technogenic approach to smart hospitality education and self-improvement

Presented above, the content of Smart hospitality requires the use of a homogenous qualitative approach to learning and self-improvement on such subjects. Created by Prof. Dr Stasys Paulauskas methodology of **Technogeny** (*techne – skills, arts; genie – origin, development, genesis; ancient Greek*) constructs virtual models of an origin and development of learning and self-improvement seeking to gain necessary for success practice skills and abilities. Genetic approach helps to compose very attractive and efficient learning programmes.

7.1. Needs and path of learning qualitative transition

Permanent learning and Self-Improvement are genomic unavoidable abilities of each live organism. **Anthropogenic** self-regulation cycle evidently shows, how seeking to cover an actualised demand live organism is modelling and implementing own action, which after is assessing in matter of economy – lowest expenses of time and energy for cover a demand²⁰. Applied action programme with success' indexes is placed into memory for next time to take from here the most efficient programmes. Moreover, genomes have the special ability to simulate action programmes in a brain without implementing it in real practice. This ability is **gaming**, which enables mentally accumulating and enriching personal libraries of action programmes. It's very important to know that when we sleep, a genome-like accurate librarian takes all newly created and applied action programmes and places them into certain places of the memory, classifies it each moment according to new criteria and convenience to find it's easier and quicker. Our learning programmes are like video games with signs of all human senses: vision, hearing, touch, smell, and taste. So, why after waking up in the morning, everything is clearer in our minds.

So, each realised action helps to gain improved action programmes, which has a sense of **learning** and **self-improvement**. In animals' world learning has a sense of copying and imitating by juniors' actions of adults. Its parents do not imagine that they are doing some special education programmes for the benefit of juniors. Education is a normal constituent of natural family relation. In human family verbal communication enables significantly increased efficiency of transferring of success programmes to younger generation in much shorter time, thanks to the **teaching** - verbal analysis and modelling of action programmes. Education and teaching become specialized human activity dedicated to transfer accumulated by previous generation experience to younger generations.

However, not seeing special technical means humans teach juniors – transferring experience to the younger generation one third of their life span – 25 years. The main reason for such a waste of time is lost understanding of the sense of learning. A human action programme is the **Natural Learning unit (NLU)**. NLU is a complex procedure on covering actualised demand and fixing it. However, specialised

²⁰ Paulauskas S. Anthropogeny: HUMAN QUALITY VIRTUAL LEAP/ [Management - Journal of Management. Lithuania business university of applied sciences, ISSN 1648-7974. Klaipeda, Lithuania. 2020, № 1\(36\).](#) -P.61-66.

activities of science and education for analysis purpose divided and fragmented such learning units and forgot to collect it again for its synthesis in higher quality of practical use. So, growing exponentially mountains of fragmented knowledge worse opportunities for quick find of LU for practical needs. Big libraries, encyclopaedias, Wikipedia, computers, big data bases, Google engines, etc. are developing to navigate in this ocean of fragmented knowledge. Therefore, attempts to transfer such knowledge disorder into the brains of juniors meets so big resistance.

Understanding the sense and practical purpose of the learning unit helps to collect fragmented knowledge into the Natural **Knowledge unit (NKU)** – universal element of the Knowledge, like the atom is the unit of physical World. Humans are nearing a significant choice between two general knowledge concepts: chaotic and unified. Chaotic fragmentedness towards infinity knowledge leads to nowhere. The progress leads to efficient activity towards defining and concentration into Knowledge learning and applying into human practice. According to Virtualics World development spiral, Anthropogenic quality leap synthesis of knowledge units leads to discovering and construction of artificial learning units, what has sense or creation of artificial intelligence. The smart quality of learning and self-improvement mean arrangement of humanity’s self-management according to the genomics of a single human.

Going this way, the Genius learning programme was synthesised, and it’s implemented for more than thirty years. The genius knowledge subject is Innovation. Each human like any other live organism is an innovator who creates and implements new action programmes on exceeding the time. So, innovation is the **craft of Genius**, who gains success by exceeding the time. We can do this for a shorter or longer future and can be less or more successful. So, let us become Geniuses, thanks to the synthesis of the Knowledge unit.

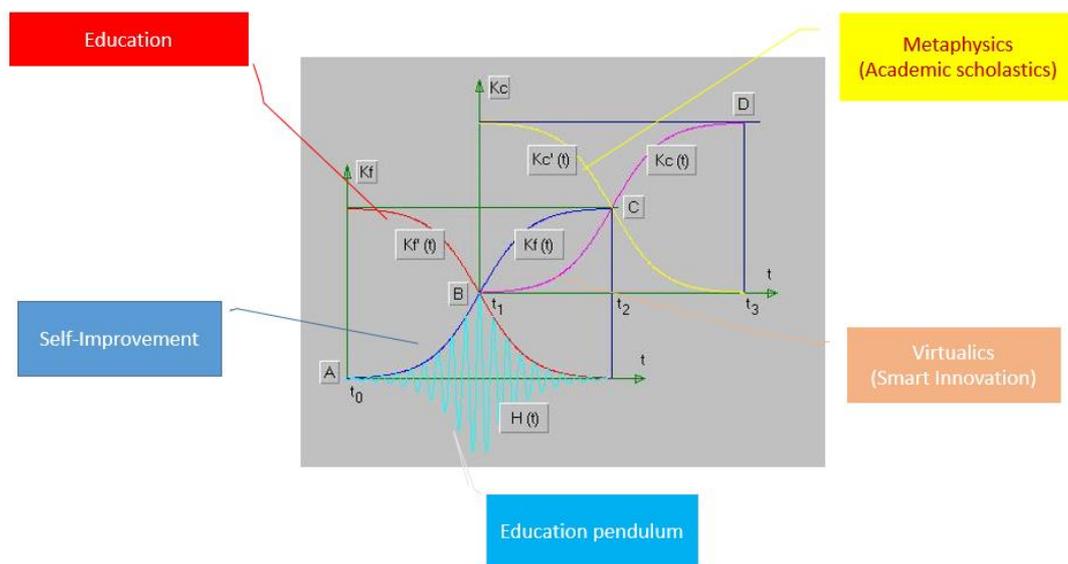


Figure 7.1. Virtual model of Self-Improvement transition. (S. Paulauskas. 1995)

Virtual model of Self-Improvement qualitative transition consists of dichotomies of the **form $K_f(t)$, the content $K_c(t)$ and contradiction between them $H(t)$** (Figure 7.1). The form of Self-Improvement replaces **Education** quality and creates conditions for changing learning content from **Metaphysics**

(academic scholastics) to **Virtualics** (Smart Innovation) through contradiction in the shape of resonance sinusoid. The pendulum shows how is accelerating the fight between New and Old until culmination point B, after which new wins this competition and contradiction slightly disappears.

Transition of Old education quality to New one means **innovation of education** – creation and implementation of new forms and content. (Figure 7.2).

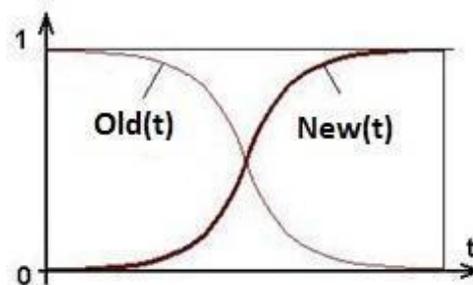


Figure 7.2. Learning innovation dichotomic virtual model. (S. Paulauskas. 1995)

It's important to understand that innovation of Self-Improvement is a natural permanently running process, which is going without targeted impact of humans. Humans have three choices or scenarios, how to deal with innovation trends: a) not follow them; b) follow and c) exceed the time.

7.2. The Learning form innovation

A learning form transits from education to Self-Improvement passing three qualitative steps of social relations: **A(t) autocratic face-to-face education**, **B(t) democratic blended learning** and **C(t) virtual liberal Self-Improvement** (Fig. 7.3).

Long-time Autocratic school with domination of a teacher and communal school was the main alone form of Education. Nowadays the democratic quality of Blended learning dominates, thanks to the opportunity to use some digitised PC and Internet tools in the learning process. The Future of education belongs to Virtual Self-Improvement, what significantly will change communal education. Giant push towards virtual Self-Improvement made COVID-19 virus.

Education transition quality is changing from group education to Individual Self-Education, which enables to avoid interests of educators versus interests of schoolboys. (Table 7. 1).

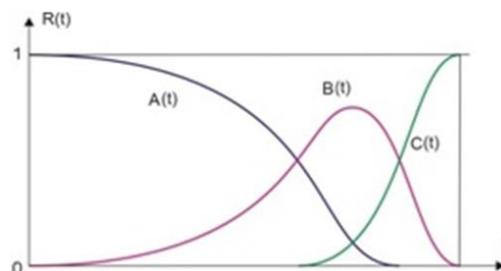


Figure 7.3. The learning form quality transition trichotomic virtual model (S. Paulauskas. 1995).

Education tools in the shape of writable and verbal knowledge is replaced by virtual self-education tools (PC, Internet, etc.). Big expensive buildings are replaced by virtual surroundings at home, which enable reduced learning costs and assure personally oriented education. Designated teachers are replaced by chosen mentors according to individual needs and opportunities of a Self-Improving person.

Communal State education is replaced by private business service, enabling assure quickness of education according to individual abilities and opportunities. Communal education market is replaced by the consumer market, where market competition and social responsibility mechanisms accelerate creation of virtual self-improvement tools and mentor’s quality improvement. Success of education form innovation also depends on modernisation of social relations in a community from Management to Self-Management and transition to digital direct democracy.

Table 7.1. Learning form transition. (S. Paulauskas. 2012)

Quality	Old	New	Earnings
Education quality	Group education	Individual virtual self-education	Avoiding impact of interest of pedagogues
Education tools	Verbal and writable knowledge	Virtual self-education tools (PC, internet)	Quickness, efficiency, personally oriented
Buildings	Big expensive buildings	Virtual surroundings	Cheap, personally oriented
Educator	Designate teacher	Chosen mentor	According to individual needs and possibilities
Organisation	State education	Private business	More rapid improvement
Market	Education institutions	Consumers	Responsible business
State education system	Non sustainable education	Sustainable self-education	More efficient self-improvement
Order	Management	Self-Management	More initiative
Politics	Autocracy (partocracy)	Direct democracy	More rapid development

7.3. The Learning content innovation

Self-Improvement content is changing through innovation dichotomies with help of digitalisation needs and opportunities. If old education content is focused on analysis of learning subjects, needs of creation more efficient action programmes require finalise gnostic process by synthesis of such programmes. World view is changing from a metaphysical sphere of things to a virtual world development spiral, enabling foreseeing the future. Formal abstract logic is replaced by virtual logics, enabling virtualized mental images.

Ethics is transiting from loyalty to social responsibility, what increases personal freedom and longer life span opportunities. Nowadays human’s race form is changing from speech to virtual images with the help of PC and Internet, which enables accelerated communication processes. Obligatory work is replaced by free creative activity towards freedom and longer life span of people. Social relations transferring from Management to Self-Management, giving more initiative to a person. Technologic activities develop from belief to knowing and safety of the overall life cycle in matters of responsibility and controllability. The Economic paradigm is changing from economics to sustainable development, what enables more quick development.

Table 7.2. Learning form transition. (S. Paulauskas. 2012)

Quality	Old	New	Earnings
Cognition	Analysis	Synthesis	More efficient action programmes
World outlook	Sphere of things, element - atom	Development spiral, “universum” - leap	Opportunity to model past and future
Methodology	Scholastics (what is)	Virtualics (how to change)	Possibility to use knowledge in practice
Logics	Formal	Virtual modelling	Possibility to virtualise mental images
Ethics	Loyalty	Responsibility	Personality freedom, longer life span
Homo sapiens sapiens form	Speech	Virtual images	More quick communication
Homo sapiens sapiens content	Obligatory work	Free creative activity	Personality freedom, longer life span
Sociology	Management	Self-management	More of initiative
Technology	Belief	Knowing	More responsibility
Paradigm	Economics	Sustainable development	More quick development
Business	Production/service	Sustainable innovation	Freedom and responsibility

Understanding of business quality is changing from production and service to sustainable innovation, giving to humans more freedom and responsibility.

7.4. The synthesis of the Genius Learning Unit

The synthesis of the advanced form and content of the Learning enabled it to recognise the highest Learning unit as a success-oriented Genius programme of an Innovator. Nobody can repeat any action programme. Each next action needs an updated sequence of movements in new time, changed surroundings and renewed actors. So, each human programme is an innovation, which needs to be created and implemented. The Practical Knowledge unit is an Innovation programme. Consequently, the

Learning unit is an Innovation programme. Simply, the smartness thing is to learn programming of innovations, which could be applied in different fields of human activities.

Innovator is **a Genius** – a human, who exceeds a time through creation and implementation of novelties. Majority are short-term geniuses, able shortly exceed a time. But exists persons, who exceed the time for tents and hundreds of years, who we named as Geniuses. As more you exceed the time and your colleagues as more you are a Genius. The Genius learning programme is constructing forty years and it consists of 3 virtual learning tools: a) Psychological Self-Improvement on innovation iGenius²¹(2015); b) Virtual Self-improvement portal with subject of Virtualics as the Innovation metatheory (1995) and c) Practical programme of innovation iMillionaire (2007).

Such Genius programmes and virtual tools belong to the highest synthetic level of virtual Self-Improvement. They were checked and discovered great results during bachelor and master’s degree studies in Klaipeda University, Lithuanian Business University of applied sciences, International Erasmus+ studies. Virtual Self-Improvement was applied in 4 Leonardo da Vinci projects, dedicated for working out innovative learning programmes on Renewable and wind energy in 2006-2015 years. In 2019-2021 years, Strategic Self-management Institute initiated and is leading the international consortium on implementation of Erasmus+ programme strategic project Smart hospitality, where the Genius programme is applying for the tourism service SMEs sector.

The learning programme and virtual Self-Assessment tool iSAT will be created to help tourism sector innovation. COVID-19 pandemic played a significant role in pushing learning quality towards virtual Self-Improvement in all countries and fields of education, by isolating schoolboys and students at home, which will be the best place for virtual Self-Improvement soon. The Genius programme will become a sweet cherry on the cake of smart Self-Improvement of humans and Artificial intelligence for smart machines and robots.

7.5. Smart hospitality learning programme scope and modules

Main passport of Smart hospitality methodology is defined by next orientations:

- Target group – owners and employees of tourism service providers
- Learning tasks – Self-improvement towards smart hospitality service business abilities
- Success formula – exceeding Self-Improvement on own skills, tourism service and business
- Durability – lifelong learning.
- Knowledge sources – Smart Hospitality toolbox as learning materials and best practice examples
- Advisories – designated teachers and chosen mentors.
- Self-Improving skills:
 - Psychological Self-improvement
 - Cognitive Self-Improvement
 - Practical Self-Improvement on SH innovations

²¹ [iGenius \(virtualika.lt\)](http://iGenius.virtualika.lt)

- Self-improvement tools and learning platforms – up to users of such methodology and learning materials.

Smart hospitality learning course consist of 6 modules and common time of 23,5 academic hours:

- Module 1. Smart hospitality marketing innovation – 3 a.h.
- Module 2. Smart hospitality communication innovation – 5 a.h.
- Module 3. Smart hospitality accommodation innovation – 7 a.h.
- Module 4. Smart hospitality catering innovation – 3 a.h.
- Module 5. Smart hospitality wellness innovation – 3 a.h.
- Module 6. Smart hospitality local transportation innovation – 3 a.h.

Considering different starting qualifications and achievable learning tools this methodology is universal and it is not limiting use of described Self-Improvement forms and content. The methodology and learning materials could be used in face-to-face, blended learning and virtual self-improvement qualities by teachers or by tourism services providing businessmen.

8. Training modules

8.1. Module 1: Marketing innovations

MODULE 1:	Marketing innovation
GLOSSARY	Tourism marketing, innovation, 4P, feed-back, marketing strategy, global marketing, virtual marketing
GENERAL GOAL(S):	The course is dedicated for self-educating tourism service providers to learn advanced marketing technologies and techniques, related to market research and formation in tourism sector innovations. 4P marketing mix with tourism service product, pricing, placing, and promotion is present in scope of physical, economic, green, sustainable and smart growth. Advanced marketing strategy is targeting the most global feed-back by using a global marketing loop and virtual self-marketing of consumers.
OBJECTIVES:	By the end of the module, participants will be able to: <ul style="list-style-type: none"> • Skills on permanent virtual self-improvement on smart tourism marketing innovation. • Knowledge on tourism service marketing structure, qualities and innovation means. • Attitude for exceeding self-improvement on tourism service marketing innovations.
METHODS:	Virtual Self-training, Self-assessment
DURATION:	3 hours
RESOURCES NEEDED:	computer, mobile phone, internet
ORDER OF ACTIVITIES:	<p>Step 1: (30 min.) – Backgrounds of tourism marketing innovation</p> <p>Step 2: (1 hour) – Virtual Self-Assessment on tourism marketing innovations</p> <p>Step 3: (30 min.) – Global tourism virtual marketing</p> <p>Step 4: (1 hour) –Tourism service modelling</p>
EVALUATION OF THE MODULE:	<ul style="list-style-type: none"> • test/quiz (annex no.2) • close questions

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Psychological Self-Improvement virtual programme iGenius
<http://www.virtualika.lt/iGenius/>

Innovation project template – <https://www.eksponente.lt/InProject.pptx>

Virtual business plan template - <http://www.eksponente.lt/BisPlanModel.xlsx>

Tourism service Self-Assessment tool - [iHsat](#)

Background of tourism marketing innovations

Marketing is the first stage of tourism service steps, which also includes communication, accommodation, catering, wellness, and local transportation. Marketing is activity targeted to investigation and formation of the tourism service market. According to European Union EU2020 strategy for smart, inclusive, and sustainable growth, the strategic initiative of Innovation Union and Circular economy 3.0 methodology tourism service is developing through quality of Physical, Economic, Green, Sustainable and Smart innovation. So, tourism service strategy should be grounded on investigation of consumers demands and arranging this service by introducing best innovations.

Innovation is activity connected to investigation and implementation into tourism service business novelties according to four stages of Innovation cycle: a) basic research; b) applied research, c) development and d) commercialisation.

The Virtualics is an innovation methodology, which enables virtual modelling of development trends, including growth of Human demands and activities using digital graphs. Anthropogeny is the theory of Human origin and development trends. Sociogeny is the theory of origin and development of social relations. Technogeny is theory of origin and development of Human skills and arts.

Here exist three options to deal with innovations: a) not introduction of innovations, b) to follow competitors and c) to exceed time and competitors.

The crucial point of tourism service marketing is investigation of consumers demands development trends and to assure exceeding growth of quality of a tourism service provider.

Tourism service marketing consists of 5 main actions: market research, service formation, pricing, advertising, and guests' polls. All such marketing actions could be implemented in different mentioned above qualities: physical, economic, green, sustainable, and smart growth.

Tourism service providers are targeting to achieve success in tourism service market through permanent exceeding self-improvement in three levels of education: a) psychological readiness for tourism innovations, b) cognitive abilities to understand global tourism virtual marketing and manage marketing innovation complex 4P: product, price, place and promotion, c) tourism service innovation practice trough.

Virtual Self-Assessment on tourism marketing innovations

Starting point of tourism service marketing is motivation of businessmen to form personal marketing strategy on exceeding introduction of innovations with help of special Self-Assessment tool like iGenius dedicated to common personal motivation and iHsat as a special virtual tool prepared for tourism service innovations.

iGenius consists of 25 questions questionnaire, answering to which gives the opportunity to know the common score on innovation level in scale: slave, hired worker, employee, businessmen, innovator/Genius. The program also shows analogic progress on personal features: smartness, novelty, expedience, flexibility, and reality.

iHsat is the virtual Self-Assessment tool worked out during Erasmus+ project Smart Hospitality implementation. After answering a whole of questions, a learning person will receive conclusions on the quality level of tourism service growth: physical, economic, green, sustainable, and smart. The program will calculate how much of material, energy, office costs and manual work can be reduced. The map will help a service provider to compare its own innovation quality with other geographical tourism service providers. The Self-Assessment tool has functions of perfection on tourism service innovation through repeating Self-Assessment and comparing progress.

Global tourism virtual marketing

Think globally, act locally. This useful rule is highly acceptable in tourism service marketing. Because the tourism market is global though includes local components. Each hotel, restaurant or SPA in the World is open for guests from the overall planet. So, marketing of each tourism service provider should be oriented to each person in the world, not seeing to language, culture, attitudes, habits, etc.

Smart quality of tourism marketing means avoidance of office material, energy, and work expenditures. Smart hotel is imagined as contact-less self-service during booking, accommodation, catering, wellness, and local transportation self-services. Smart quality tourism marketing means self-marketing of a consumer, who implements all self-marketing functions by internet with help of PC, mobile device, etc. Special Smart hotel software is providing consumers with needed information and implementing their own service and business preparatory, supporting, and maintaining operations seeking to assure the highest quality of service and satisfaction of a consumer.

Tourism service modelling

Tourism service modelling is a creative procedure during which tourism service innovation is examined about smart innovativeness. It is implemented by using 4 methods: recognition of innovativeness, assessment of smartness, 4P complex and business modelling.

Recognition of innovativeness of a service, technology or method is implemented by placement of an innovation on dichotomic, trichotomic or polytomic virtual trend. It should be based on growing part of the trend not less than 10 years in the future for nowadays state.

Smartness of an innovation is evaluating with help of 5 criteria:

- Physical – availability of existing devices or technologies in the market.
- Economic – higher work productivity – less manual work.
- Ecologic – no/less pollution.
- Sustainable – longer life span of people.
- Smart – more happiness to people.

Tourism marketing complex 4P means scope of 4 components: product/service, price, place, promotion is implemented by using half-prepared interactive graphs in excel sheets.

Virtual innovation business model is pre-designed excel sheet, in which service providers should enter number, service item costs, investment, expenditures and tax rate in each of next 10 years. The tool will calculate Accumulated net profit on 3 scenarios. The task is to achieve net profit more than 1 million euros during ten years by changing entered primary data.

If many evaluations result by each of 4 methods demonstrates innovativeness of chosen service or technology, service providers could make decisions on the start of introduction of this innovation. If the provided service does not pass this exam, it's recommended to start searching for another innovation. In this case marketing research must be repeated.

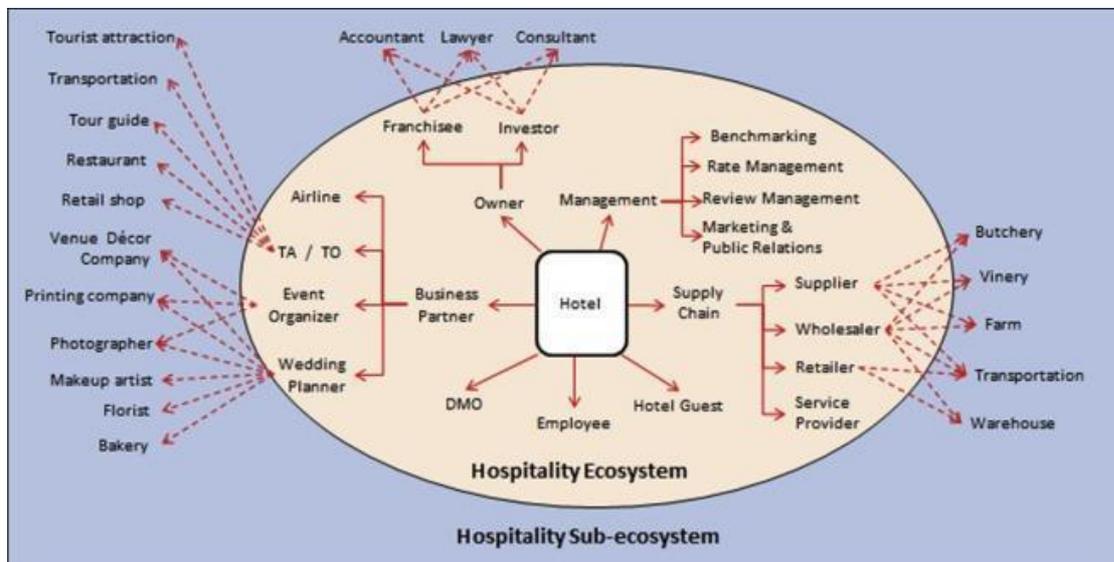
8.2. Module 2: Communication innovation

MODULE 2:	Communication innovation
GLOSSARY	Push-to-talk over cellular (Pock); The Internet of Things (IoT); OTAs (Online Travel Agencies; Customer relationship management (CRM)
GENERAL GOAL(S):	This course will introduce students to the innovations in communications for the hospitality business. Students will learn about technologies in reservation, check-in and check-out and about social media, they will gain an understanding of the basic skills and knowledge needed for a successful career in the hospitality sector.
OBJECTIVES:	By the end of the module, participants will be able to gain new: <ul style="list-style-type: none"> • Skills to find and develop new innovative solutions for communication in the hospitality industry. • Knowledge about trends and good practices about communication. • Attitude to be proactive and motivated to work on new innovations, to gain new competences in the hospitality industry and particularly communication skills.
METHODS:	Self-training, self-evaluation
DURATION:	4,5 hours
RESOURCES NEEDED:	Computer, internet
ORDER OF ACTIVITIES:	<p>Step 1: (45 min.) – Introduction of global trends in communication</p> <p>Step 2: (45 min.) – Reservation</p> <p>Step 3: (45 min.) – Front office: check-in and check-out</p> <p>Step 4: (45 min.) – Social media</p> <p>Step 5: (45 min.) - Self work</p>
EVALUATION OF THE MODULE:	Step 6: (45 min.) – Questions to check learning achievements
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Introduction of global technical trends in communication

Innovations in communications between hotels, customers, suppliers, and different business partners are improving rapidly. Hotels build a smart ecosystem which allows to operate in the most efficient way inside this system and outside with hospitality sub-ecosystem.



**Hospitality Sub-ecosystem.*

Source

<https://www.sciencedirect.com/science/article/abs/pii/S0278431917301974>

These days, most hoteliers are focused on using every available technology to enhance and hyper-personalize guest experience. Multi-purpose communication devices can help transform customer

service from good to superior. Plus, the benefits extend beyond guests to include employee experience as well. By consolidating programs into single hands-free communication devices, staff equipment and workloads are lightened.

Consumer dependency on mobile devices has pushed integrated messaging to higher levels. A few years ago, major messaging platforms introduced chatbots and hotels began offering messaging services for guests. Now, Artificial Intelligence (AI) powered chatbots that all but eliminate human interaction and appear completely natural, will further boost guest experience. However, few hoteliers have realized the full potential for this burgeoning technology. As AI becomes more sophisticated, independents and chains will find new ways to enhance every phase of the travel/stay experience.

The existing Wi-Fi network is basically free, but it is also vulnerable to hacking, interference, and failure. Therefore, important network functions will utilize backup and redundant services such as LTE/4G/5G. Digital narrowband, Third Generation (3G), Long Term Evolution (LTE) and Internet of Things (IoT) are just a handful of next evolution networks that have arisen over the years.

Wireless Communication

Most people have heard the saying “There’s an app for that.” Now devices are evolving to keep up with the ever-increasing introduction of specialized mobile-applications for every field, particularly hospitality. „Pryme Wireless Communication Accessories” company presented some key trends within wireless communications and hardware development for the hospitality industry and explain trends of hospitality and entertainment applications.

Push-to-talk over cellular (PoC) has already impacted wireless communications and hardware development with the introduction of Bluetooth equipped two-way radios, transitional gateways for hybrid systems and smartphone adoption. With a simple push of a button users of the GroupTalk service have access to real time group communication, like two-way radios, from the phone. Recently, it has seen a growing trend toward the use of mobile messaging apps among hotels, casinos, stadiums and other venues. Plus, with the addition of PTT accessories, which enhance audio clarity, offer hands-free convenience and discreet communications, more hospitality companies are jumping on the PoC bandwagon.

The hotel’s engineering discovered ZelloWork, from Zello, a push-to-talk (PTT) walkie-talkie app. Zello offers critical features that the hotel needs for their day-to-day operations. The app works on any carrier’s data network or Wi-Fi. ZelloWork also provides an affordable gateway solution to stay connected with existing two-way radios.

The Internet of Things (IoT) has been the impetus behind most wireless innovations and will continue to be until another network technology surpasses it or, as some may fear, it reaches maximum capacity. Mobile apps are being developed daily to fulfil sector-specific needs and are easily accessible over internet (Wi-Fi) or broadband networks, as well as cellular, allowing extended reach and consistent connectivity.

Additionally, PoC is a more affordable communications method than traditional land mobile systems,

requiring no infrastructure or major equipment, which means serious savings to hospitality businesses. Thus, end users are hungry for devices optimized to support these new mobile applications.

Although trends indicate that every job will eventually have a dedicated application, today’s cell phones, iPods or tablets may not always fit the utilization. Manufacturers are already developing app-specific devices and unique communications accessories designed for individual departments. For example, Housekeeping, Food/Beverage, and Front Desk might need a wired earpiece, while engineering may want hands free with wireless Bluetooth headsets instead.

Staying relevant

Lately, new software technologies are acquired as fast as they are launched. The consolidation trend will continue, as demonstrated by Motorola’s recent purchase of Kodiak’s PTT platform. To stay relevant, manufacturers must be able to react quickly.

Another way manufacturer can stay relevant is to develop joint solutions with other companies to meet end user mandates. LMR radio and smartphone makers are already working with PTT (push to talk) app firms and network providers to keep up with PoC demand. Synergistic partnerships to share the load, or systems integration alliances to compete for new business, will continue to spread among hardware companies.

Merging devices

The trend toward replacing two-way radios with smartphones has been on the rise. Still, some remain reluctant to convert. Consequently, manufacturers are creating devices that look exactly like radios on the outside but are really 4G phones on the inside. It will not be long before this transition becomes commonplace. Ultimately, as software and network improvements prove to enhance safety, productivity and response time, hospitality and entertainment businesses of all types will convert to the newly developed hardware devices that support them.

Coming soon

Doing more with less is an ongoing trend, Hardware devices that control multiple communication outlets at once, yet are smaller than ever before will soon emerge. Pryme is working on a ring-sized Bluetooth Low Energy (BLTE) button that controls everything, including PTT (App activation), phone calling, channel selection (App Groups and Channels) and even music programs.

Bluetooth technologies also offer similar sensors to Wi-Fi beacons and near-field technologies that communicate with smart devices at strategic access points to display individualized messages. Some hotels are even experimenting with technologies that send keys directly to smartphones for guests who want to skip the check-in process.

Venues are finding more and more ways to incorporate this kind of location information into communications and marketing, as well as to establish deeper customer relationships and more

personalized service. Ultimately, it is the end-users that drive future applications, which in turn inspire hardware and accessory innovations.

Advanced Push-to-Talk solutions for hospitality

Now more than ever, delighting the guest and showing the value of the hotel experience are critical to retain customers and expand market presence. Deliver the ultimate guest experience by maximizing your personnel. Leverage Push-to-talk Over Cellular (PoC) technology to achieve 5-Star service with 3- or 4-Star staffing levels. Today, virtually everyone – from the smallest hotel to the largest resort – can benefit from push-to-talk (PTT) across their entire operation, for PTT brings the immediacy and spontaneity to connect personnel. WAVE™ PTT Mobile App Communications allows staff to use their current devices to connect with radio systems and other broadband networks and devices - like consumer-grade smartphones, desk phones and PCs - so that more employees can use push-to-talk to communicate. Whatever the device or available network, WAVE has client applications that meet the needs of all types of users.

Coordinate staff instantly with WAVE™ PTT Mobile App Push-to-Talk

When it comes to speed, nothing is faster than push-to-talk. WAVE™ PTT Mobile App provides the instant group communications needed for high-performing teams. Use WAVE radios for clear voice in most any condition, or the WAVE™ broadband PTT application for instant anywhere connectivity. Because when your staff needs to help keep a guest happy, every moment matters. With WAVE your teams can simply push, talk, and confidently get the help they need.

Better service requires better connectedness. WAVE™ PTT Mobile App connects smartphones, computers, and radios onto a single platform so you can freely communicate and collaborate on the device that suits you best from virtually any location. From housekeeping to security to administration, your employee base is only a touch away.

Lower infrastructure costs by leveraging the devices your employees already have in place. Not all employees (or workplaces) need two-way radios. For those who do not, WAVE™ PTT Mobile App can be placed on the same smart device they use for tasks like work order tickets, reducing costs and allowing employees to open and close tickets and work more efficiently.

Transform Guest experiences with Wave™ PTT Mobile App

Boost collaboration no matter what device the team is using. Whether it is front office workers talking to the construction site, or sales staff communicating with the warehouse, the Wave PTT Mobile App enables instant communication between radios and smartphones across carriers. You can even use the WAVE two-way radio with your current compatible two-way radio systems and smartphones. There is no costly or time-consuming FCC or spectrum licensing, or manual programming required.

Equip your team with the Purpose-Built devices for Instant PTT communication

Eliminate the barriers between devices, networks, and locations. Give your employees the best communication tool fit for their role and workplace. Whether they use a radio, mobile phone, tablet, PC or landline, your employees can communicate as one team.

- Communication between outdoor & indoor environments
- Ability to respond quickly to emergency situations.
- Integrated voice and business applications
- Long-lasting and durable devices

For properties that prefer a simplified and voice-optimized design you can even use the WAVE™ TLK 100 Two-Way Radio with current compatible two-way radio systems and smartphones. It delivers distraction-free voice communications. There is no costly or time-consuming FCC or spectrum licensing, or manual programming required. Unlike traditional radio, there is no costly upfront investment required. A month-to-month plan keeps costs under control. You do not have to worry about unknown replacement costs, either, because Motorola will replace any WAVE radio that’s accidentally damaged.

A few of the benefits the hospitality Industry receives by using push-to-talk over cellular technology include:

- Communicate at the Touch of a Button between Android, iOS and LMR Users
- GPS Mapping and Location Services Allow You to View Users on a Map and See Their Status
- Use Text Messages to Communicate Discreetly Without Disturbing Guests
- Instantly Connect with a Group or Individual with Multimedia Communication with Critical Information
- Web-Based Dispatch Features Clear, Consistent Communications and Location Tracking
- Real-Time Presence Allows You to Accurately Estimate Arrival and Departure Times as well as Who is Available or Offline

To communicate quickly in teams, it is good to use standard smartphones. Hospitality staff can use **Wired or Bluetooth Headsets** to keep in constant contact.

Each department can be grouped into their own channel. Via headsets, your staff can communicate and pay attention to their guests at the same time.

A SOS channel can be configured across departments to quickly pull in key personnel in the event of an emergency on property.

We will introduce few fields of innovations which include:

- Reservation/booking.
- Front office/check-in, check-out, and payment.
- Communication in social media.

Reservation

Many travellers use OTAs (Online Travel Agencies, like Expedia or Booking.com, etc.) to compare rates. They take a commission (12-15%) but are also very powerful. It is important to manage them well. It starts with setting up nice pages for your hotels on the most important OTAs for your destination and with great professional photos. Being on these sites will drive your revenue stream and attract customers from around the world. However, this does mean that your rate will have to remain competitive in the area your hotel is located. If your price is higher than similar hotels in the area, you will need to justify this by promoting your unique selling points. It is important to do continuous research on what your rival hotels are offering and what their rates are to ensure you remain value for money.

Also, always more of travellers go then booking directly on the hotel website directly. It is very important that when they type the name of a hotel on Google, your website shows up on the first page. Every successful online business will know the benefits of utilizing SEO, or ‘search engine optimization’ for pulling in traffic for website.

Your website is often the first impression that future guests will have about your hotel. If it’s not convincing, you might have to tell them “Goodbye” even before you could have said “Hello”. Website main objectives

- Provide users with clear and precise information referring to their search criteria.
- Reassure them about your hotel’s quality, value, and significance.
- Make it a dream and desire for them to stay and experience your hotel.
- Allow them to easily check rates and availability so they can book their rooms promptly and effortlessly.



Your site UX and design should guide a visitor from introduction through to your hotel’s location, facilities, special offers, cost, contact information and booking system.

Hotel website simple marketing tips

Responsive template

This means that your website’s template (its structure and design) adapts itself automatically to all sorts of screen devices (smartphones, tablets, etc.) for an optimal viewing experience. Most people today browse the Internet on their phones or tablets, especially when traveling.

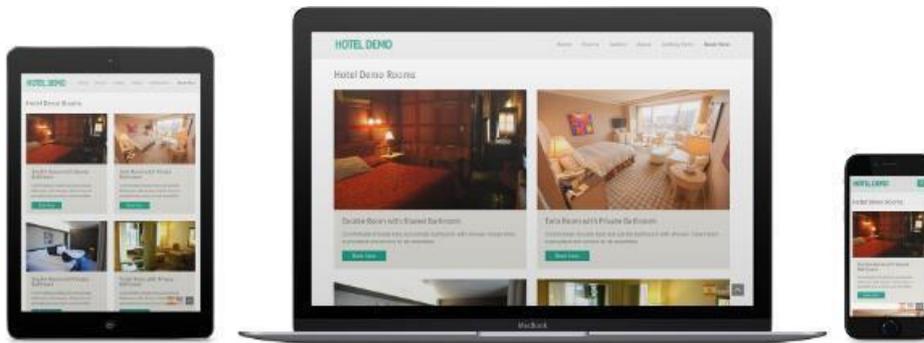
Quick navigation

You need a website that is fully functional, where content and images load rapidly. When browsing for information online, it can be frustrating when one encounters a site that is delayed and takes too long to load. A user-friendly website is key to ensuring that happens, and that you make that all-important sale. If the website is hard to navigate with flashy animations that give no directions of where to click, soon they will take their booking elsewhere.

Booking engine

A Website Booking Engine makes it possible to check rates and availability for specific dates. It is usually included in your Channel Manager package. The Channel Manager is the tool that allows you to centralize and automate the management of your various online distribution channels (Expedia, Booking.com, Easy-to-book, etc.). If your current best rates are advertised on the home page, or the room rates appear next to the room descriptions, this could absolutely increase your conversion ratio.

Simple design



Choose a simple and light design design that both respects and accentuates your brand and logo graphic chart. The design should transcribe your hotel positioning (your concept; the features that make your hotel unique and interesting) at first glance.

Clear menu

Have a clear structure and menu that makes navigation simple and effortless. The visitor should be able to find all the information quickly and easily he/she is searching for. Additionally, build an effective interlink between your different web pages, to make navigation even easier.

Professional pictures

An image speaks a thousand words; make your website visual! Keep the text simple and use the maximum keywords, to enhance Search Engine Ranking. Travelers prefer visual stimulus in the form of

images and videos that encourages them to better visualize and experience your property, rather than reading lengthy room descriptions.

Most people will decide in the first few seconds of seeing a hotel’s photos whether they want to stay there or not. It is important to show photos that honestly represent your hotel. There is no point showing a picture of a 5* luxury pool when it looks more like a bathtub. The customer should still be pleasantly surprised when they arrive at your hotel and see your amenities in person. But that does not mean you can’t tweak your photos to show it looking polished and at its best.

You could have the most luxurious hotel in the world, but if your pictures do not do it justice then you will never get those customers that it deserves. When someone sees a beautiful picture of a beautiful hotel, they immediately will start imagining themselves being there. If you can make them picture themselves eating your mouth-watering food in your restaurant, or lounging on your comfy looking bed, then you have made a sale. You have worked hard on your hotel, so do not fall at the last hurdle with bad photos that do not show off your hotel in its best light.



Communicate directly to your potential guest.

Communicate regularly through social media or on a blog section to inform visitors of activities, experiences, and various news that could be of interest to them.

Use personal words and keep the content relevant to your potential guests. This could be done by describing the list of activities available at your destination; then linking them to the corresponding pages or articles. This way, guests can easily gain access to more details and information. Your visitors will eventually share the relevant content on their social networks, thus enhancing your Search Engine ranking.

Multilingual content

If you would like to gain international visibility, it is best to begin with translating your website into the different local languages of the countries you are targeting. This not only ensures you a higher ranking on Google, Bing, or other Search Engines for each country, but will also offer a great convenience to potential guests and motivate them to book directly on your website.

Site visitors can be from all over the world so make the site experience as easy as possible by giving them the option to read it in their own language. Translating your website is for most a straightforward process using most key languages. Also mention on your site the bilingual capabilities of your staff. It’s a huge selling point if you and your staff can communicate and advise your guests in their native language especially if any difficulties may arise during their stay.



Free Wi-Fi

This might sound pedantic, and many may be going on holiday purely to get away from the trappings of modern technologies and communications. But that does not mean they want to be cut off from their Facebook or email. As consumers we like to have choice and want the option to be able to go online to let their loved ones to let them know they have arrived safely and maybe ask someone to double check they unplugged the iron. Travelers will not book a hotel if it does not have Wi-Fi and if the Wi-Fi isn’t free.

Front office

The role of the front office department starts as soon as a guest makes a reservation enquiry. After this enquiry, the front office sends a confirmation mail, call or SMS to the guest. Upon arrival, the front office ensures an easy check-in and assigns a room to the guest. The front office software in a hotel also comes into play as it assists the guest to check out of the hotel smoothly.

Another function the front office software performs is to store guest history details. These are extracted when a guest checks into the hotel again or if the hotel plans to send promotions. A strong guest history feature allows hotel staff to anticipate the needs of the guest, personalize his stay, brand the hotel strongly and build loyalty of the guest.

Smart hotel trends include voice-activated controls like Amazon’s Alexa and Google Home. Smart hotels are timesavers. Guests no longer must pass by reception because they can check-in and check-out directly from their phones. They can use their phones as room keys. All without having any human interaction.

Important role is smart hotel control which enables complete overview at the reception. From check-in to check-out, all calls and signals sent by guests from their room are registered at the reception. Furthermore – reception receives emergency signals such as flood and burglary All signals are shown in real time.

The main trends in communication from the front office now include:

- Enhanced Connectivity to Guest Services and Staff Members.
- Intelligent Environmental and Entertainment Controls.
- The Inclusion of Voice-Ready Technology.
- Smart and Interactive Maps.
- Personalized Forms of Entertainment.
- The Concept of Sustainability.
- Adopting Smart and Targeted Forms of Data Collection.

Reservation

The front office management assists the hotels front desks to speed up the reservation process. The ‘Quick Booking’ option lets the front office staff book a reservation in a few seconds and generates a booking/reservation number. If reservation is not confirmed your booking status will be:

- Waiting List.
- Confirmation Mail to Guest.
- SMS Sending to Guest.
- Adding Guest instruction time of reservation Time (Ex: Give me room in Ground Floor).
- We Can Add Extra Charge time of reservation (Ex: Pickup from Airport).
- RAC & Waiting List Concept.

Amend Reservation: The front office management module can amend reservation numbers according to the Guest Arrival to Hotel.

- Amending Mail to Guest
- SMS Sending to Guest
- Adding Guest instruction time of reservation Time (Ex: Required Ground Floor)
- We Can Add Extra Charge time of reservation (Ex: Pickup from Airport)

Cancel Reservation: Cancelling reservation as well as waiting list.

Online Reservation: Room reservations are like sweating the small stuff and so more vulnerable to systemic inefficiencies. Cognition Reservation Grid delivers a 360-degree display of the data on the dashboard. This way you can execute the most complex room operation tasks without any kind of hassle whatsoever, as a hotelier or a property manager or a vendor as well as your end customer.

Some of the key features in the reservation module include Allocate with preference, scan through real time status of occupancy, Payment gateway, Centralized reservation system, Integrated website with reservation modules, Online Reservation using Smart Phones, Reservation Status confirmation, Group Reservation, amendment to reservation and cancellations to save time and ensure quick and unfussy guest check-ins.

Hotels sell their inventory through their own hotel website. This is ideally the best hotel reservation software system for hotel owners as majority times they are not paying any commission when

reservations come from the hotel own website. Cognition central reservation system provides desktop & mobile reservation engine tightly integrated with Cognition Front Office System.

- Booking & Reservations.
- Multiple room selection for stay at reservation.
- No-Show & Cancel Reservation.
- Reservation Confirmation Sent Through SMS & E-MAIL.
- Payment GateWay Integration with Leading Banking.

Loyalty cards: The hospitality world is flooded with loyalty cards, point schemes and membership bonuses. Finding a good hotel is key to a successful vacation or business trip, so once someone has found one, you want to encourage them to come back again and again. Building links with companies and individuals can lead to long and profitable relationships. Do not forget to tell people about your loyalty offers on your site and an absolute must is to share these across your social network sites.

If you can, joining forces with larger rewards programs can offer guests the potential to gain greater and wider ranging rewards. They also do not necessarily impact your profit margins in the same way. For example, they may earn points from staying at your hotel. However, they can also use these points to stay in a location where you do not have a hotel therefore you haven't lost out on any income.

Additionally, being part of a rewards club means you can be included in their marketing structure. You could be featured in their newsletters, or on their website as a similar alternative to the current hotel a visitor is viewing. Yet another advertising stream that could bring in customers you previously would not have had access to.

Express Check-in

Weary after a journey, guests prefer to experience the comfort of their room quickly. Hotel industry standards also set that a check-in should ideally happen within 3 minutes of the guest entering the lobby. The 'Express Check-in' feature in the front office module enables hotel staff to simply drag and drop to make a reservation. This introduces efficiency for the hotel staff and significantly reduces waiting time for the guest.

Check-in Process

- Guest Information(mandatory)
- Guest Photo(optional).
- Guest Signature(optional).
- Guest Documents(optional).
- Sending Welcome SMS to guests.
- Sending Wi-Fi Password and User id to Guest.
- Generate Food coupons to Guests According to their Plan.

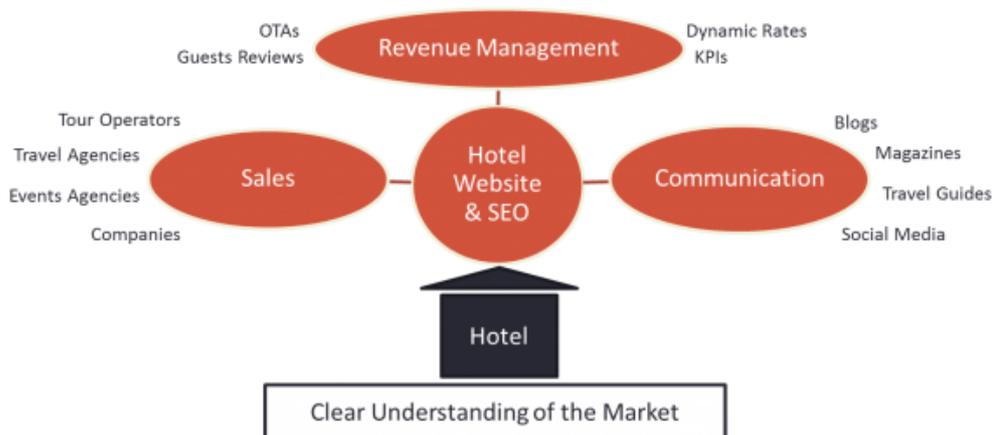
For foreign guests – collecting all passport and visa details to submit form c to the registration authorities within 24 hours of the arrival of the foreigner at their premises.

- Guest Information(*mandatory) ∅ Guest Photo(mandatory)
- Guest Signature (Mandatory)
- Guest Documents (Mandatory)
- Sending Welcome SMS to guest
- Sending Wi-Fi Password and User id to Guest
- Generate Food coupons to Guest According to their Plan
- Send Foreign Guest Details by Email to Nearest police station immediately.

Mobile hotel check-in

Fast hotel guest registration without queue on reception is a must-have option for hotels with guest experience in mind, which simplifies the self-check-in process and increases guest loyalty. With special software, there will be no lines of grumpy clients at the reception desk, happy guests will return to your hotel again, and again. More about mobile check-in read on <https://hotelfriend.com/b/mobile-check-in>

Communication in social media



Travelers are looking on Google for specific keywords corresponding to your positioning (for example “Eco-Hotel + destination”). Here organic Google searches can be a precious source of business. You need a good ranking on the first page of Google results. It is something that you can work out using SEO techniques (Search Engine Optimization). If computers are not really your thing, better ask for the services of a professional.

Everyone who looks for a hotel is usually choosing a destination first and a hotel second. Potential guests are picking that destination because it is relevant to either a specific location, experience, activity, event, attraction or to visit someone. Knowing your surroundings and attractions or events going on near your hotel location are crucial. For example, if your hotel is located near a beach and they have an annual surfing competition that’s a huge potential booking fest for you. Bookings could literally be coming in waves.

Approach companies involved in the event sponsorship or surfing teams taking part, after all they need somewhere to stay. They are also likely to bring friends and family; you will be fully booked in no time.

If you give them a pleasurable stay, they in turn recommend your hotel to fellow surfers looking for a great hotel with nearby great surfing. Linking to surfing schools would be another great way to get bulk group bookings. If your hotel is near something exciting let people know you can place them near to these amazing places.

Guest's review

One of the most important issues involves online guest reviews. This is today the first source of recommendation: the "digital word-of-mouth". Websites such as Booking.com and TripAdvisor can make or break a hotel. In the same respect, most of the feedback found on these and other portals involves whether the guests felt that their needs were being catered to. This begins and ends with the services provided by the hotel.

TripAdvisor is the number one pre-booking place for anyone looking for a hotel, restaurant, and everything else in between. The reviews are often humorous and routinely critical. This is the most popular place for people to give their opinions on your hotel.

As a rule, you should be replying or responding to every comment that someone leaves. This builds on that relationship for possible future bookings and shows you are attentive to your guests. For positive comments you can pretty much get away with a generic response, something along the lines of: "We're so glad you enjoyed your stay with us. We look forward to welcoming you back".

If there is a bad review, the hotel can respond like this: "Dear Guest, we are sorry you felt let down by our level of service and please be assured we have since your stay replaced the types of sockets used to avoid this type of incident happening again. Regards, Sean Paul, Hotel Manager".

The outsider checking out recent reviews will see this as a sign that the hotel manager looks to accept responsibility for a bad experience and act.

It is important to build sales relationships with targeted third parties. Depending on your overall strategy and positioning, it might be interesting to develop relationships with targeted professional referents. You need to get a proactive sales state of mind to approach them. Also, you might need to design personalized power points presentations for each of them. This might be a more complex and time-consuming part. But if you know where to get the information and the good contacts (using proactively LinkedIn, for example), it can result very powerful and efficient.

It is also important to develop a good relationship with your local tourist board. Make sure to appear in the list of hotels that they might publish on their website, and make sure that all the people who work at advising visitors are aware about your property (organise visits or invite them for breakfast). If your destination is proactive with its promotion, they might offer you to join them on international trade fairs, this can be a nice opportunity to establish new contacts.

Recommendations for smart communication:

- Write down a media kit and publish press releases to get visibility on targeted markets.
- Use social media with a clear goal to raise brand awareness on your local market.

- Approach bloggers and magazines adapted to your positioning.
- Use a good channel manager to help you centralize your hotel daily availability and rates management, as well as a good PMS (Property Management System) connected to the channel manager to make bookings management automatic and efficient.

Communication skills for students in hospitality industry

While the hospitality industry is moving towards emotions and focusing on the guest and his or her needs, the host's ability to communicate is becoming increasingly important. The communicative activities must always be put into context and consider that emotions are socially supported and individual, and that they can also differ culturally. The culture code of each individual guest must be considered in the communication.

Employers are looking for young communicative talents. Hospitality graduates need the ability to work within a team structure, to communicate and organize work. These competences are among the five most sought-after skills of future employers. Employees in the hospitality industry have a range of settings in which they can use their talents, skills, and education. When we talk about communication, we mean oral, speaking, written, presenting, and listening capabilities.

It is vital that when communicating the message hotel businesses and employees are sending is understood in the way that it was intended, and that communication is not distorted. But before speech was developed, humans relied on body language and sounds to transport attitude, emotions, and feelings. Nowadays, nonverbal communication, which includes body language, the use of personal space, facial expressions, and tone, still makes up approximately 65 percent of our communications.

While verbal communication is often used to carry facts and data, nonverbal communication articulates our physical, mental, or emotional states of hotel or restaurant customers. Hospitality is a highly interactive and people-focused business, and it is therefore important to hotel managers and staff to master both ways of communication.

Hospitality is moving away from pure service to emotion economy.

In times of digitalization, emotions and unique experiences are increasingly sought-after by travellers, hotel, and restaurant guests. Today's guests are not just looking for a roof over their heads or delicious food, but a unique experience. Emotions crystallize as one of the most important factors for the individual well-being of guests.

By appealing to emotions and creating experiences, society is inevitably moving towards the creation of an individualized, emotional feel-good factor. The ability to construct emotions by means of staging is therefore one of the increasingly important soft skills in the hotel industry and communication is one of the main factors within.

The competence to construct emotionally charged experiences is important. The hospitality industry must therefore create experience-oriented services that are associated with emotions. To create conscious and positive emotions for guests, the entire sensory spectrum must be activated, and verbal and non-verbal communication considered. Because only emotionally charged experiences succeed in

anchoring themselves in the long-term memory of guests, creating guest satisfaction and loyalty and thus generating a decisive competitive advantage.

Health and safety information

As the hotel industry starts to recover from the devastation of COVID-19, maintaining strict health and safety standards is a must. Sweeping changes are being made to housekeeping, food safety, and guest check-in and checkout.

Here are just a few safety and cleaning precautions hotels have recently implemented in response to COVID-19.

- Enhanced disinfecting protocols.
- Making cleaning procedures and guidelines clearer.
- More sanitizing tools for guests.
- Contact-free check-in and room access.
- PPE and advanced training for hotel employees.

8.3. MODULE 3: Accommodation innovations

MODULE 3:	ACCOMMODATION INNOVATIONS
GLOSSARY	Biometric scans - virtual reality - extended reality - augmented reality – biometric sensors – retina scan- thermography recognition – intelligent furniture
GENERAL GOAL(S):	This course will introduce students to the innovations in the specialty area of hospitality business. Students will learn about innovations in accommodation technologies. Students will gain an understanding of the foundation skills and knowledge needed for a successful career in the world’s largest industry.
OBJECTIVES:	By the end of the module, participants will be able to: <ul style="list-style-type: none"> • Identify the future trends in accommodation. • Knowledge to be able to implement. • Detect the needs of the company based on the course knowledge.
METHODS:	Self-training, self-evaluation
TOTAL DURATION:	7 hours
RESOURCES NEEDED:	Computer, Internet
LEARNING MODULES ACTIVITIES:	ACC Module 3.1: (1 hour) – DIGITAL REALITIES: Virtual, Augmented, Extended and Mixed Realities.
	ACC Module 3.2: (1 hour) – Digital Concierge & - Guest service robots
	ACC Module 3.3: (1 hour) – Biometrics scans of guest
	ACC Module 3.4: (1 hour) - Intelligent furniture: smart bed, smart TV smart mirrors.
	ACC Module 3.5: (1 hour) – Smart Energy in accommodation
	ACC MODULE 3.6: (1 hour) Innovation after Covid-19 – Safety Hygienic and medical technologies for The New Normal
	ACC MODULE 3.7: (1 hour) Self work plan and evaluation
Video summary	https://www.youtube.com/watch?v=QsJRYHxEc8s Marriot example: https://youtu.be/1qVN32DKSEU The Future: https://youtu.be/pkorb1oxYqY
EVALUATION OF THE MODULE:	Test/quiz (annex no.) Close questions
Self-work	PERSONAL ACTION PLAN

REFERENCES:

- <https://www.fi.edu/difference-between-ar-vr-and-mr>
- <https://www.fi.edu/what-is-augmented-reality>
- <https://www.fi.edu/virtual-reality/history-of-virtual-reality>
- <https://www.fi.edu/tech/what-is-mixed-reality>
- <https://www.fi.edu/tech/what-is-extended-reality>
- <https://hospitalitytech.com/facial-recognition-market-expected-reach-96-billion-worldwide-2022>
- <https://roomkeypms.com/blog/5-ways-biometrics-could-change-the-face-of-the-hospitality-industry/>
- <https://www.hospitalitynet.org/opinion/4096433.html>
- <https://www.hi-interiors.com/hi-bed/>
- <https://www.hotelmanagement.net/tech/why-smart-energy-systems-ensure-guest-satisfaction>
- <https://wp.nyu.edu/dispatch/2020/03/13/smart-energy-management-tech-has-transformed-the-hotel-industry/>
- <https://www.hotelmanagement.net/tech/7-energy-management-saving-tips-for-hotels>
- <https://www.hotelmanagement.net/tech/how-smart-technology-will-influence-guest-experience>
- <https://hospitalitytech.com/biometrics-place-post-covid-world>
- <https://findbiometrics.com/guest-feature-biometrics-in-a-new-era-906196/>

Introduction

Tourism can take many different forms and types but increasingly seen as one of the most innovative industries in the world. This course displays the innovations in accommodation tourism through a creativity, sustainability, and technology perspective.

Tourism Innovation: Technology, Sustainability and Creativity addresses the growing use and importance of tourism innovation in society. Readers of this course will gain a global perspective on how the tourism industry is changing and taking advantage of emerging technologies, which will help them to foresee potential changes in the industry and plans. Tourism innovation is defined as innovating in a cost-efficient manner by considering the available resources. Most of the focus on tourism innovation has been on developing countries but it is also used by companies in other locations. This book explores the way in which tourism innovation differs from other types of innovation and offers a creative solution to issues about sustainability and the circular economy. In this vein, it includes chapters addressing issues related to the following but not limited subjects: co-creation in innovation, social issues in innovation, leadership and innovation, forms of innovation, government innovation and innovation research. This course is suitable for tourism industry professionals, students, researchers, and policy experts who are interested in how innovation is embedded in the tourism industry.

Digital Concierge & Guest service robots

What is a Digital Concierge?

The latest customer experience (CX) technology enables hotels to put a personal concierge in the pocket of every guest. The Digital Concierge is a conversational, digitally powered, and intelligent messaging experience embedded into your native app. With the Digital Concierge, you can say goodbye to the disjointed model of the past. By augmenting existing native apps, hotels can provide higher value to their guests through every step of their journey.

Digital Concierges provide guests with the conversational, contextual assistance and special attention that guests have come to expect from a traditional in-property concierge. Whether it is an inquiry about booking availability and room selection, pre-stay research, or inquiring about in-stay amenities, the Digital Concierge is always there and always ready to provide an answer.

The digital concierge can help at every point in the guest’s experience:



Booking:

- - Property selection
- - Room rates
- - Upgrade requests
- - Using loyalty points
- - Adding/changing current booking

Pre-stay:

- - Make bookings (spa, restaurant, car for the day, etc.)
- - Special requests (more pillows, a fan, bottle of Champagne in the room)
- - Trip planning
- - Add-ons
- - Adding an additional night’s stay

IN-stay:

- - Make bookings (spa, restaurant, car for the day)
- - In-room requests
- - On property reservations

- - Concierge requests
- - Late check out

Post-stay:

- - Feedback to the hotel
- - Missing Item inquiries
- - Loyalty points system information
- - Next stay discounts and promotions

How Technology Digitizes the Traditional Concierge:

The best guest experience solutions focus on endpoint technology features as the most crucial components for success. These features mimic the attributes of a traditional concierge to provide a conversational, contextual experience for guests:

- **One persistent interaction:** Once you know who the customer is, with one canonical thread you will never lose the chat session as you would at the end of a typical web chat session. Past conversations will always be there, allowing both companies and customers to see the context behind any inquiry and everything chatted about in the past.
- **Serving up information at the right time:** As with any good concierge, listening to the guest and determining when to offer certain information makes the experience feel more personal and human. If a guest asks how long it takes to drive from a conference centre to the hotel, for example, a concierge will supplement the answer with information on parking. Predicting the best time to provide information to a guest is necessary for delivering the optimal guest experience.
- **Contextually relevant:** The ability to understand the context behind a guest inquiry humanizes the guest experience. If a visitor in the pre-stay stage of their experience (booked but still researching) is, for example, on the Hilton Santa Fe property page in the app and asks, “Can I bring my pet?” The digital concierge can see that the visitor is on the Hilton Santa Fe page, know that pets are welcome, and provide a specific answer like, “The Hilton Santa Fe property does allow pets. You can even add a Pampered Pet Package for \$50 per stay. [Click here to add this to your booking.](#)” By understanding the context of a guest inquiry, the system goes beyond the outdated ‘keyword triggered’ automated systems that only provide general information.
- **Provide one right answer:** If a guest asked a concierge, a question and she replied with “Here are six potential answers to that question.” The guest would be left quite perplexed as to why they were not just given the single answer they were looking for. Technology only provides multiple answers when it cannot figure out what the guest is looking for. Delivering a digital concierge experience that uses natural language processing, predictive analytics, and machine learning to provide the one right answer to the guest the same way a traditional concierge would, is key.

Then there are the unique technology features that provide a level of customization that goes beyond the traditional concierge.

Retaining information: Every guest interaction will have a digital "paper trail". This information can be used to provide benefits to the guest that traditional methods could not. If a guest enters specific preferences for a hotel stay, during their next stay that archived information can be used to present a notification asking if they would like the same special considerations, they had last time. This gives guests the experience they want with no extra effort on their part.

Video examples of digital concierge: <https://www.youtube.com/watch?v=gs3zTP4m8Fo>

Singapore tourist board Digital concierge example: <https://www.youtube.com/watch?v=69KgynWs7CA>

2018 PRISCILA digital Concierge: <https://www.youtube.com/watch?v=CeCYXCPUSdc>

2019 ISTAY digital concierge: https://www.youtube.com/watch?v=n3Au6_zJu4g

ALEXA en Hotels: https://www.youtube.com/watch?v=qDp9_eD8dV0

Robots

One of the most exciting technological developments within the travel industry in recent years has been the increased prevalence of robots, with examples ranging from text-based chatbots and front desk robotic assistants, to security robots and robotic travel cases. This article takes a closer look at the way robots are transforming tourism, providing eight real-world examples of their use, and examining some of the pros and cons.

Although most of us have a concept of what a robot is, it can be more difficult to clearly define what 'robot' means. Effectively, a robot is a machine designed to automatically perform specific tasks accurately. This could include physical tasks, such as part assembly in a factory, or text or speech related tasks.



In terms of appearance, while you may immediately think of a human-like android, robots can take many different forms. They can be completely autonomous, or semi-autonomous, operating with some human assistance. Modern robots use technology ranging from collision detection to speech recognition, as well as artificial intelligence.

The incorporation of robotics came relatively late to the industries involved in travel, tourism, and hospitality, probably since many of the services provided require sophisticated reactions to the needs of the customer. While some automobile factories were largely staffed by robots by the mid-1990s, it was only in 2015 that a hotel predominantly staffed by robots opened (the Henn-na Hotel in Japan,

<http://www.h-n-h.jp/en/>). While most hotels and hospitality operations are not as automated as the Henna Hotel in Japan, there are increasing concerns regarding the way in which such robotic and artificial intelligence technologies will be incorporated into travel, tourism, and hospitality (Ivanov et al., 2017; Murphy et al., 2017b). At present, robots are used in hotels for such tasks as checking guests in, vacuuming floors, delivering things to guests, concierge services, and other common chores. Robots are also involved in many other services in tourism and related industries, such as preparing drinks, entertaining guests, guiding guests, and offering information to guests (Ivanov et al., 2017). As application areas expand, more (and more diverse) research will be required to inform development and implementation efforts.

One of the principal reasons for companies to introduce service robots is to reduce their costs and increase their efficiency (Ivanov and Webster 2018). This is the case of waiter robots implemented in Asian and Western countries, which have an average price around 6000 USD, below the average yearly salary of hospitality workers in China, and that deliver between 50% and 100% more meals per day than a human employee (Hospitality and Marketing News 2019). Another frequent reason for implementing service robots is to enhance customers’ hospitality experience, that is providing extra benefits such as welcoming customers, improving service consistency or reducing waiting times; Indeed, not only companies but also customers need to be ready and willing to accept such innovation (Ivanov and Webster 2018). In this regard, previous research identified that the levels of robot human-likeness and user-robot affinity play a crucial role for their acceptance among customers of hospitality and tourism services.

Definitions outlining precisely what counts as artificial intelligence are somewhat fluid. Nevertheless, it is usually agreed that speech recognition, problem solving, learning from human interactions, completely autonomous movement and the demonstration of logic and reasoning all fall within this field.

Example in 2016 Hilton Los Angeles Hotel:

<https://www.youtube.com/watch?v=ifgf6bZhxiE&feature=youtu.be>

Hilton Worldwide is pleased to introduce “Connie”, the result of our collaboration with IBM. Connie is the first Watson-enabled robot concierge in the hospitality industry and is currently being piloted at the Hilton McLean in Virginia. Connie draws on domain knowledge from Watson and WayBlazer to inform guests on local tourist attractions, dining recommendations and hotel features and amenities. Connie, named for Hilton’s founder Conrad Hilton, marks the first time IBM has developed a Watson-enabled robot for the hospitality market. Connie will work side-by-side with Hilton’s Team Members to assist with visitor requests, personalize the guest experience and empower travellers with more information to help them plan their trips.

Example in 2018: <https://www.youtube.com/watch?v=bsXRfZPo3Mw>

Tactile Robots

Tactile Robots innovates hospitality by introducing autonomous mobile robots. TR1 delivers the room service to the rooms of the clients. Thanks to TR1, hotels can significantly reduce their costs. Their clients

enjoy an improved privacy and an amazing experience. TR1 has a sizable internal volume, it is compact, and has a high level of safety. In fact, it is the first mobile robot to be soft and to have the sense of touch.

tactilerobots.com

Room service delivery tactile robots: <https://www.youtube.com/watch?v=XdVNgB5KbZc>

2017 Henna Hotel the robot hotel: first hotel to install robots at every department with no staff: <https://www.youtube.com/watch?v=P9DBb-Eng20>

2019 Henna Hotel two years later: Robots were “fired” for not properly working during working hours 😊: <https://www.youtube.com/watch?v=0VKC1etRrlg>

Yosi Robot hotel in Singapore: <https://www.youtube.com/watch?v=AlS1Ef8EeSg>

Room service robot: <https://www.youtube.com/watch?v=NnRaFZRSoPw>

Biometrics scans of guest

Biometric is a technical term that is incorporated from a combination of two words, bio, and metric. Bio refers to the life and metric represent calculation or measurement. Therefore, the term refers to the measurement that is associated with the life characteristics. This technology incorporates in our society to make the identification and surveillance mechanism easy and proactive. The biometric identification method selected over the traditional methods like pin code, passwords and use to make the system more secure and advanced. This article will help us to understand the importance, uses, advantages, and drawbacks of biometric technology.



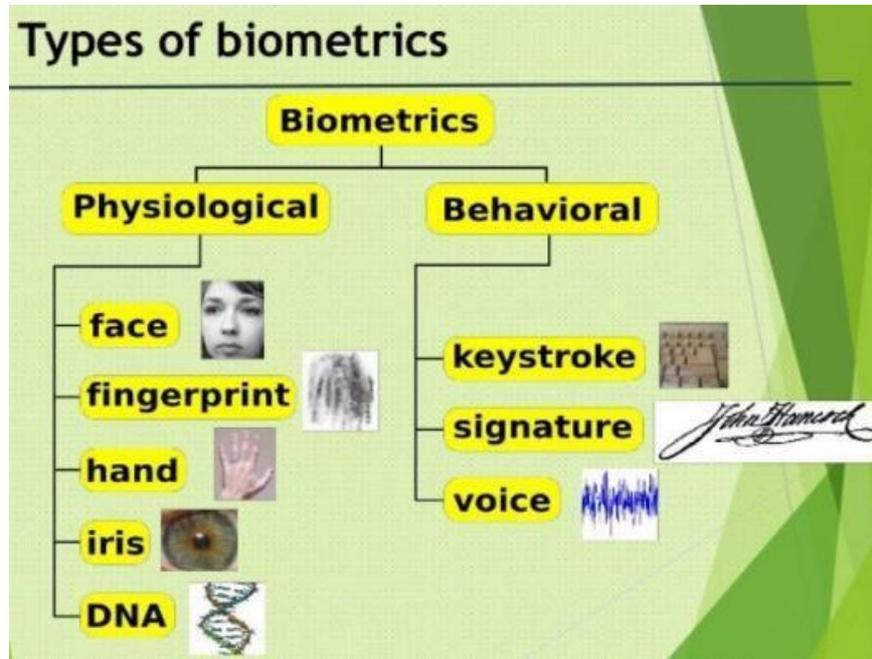
Types of Biometric Sensor

When most people think of biometrics, they imagine fingerprint or facial recognition, but there are many different types of biometrics used today to identify and authenticate individuals. Whether for security, access, or fraud prevention, biometrics come in many forms, and the software needed to collect biometric data is evolving quickly, as well.

Biometric sensors or access control systems are classified into two types such as Physiological Biometrics and Behavioural Biometrics. The physiological biometrics mainly include face recognition, fingerprint,

hand geometry, Iris recognition, and DNA. Whereas behavioural biometrics include keystroke, signature, and voice recognition. For a better understanding of this concept, some of them are discussed below.

Types of Biometric Sensors:



Different Types of Physiological Biometrics

Physiological biometrics are those that rely on one's physical characteristics to determine identity. This biometrics type includes but is not limited to the following:

Fingerprints

Fingerprint recognition, which measures a finger's unique ridges, is one of the oldest forms of biometric identification. After capturing the print, sophisticated algorithms use the image to produce a unique digital biometric template. The template is then compared to new or existing scans to either confirm or deny a match.

Finger/Hand Veins

Veins are considerably harder to hack than other biometric scans because they occur deep within the skin. Infrared lights pass through the skin surface where they absorb into deoxygenated blood. A special camera captures the image, which digitalizes the data, then either stores it or uses it to confirm identity.

Hand Geometry

Hand geometry biometrics refer to the measurement of hand characteristics like the length and width of fingers, their curvature, and their relative position to other features of the hand. Though once a

dominant method of biometric measurement, modern advances in fingerprint and facial recognition software have replaced its relevance in most advanced applications.

Iris Recognition

The iris, or the coloured part of the eye, consists of thick, thread-like muscles. These muscles help shape the pupil to control the amount of light that enters the eye. By measuring the unique folds of these muscles, biometric authentication tools can confirm identity with incredible accuracy. Liveness detection (like requiring a user to blink for the scan) adds an additional layer of accuracy and security.

Retina Scan

Retinal scans capture capillaries deep within the eye by using unique near-infrared cameras. The raw image is first pre-processed to enhance the image then processed again as a biometric template to use during both enrolment and verification.

Facial Recognition

Facial recognition is, by far, the oldest form of biometric authentication. Even infants use facial recognition to identify the people closest to them. Biometric facial recognition software works much the same way, albeit with more precise measurements. Specifically, facial recognition software measures the geometry of the face, including the distance between the eyes and the distance from the chin to the forehead (just to name a few). After collecting the data, an advanced algorithm transforms it into an encrypted facial signature.

Voice Recognition

Voice recognition technology falls under both the physiological and behavioural biometric umbrellas. Physically speaking, the shape of a person’s vocal tract, including the nose, mouth, and larynx determines the sound produced. Behaviourally, the way a person says something – movement variations, tone, pace, accent, and so on – is also unique to everyone. Combining data from both physical and behavioural biometrics creates a precise vocal signature though mismatches due to illness or other factors can occur.

Thermography Recognition

A thermogram is a representation of infrared energy in the form of a temperature distribution image. [Biometric facial thermography](#) captures heat patterns caused by moving blood beneath the skin. Because blood vessels are highly unique, corresponding thermo grams are also unique – even among identical twins – making this method of biometric authentication even more accurate than traditional facial recognition software.

DNA Matching

DNA has long been used for identification purposes. Additionally, is the only form of biometrics that can trace familial ties? DNA matching is especially valuable when dealing with missing persons, disaster victim identification, and potential human trafficking. Furthermore, other than fingerprints, DNA is the only biometric that can be “left behind” unintentionally. DNA gathered from hair, saliva, semen, and so on contains Short Tandem Repeat sequences (STRs). DNA STRs can confirm identity by comparing them to other STRs in a database.

How secure is Biometric Authentication Technology and Biometric Data? | Biometric Security:
<https://www.youtube.com/watch?v=ZPG3XQhZVII>

Final Thoughts on the Different Types of Biometrics

Every individual is unique. Even identical twins differ in their behaviour and physical make-up. Biometric technology differentiates unique characteristics to confirm identity and improve security.

Recognition technology in the hospitality industry:

The use of biometrics has already started to impact in the travel industry, with facial recognition being used at airport check-in or customs kiosks and to confirm passenger identity for ‘biometric boarding’. Through fingerprints, face, or iris scanning, or even voice recognition, biometric data can also be used to change the hospitality industry, creating new levels of efficiency and security in five major areas.

Rapid Check-In

Check-in via facial recognition is already active at hotels in China. FlyZoo, a 290-room hotel located in Hangzhou, allows guests to select their floor and room during booking on their mobile app. Once the guest has arrived at the hotel, there are a few options: if they are residents, they can check-in by scanning their face through the mobile app, and non-local guest’s check-in by scanning their face at kiosks located throughout the lobby.

Skipping all check-in formalities may not always be an option, but fingerprint or facial scanning can help to expedite the process. Hoteliers can also use this same functionality to manage guest access to areas of the property, by requesting fingerprints to access the pool, for example.

Easy and Secure Room Access

Hotel room access based on biometrics offers clear benefits to both hoteliers and guests. First, by making guest rooms accessible only by fingerprint or facial scanning, it eliminates the needs to manage key card inventory and the headache of lost, stolen, or deactivated cards.

Often associated with vehicles, keyless door entry is also changing the way we access buildings and interact with public and private spaces. This convenient and timesaving technology is not new (relatively speaking), but you might be less familiar with the many features and options available today.

To help you make an informed decision for your building or facility, we will take a closer look at **keyless entry locks** and highlight the top five ways they make life better:

Convenience is probably the first thing that comes to mind when thinking of keyless entry, but it’s about more than easy access or not having to fumble with keys anymore. Keypads and other kinds of electronic door locks are often easy to install and maintain, even allowing retrofitting so you can **quickly upgrade from a traditional mechanical door** with minimal disruption.

In most cases these keyless entry locks are battery-powered, which eliminates the cost and hassle of routing wiring to the door, as well as preventing access issues from power failures. Battery-life indicators will ensure you are never locked out, although some keyless entry doors also come with mechanical locks for added convenience.

Better Access Control: For more security-sensitive applications or businesses with a high rate of employee turnover, it is vital to have an access control system that can handle the specific needs of the building and its users. Keyless entry often plays a major role in this area. **Mechanical keys can be lost, stolen or copied**, but a password protects against this risk (provided it is well chosen and changed from time to time).

Save time & money from re-keying: As some companies know first-hand, the costs of re-keying mechanical locks can add up over time. This is especially true for businesses with high employee turnover, such as grocery stores and big-box retailers.

The turnover, long operating hours and large physical spaces present unique challenges for employers and security staff. **Keeping track of physical keys requires extensive oversight and organization** — both of which take time and money that could be better spent elsewhere.

With keyless entry locks, adding or revoking access is simple and instant. User-friendly features like multilingual voice guidance for programming and state-of-the-art touchscreen technology make it easy to manage a high number of individuals without special tools or technical knowledge. This includes customizing levels and times of access.

Advance Security: Of course, locks are only as good as the level of security they provide. That holds true for high-tech electronic locks as much as it does for traditional mechanical models.

Keyless door locks are typically compatible with a variety of locking devices, including cylindrical latches, mortises, deadbolts, dead latches and exit devices. To ensure you are getting the right functionality and level of security for your needs, it is always best to talk to a specialist.

Personalized guest experience: 41% of hotel guests were more likely to visit with greater frequency if an employee recognized them without having to give their name, and 62% of hotel guests believe that having this recognition would improve their experience.

The use of biometric data can help to ‘announce’ guests, their information, and their preferences without them having to provide any additional information. For example, an arriving guest can scan his fingerprint at the front desk, whereupon the concierge would then immediately have access to his

personal information, his reservation and any room or service preferences, to help truly personalize the guest experience.

Quick Payments and Accurate Billing: Requiring the use of a fingerprint to authorize any additional payments during a hotel stay, such as food and beverage orders, spa treatments, or in-room entertainment purchases, makes check-out billing quick and accurate. A bored teenager cannot keep ordering movies off the TV without the fingerprint of his mom authorizing the purchase!

Employee Management: Biometrics are not just used to enhance the guest experience. They can also help create in-house efficiencies as well, such as with a biometric-based system to track when employees clock-in and out to help manage time tracking and attendance.

We are still in the early days of using biometric data for the hospitality industry, but you can see there are many ways that it can help improve traditional processes and create efficiencies to improve the guest experience. As the population becomes more comfortable with the use of biometrics in everyday life — such as using our fingerprints or faces to unlock our mobile devices — they will come to expect that same ease of identity verification for other purchases or experiences, like travel.

Examples:

Melia Hotels International has developed, together with Oracle, smart wristbands to improve the customer experience at its hotels in Magaluf (Mallorca). Thanks to this innovative technology, the user can open their room or pay at any of the company's establishments in the destination, without having to carry their wallet with them. www.melia.com: <https://www.youtube.com/watch?v=TPGU8NYA59s>

Fingerprint Keyless Smart Door Lock: <https://www.youtube.com/watch?v=9kx49EUygVk>

Intelligent furniture

Smart bed, Smart TV, Smart Mirrors

Smart, innovative interior design not only pleases the eye and makes for a great guest experience, it also improves your hotel operations efficiency, driving up the profitability in your bottom line.

In exemplary hotels, plenty of innovative design solutions can be found not only in the front of house but also in the back of house. You will encounter smart design in physical spaces and objects such as furniture, but also in staff's equipment and in intangibles such as light fixtures. **Hotel owners, developers and managers have the "power" to influence an infinite number of details to improve hotel operations and, as a result, augment profitability.** In the following lines, I will share with you three ways to embrace that power.

Consider operational efficiency early on the hotel room design process:

Design functionality can be improved in many areas of a running operation. However, some crucial aspects of functional design must be considered early on during the planning phase.

Take the case of housekeeping: **the less time a housekeeper requires to get a guest room spotless clean, the more efficient the whole department is going to be.** Take a large hotel and the effect of scale multiplies. Thus, smart interior design should consider the ease of cleaning. Yet, especially in bathrooms, we still find wall finishes such as narrow stone slabs, that make it extremely hard and time consuming for housekeepers to clean. In addition, hard water drying in the shower leaves a trace of white chalk on surfaces. The more porous the surface, the harder it is to clean. Smoother and rounder the surfaces would have made it easier for housekeeping to clean efficiently.

Another example with direct impact on the bottom line is textiles. Many hotels feature curtains, bed throws, and cushions made of delicate fabrics that require dry cleaning and create soaring costs of washing. If you choose elegant yet washable fabrics, you can have them washed in house or externally at a fraction of the cost.

Once the room is built and furnished, there is little an efficient housekeeper can improve to save time. Once all the textiles are bought, it will be costly to have them all replaced. During the design and procurement phase however, developers could optimize everything from the choice of materials to the shape of built in and loose furnishings. Do not miss that opportunity.

Improve the guests experience with design that goes beyond aesthetics:

Undoubtedly, aesthetic interior design is imperative, but it is by no means everything that makes a great guest experience. Many factors go beyond the eye. Take seating comfort for example: Not all beautiful chairs are equally comfortable. Before ordering a full set of chairs for your hotel rooms, test-sit the chair in combination with the table to ensure the right distance between the tabletop and the seating height. Also, choose a tabletop that is not only beautiful but also long lasting, ergonomic and with a good grip for the client.

Smart bed



Probably the most important item of a hotel room is **the bed.** After all, the overnight stay is the core product of the accommodation business. Guests are often unsatisfied with sleeping accommodations in hotel rooms. One finds the mattress too hard, for other guests it is too soft. An individual adjustment of the mattress is a perfect solution. Some manufacturers already offer electronic products for this purpose. For business tourists, the furniture of the hotel room is also an important issue, as they often must work in the hotel room. Therefore, adequate equipment is needed. Smart desktops, which can be converted into a workstation, fulfil this requirement. Hence, it is important to know about the different target

groups and their individual needs. A high demand will be on versatile furniture. For example, a moveable mini bar would be a nice gadget for guests or an interactive mirror in the bathroom, which enables watching TV or gives information.

Examples of Smart Beds: <https://vimeo.com/335175781>, <https://www.hi-interiors.com/hi-bed/>

HiCan reinvents an element with which we relate daily and which we did not think could have other forms of expressive capacity. It is enhanced by the function of personal health tracker monitoring time and quality of sleep, preserving an accurate historical archive of time spent in bed, weight and personal habits and providing immediate and comparable comparisons over time on wellbeing. A system equipped with intelligent alarms and automated functions, such as the control of lights when leaving the bed and the movement of the bed bases, which will soon be ready to respond to voice commands and take on the role of a real health coach.

Quality of sleep monitoring: monitoring of sleep quality: monitoring of sleep time and stages, of the main biometric parameters of the host and of the environment in which it is inserted (temperature, humidity, air quality, noise level and brightness and sleep quality), non-invasive measurement of heartbeat and respiratory rate with historical register and possibility of synchronization with other devices.

YOU BED, The intelligent bed: <https://www.youtube.com/watch?v=SaS4MdczsZU>

Smart TV

The new potential of TVs in guestrooms raises high expectations. 'The advances are so great regarding in-room entertainment that some equate the experience with the revolution from black and white to colour television' (Malley, 2004). Travellers experience new sorts of TV at home, and it is not surprising that guests expect this entertainment in hotel rooms as well. Modern in-room entertainment includes video on demand (VOD), music or audio on demand (MOD), video games, and enhanced services like reservations for the restaurant or spa treatments. In the US hotel industry, such features are very common, and the European market is following. Another important issue for business guests is video conferencing. The possibility to attend a video conference in the hotel room will be a special offer and easy to implement. In the future, not only business guests might demand these services; family members also benefit from video conferencing helping them stay in face-to-face contact with relatives at home.

Turning Hotel Rooms into Smart Rooms <https://www.youtube.com/watch?v=Oo2ZxR2y11Y>

Smart Mirrors

Behind a great hotel, there is always a great team and a customer-orientated strategy that takes care of details that can make the difference between just spending the night in a hotel room and a memorable experience. Imagine watching TV in the bathroom mirror during your stay. This is already a reality at several luxury hotels across the globe, where guests can watch high-definition TV in mirrors, usually while enjoying a bathroom, sauna, or swimming pool.

SMART Mirrors transform the bathroom vanity into a personalized digital hub, enabling you to be more efficient and effective every single day. The SMART Mirror is designed with an interactive touch and voice-to-text controlled display that is fully customizable and highly capable. The user interface allows you to create your own custom SMART Mirror dashboards featuring your favourite apps and widgets from the Google Play Store. The SMART Mirror offers the convenience of bringing your calendar, weather, email, music, social media, video streaming, home control, live TV and more to the bathroom mirror.



Magic Mirror TV 2011: <https://www.youtube.com/watch?v=8Pvg559znIA>

Séura SMART Mirror 2018: <https://www.youtube.com/watch?v=XBKoRxt-iLw>

Smart Mirror Hotel 2019: <https://www.youtube.com/watch?v=jw8rYZ5Nyyw>

Companies that produce Smart Mirrors: <https://www.seura.com/>, <https://www.myqaio.com/es/>,
<https://www.seura.com/projects>

20 designs of intelligent furniture, transformation and space saving:

<https://www.youtube.com/watch?v=7w7Oq5rgVEw>

Smart Hotel Summit 2019 (This is a 2 hour interesting video gathering a few presentations about smart technologies in hotels plus a panel discussion board with professionals of the tourism industry during the Smart Hotel Summit in Shanghai 2019): <https://www.youtube.com/watch?v=OXKKLnfgCjI>

Accessible Smart hotel rooms: <https://www.youtube.com/watch?v=6HJbK64nV7c>

2018 Weird and funny Smart furniture:

https://www.youtube.com/watch?time_continue=90&v=laVRq3wXSWE

Smart Energy in Accommodation

Smart technology is changing everything from the homes we live in to how our cities are managed. The hospitality industry is no exception. In many ways, the hospitality industry is leading the charge in the adoption of smart business technology.



Smart hotel technology offers a variety of cost savings and revenue opportunities, and it is enabling hotel owners to reach new levels of profitability. Here are some examples in which smart technology will be reshaping the hotel industry in the very near future.

Smart Energy Management

Smart thermostats and occupancy sensors can monitor and respond to fluctuations in occupancy. Likewise, smart energy-management systems use sophisticated machine-learning algorithms to continuously analyse historical thermodynamics, local weather patterns and peak demand loads to optimize energy consumption in real-time, all year round. Smart energy savings are not just wild speculation. Smart energy-management systems can reduce hotel energy costs by up to 20 percent and generate some of the fastest payback periods in the industry (between 12-24 months). They can also significantly increase the resale value of a hotel.

The energy savings from Internet of Things technology is not limited only to heating, ventilation, and air conditioning systems. Smart lighting technology also enables hoteliers to better understand their energy needs, automate consumption and adapt to real-time changes in occupancy.

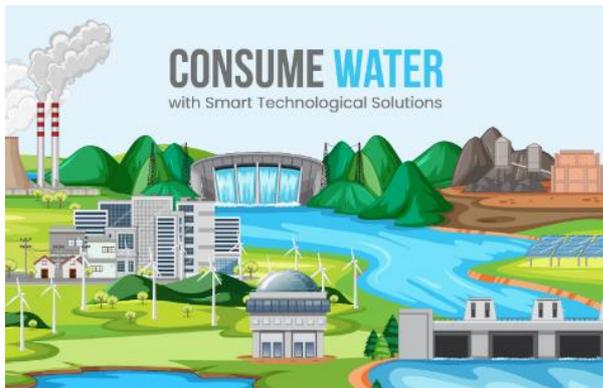
For instance, when the Chatwal Hotel in New York retrofitted approximately 1,300 lamps in the hallways, common areas, and 80 rooms, it saved more than 410,000 annual kilowatt-hours, equating to a 90 percent reduction in lighting energy consumption. Indeed, the Chatwal Hotel saved around \$124,255 in the first year alone.

Predictive Maintenance

Just as smart EMSs enable hoteliers to monitor, track and optimize energy consumption, predictive maintenance allows them to use sensor data to identify wasteful or hazardous trends and alert maintenance staff before a given issue escalates into a much costlier one. So rather than waiting for a component to break down before being serviced or replaced, technologies are enabling engineering staff to predict maintenance needs based on system usage, prevent system failures, and reduce the costs of operating a faulty system.

Smart Water Management

Water is a necessary requirement for life and every hotel relies on the stuff just to keep afloat. Whether it is part of a manufacturing process or necessary to provide customers with food, drink and sanitary facilities, dihydrogen monoxide is an unavoidable cost of doing business. When considering how a single leaky toilet can cost as much as \$840 a year plus the costs of any additional water damage, it is easy to see how water can become an unnecessarily expensive business expense. By monitoring water lines with smart, low-cost water meters, however, facilities such as hotels and college campuses can see [return on investment] on their water consumption in less than five years.



As technology advances, it changes many of our tastes, preferences and needs. It relegates old industries obsolete, creates new ones seemingly overnight and fundamentally shifts the balance of supply and demand across markets. What does not change is the need for energy consumption. Whether it is manufacturing physical products, providing customers with a comfortable experience, or keeping employees happy, productive, and motivated, energy consumption is a universal cost of doing business. For hotels willing to embrace the advance of technology, however, there is no shortage of opportunities to reduce their energy costs.

The exact mix of energy-saving technology that is right for any hotel will depend largely on its location and even customer preferences. The bottom line is hotels that leverage technology to save on their energy costs ultimately will be more profitable and better able to adapt to the ever-changing technological landscape.

Similarly, some online management platforms continuously collect data related to runtimes for each unique room and assigns them efficiency ratings. This rating is an indicator of how quickly a room can be heated or cooled back down to the guest’s preferred temperature and provides engineering teams with critical alerts when HVAC equipment needs attention.

Air Source Heat Pumps

Smart thermostats are not the only way that business can save on their heating costs. Advances in HVAC hardware technology also offer businesses new opportunities to save on energy costs. Specifically, air source heat pumps make it possible to transfer heat from outside a building to inside it (or vice versa). The science behind ASHPs involves using the principles of vapour compression-refrigeration to absorb heat from one place and release it to another. The advantage for hotels is that ASHPs can be used as

energy-efficient space heaters or coolers, removing the need to overload a central HVAC system to accommodate the specific needs of a smaller or compartmental space.

Smart Lighting Technology

Smart energy-management systems are not limited only to HVAC systems. Smart lighting technology also enables hotels to better understand their energy needs, automate their consumption and adapt to real-time to changes in occupancy. Some companies have managed to cut energy costs by 75 percent and improved productivity by 20 percent by converting to a smart LED lighting system. Just like EMS helps hotels adjust energy consumption based on real-time climate-control needs, smart lighting systems also enable properties to set preferred lighting times and track activity to improve workflow throughout the facility.

Solar Panel Technology



Rising economic superpowers and Australian suburbanites aren't the only ones benefiting from the rise and proliferation in solar technology. Hotels of all sizes are leveraging increasingly affordable photovoltaic technology to reduce their energy costs. Solar power technology offers businesses a two-fold opportunity: to reduce energy consumption from the grid and sell excess production back into that grid. Therefore, hotels can save on their energy costs and subsidize whatever energy consumption they still must pay for.

Related story: [Connectivity helps hotels manage energy use](#)

Automatic Shutdown Sockets

A significant energy cost for many hotels is vampire power draw. Also known as standby power, it refers to the way electric power is consumed by electronic and electrical appliances while they are switched off (but are designed to draw some power) or in a standby mode. This is where automatic shutdown sockets come in. These are simply smart power outlets that use infrared sensors or timers to cut power to any connected device when the device is not in use or the room is unoccupied. In other words, they allow hotels to save on powering devices whenever they are not in use.

Energy consumption is all about assisting hotels to operate more sustainably, of course, however it is also about assisting those hotels in increasing profitability while simultaneously reducing costs. It might seem like a strange and impossible feat to accomplish, however thanks to the rise and ongoing advancement of smart energy management technologies, it is a feat that is not only possible, but highly accomplishable. Hotels around the globe, regardless of size or brand, are being revolutionized from the ground up thanks to smart energy management technologies. Today, thanks to these technologies, hotels are operating with a higher rate of cost efficiency and overall longevity and success. This is just the start for smart energy management technologies and their impact on the global hotel industry -and the world.

Video examples: The Sinclair Hotel, A more efficient Hotel:

https://www.youtube.com/watch?v=bWaiU__eafk

With the partnership between e-Formula and Cisco Customer Experience, Howard Hotel not only successfully implemented Cisco IoT solutions, but also gained an extraordinary life cycle experience to make the most from the investment.

<https://www.youtube.com/watch?v=P6WBIFm99ks>

Innovation after COVID-19 – Safety Hygienic and medical technologies for The New Normal in 2020



Traveling is one of the main causes the Coronavirus has spread across the world and, consequently, government restrictions on movement and tourist traffic became a general trend. In addition to the economic downturn, it is the reason why international tourism took a severe hit. Since tourism is **one of the largest and fastest-growing industries globally**, a huge effort should be undertaken for tourism to reach back to its core capacities in the present situation. The situation needs to be strategically addressed with proactive measures for tourism to regain socio-economic stability after the pandemic. This industry includes air, sea and land transportation, food supply chain, accommodation sector, entertainment, recreation, etc. Consequently, there is a wide area of businesses proposing changes, and mostly because the post-COVID tourists will not be the same as pre-COVID ones. Innovative solutions

regarding **safety and hygiene measures**, as well as the proximity of **medical facilities**, will be of key importance in meeting the public’s expectations.

A strategy to attract tourists includes safety innovations.

During a global crisis, the tourism and hospitality industry usually takes the strongest punch, being one of the **strong pillars of the modern socio-economic system**. Especially now, when this industry is closely correlated to the origin of the crisis, we can expect an even greater downturn. The question that no one seems to have an answer to is how the changes in the industry are going to affect the rules of the game. Without a doubt, these changes will **affect almost every aspect of the tourist’s travel and stay**. The nature of the challenge this industry is facing can place greater emphasis on the safety of travellers. In response to this, tourism brands will inevitably have to move forward with bold, innovative ideas that include wider technology adoption. While major hotel brands already made significant progress in this area, others will have to follow too, not to underestimate the outcomes. It is certain that the future of tourism will strongly rely on digital and technological discoveries such as the use of chatbots to make reservations, mobility patterns to manage visitor flows, artificial intelligence, the IoT, 5G, service-oriented robotic, gamification methods for emotional monitoring, etc. These innovations are going to shape the new tourist experience.

Example of safety innovation solutions: <https://www.springwise.com/innovation/travel-tourism/citizenm-app-contactless-stays-coronavirus>

New hygiene standards as rigorous as they can be

Tourists buy experience so every hotel must accommodate their spaces with special attention to the safety of their guests. If you are thirsty, you go to the store and buy a drink, but if you want to sit in front of a beautiful landscape on a breeze of the summer wind and drink something, you will most likely travel to some special place and pay for that experience. If this includes a potential horror disease experience, no one will be interested in buying. New standard **requirements for cleaning** accommodation facilities are going to be highly regulated.

For a first example, let us look at the concept of contactless guest access and authentication. When a guest arrives at a hotel, if facial recognition technology is in place, he or she can self-check-in, activate elevators and unlock rooms through a biometric face scan – much like unlocking a smartphone – instead of offering a physical key or card for access. Concierges and staff can be automatically notified of opted-in loyalty program members, enabling them to offer a VIP treatment. Another example is integrating facial recognition technology through POS and payment terminals, which can be applied throughout a hotel and its services offered, enabling guests to pay for not only their rooms, but spa services, café meals, etc. through a face scan, without ever needing a physical exchange. These solutions not only help hotels reopen in the wake of COVID by offering touch less and thus germless solutions, but they also offer an added layer of convenience to guests that once accustomed to, will continue to be in demand for more enjoyable experiences.

Facial recognition technology will not only help businesses across industries reopen and meet health and safety guidelines, but it will also inevitably lead to more personalized experiences. Facial recognition

technology can identify not just a familiar face, but emotional responses. It can identify a traveller that frequents the same hotel and prefers to have a room on the first floor, log this information, and allow it to be used by staff when checking the guest in. It can also provide hotel managers detailed and valuable insights into which hotel services are enjoyed most by guests by aggregating and anonymizing emotional responses of guests at the spa compared to guests at the gym or guests in office rooms or the hotel restaurant. Overall, facial recognition technology will not only enable the future of hospitality, but it will also enhance it.



Example for contactless experiences in hotels: <https://www.springwise.com/innovation/travel-tourism/unmanned-hotels-contactless-china-coronavirus>

Domestic travel is a new exotic destination.

The proximity of medical facilities will make tourists rethink the distance they are willing to travel and, in most cases, affect the rising demand for domestic tourism. If the trend with closed international borders continues, it is possible that people will simply have no other choice. Outstanding opportunities lie in front of businesses truly listening to **the customer voice** and observing their behaviour. It is important to send the right message to potential customers and use marketing tools to promote the value of domestic tourism. That should be conducted in a manner of reliving nostalgic moments or the excitement of discovering hidden beauties of their country.

Example of the Tenerife Tourism board promoting the island for residents. The campaign is called “Stay near, feel like far away, Tenerife”: <https://www.youtube.com/watch?v=jACoT69R-K4>

Innovative features placed to increase health security and well-being will undoubtedly be based on technological solutions. Aiming to anticipate people has needs and make predictive models, **machine learning** can be very useful in marketing these destinations and targeting people who want to explore new places, or the places they have already visited a long time ago. The places already visited often evoke a feeling of serenity and confidence, and these attributes should be the most important ones communicated for travellers. As for facilities that usually host a large number of people such as museums, theme parks, theatres, and recreational centres, we have seen the use of **augmented reality** in practice, and we are sure we will be seeing a lot of it in the future as well.

Example of virtual reality in tourism: <https://www.springwise.com/innovation/travel-tourism/onsen-virtual-reality-bath-coronavirus>

Example of social distance Beach bubble innovative option:

<https://www.springwise.com/innovation/travel-tourism/maldives-hotel-beach-bubble-social-distancing>



Another important aspect of **future tourism is flexibility**. In this industry, flexibility is what businesses are going to highlight through cancellation policies, service rates, schedule modifications, etc. In addition, new practices and policies are expected in nearly every aspect of the guest’s experience. We are super excited to see what awaits us in future travels.

8.4. MODULE 4: Catering innovations

MODULE 4:	Catering innovations
GLOSSARY	Nanotechnology, Molecular gastronomy, 3D Food Printing,
GENERAL GOAL(S):	This course will introduce students to the innovations in the specialty area of hospitality business. Students will learn about innovations in restaurant technologies and cooking. Students will gain an understanding of the foundation skills and knowledge needed for a successful career in the world’s largest industry. The course introduces students to the innovations of the catering industry.
OBJECTIVES:	By the end of the module, participants will be able to: <ul style="list-style-type: none"> ● Use new technologies for ordering, payment, and loyalty programs to offer convenient and intuitive applications for customers. ● Know about nanofood, molecular gastronomy, food 3D printing, smart devices for restaurants. ● Change their attitude to catering, innovations in restaurants.
METHODS:	Self-training, self-evaluation
DURATION:	3 hours
RESOURCES NEEDED:	computer, internet
ORDER OF ACTIVITIES:	<p>Step 1: (30 min.) – introduction to catering global trends of innovation</p> <p>Step 2: (1 hour) – Innovation in catering business</p> <p>Step 3: (1 hour) – Cooking innovations</p> <p>Step 4: (30 min.) – Evaluation</p>
EVALUATION OF THE MODULE:	<p>test/quiz (annex no.)</p> <p>close questions</p>
REFERENCES:	<p>QSR magazine as of August 20, 2015, accessed on August 31, 2015; Franchise Help accessed on September 1, 2015.</p> <p>Nerac accessed on September 1, 2015; PR Newswire as of August 10, 2015, accessed on August 31, 2015</p> <p>https://www.youtube.com/watch?v=UZPwqImfBf0</p> <p>https://www.youtube.com/watch?v=ErISmMeCaQI</p> <p>https://www.youtube.com/watch?v=SS_m2ejm0Mc</p> <p>https://www.youtube.com/watch?v=gvWxqAcsDBM</p>


<https://www.youtube.com/watch?v=TRHqxQK3CX8><https://www.youtube.com/watch?v=dpxZUjcKC94&t=20s><https://www.youtube.com/watch?v=pEt17UjLRXM><https://www.youtube.com/watch?v=vbvQIKzSmkQ>

Introduction to catering global trends of innovation.

There is no question restaurants are innovating, but are they moving fast enough to stay relevant in the face of evolving consumers’ tastes and preferences? This is a challenge for established companies where risks are magnified - there are enormous profits, thousands of jobs, and publicly traded share prices on the line. Like many industries, the restaurant industry faces a variety of challenges keeping up with the rapid pace of change driven by the consumer trends and changing demographics. Growing preferences for healthier food options, concerns over environmental sustainability, increased competition from grocery stores, heightened consumer expectations, and rapidly advancing technology are reinventing the traditional dining experience and forcing change on how the industry operates. And the rising spending power of the millennial generation of consumers is accelerating the industry’s response to such trends.

As restaurants juggle a variety of challenges, they must seek to innovate and adapt nimble business strategies that enable them to cost-effectively compete in an ever-changing tech environment.

Technological advancements in catering business:

- Restaurant chains are adopting new technologies for ordering, payment, and loyalty programs to offer convenient and intuitive applications for customers.
- Analysts foresee creative uses for Google Glass, such as glass-wearing servers using face recognition technology to quickly locate patrons in crowded bars. Data from Apple Pay and other electronic wallet solutions will also make it easier to personalize customer experience.

Focus on Generation Z

- Restaurants are currently trying to appeal to millennials and are competing for the attention of this social media savvy generation. They also need to be mindful of Generation Z as younger teens are beginning to make their own decisions about where to eat and what to eat.
- This demographic would also demand high-tech service, louder music, moving visuals to get heightened experiences.

Restaurants will have to adapt and modify their operating strategy to attract this target segment.

Innovation in catering business

The future is now in foodservice, as long-touted advancements in data science and tailored dining start to be hammered into concrete form. Think 3D printing infiltrating commercial kitchens and the rise of

predictive dining. Operators can now project a sense of knowing the customer. The advantages of this make more headway than ever before in the wider market.

Everyone is buzzing about robotics, as if it is new to food making. A robotic arm that spreads pizza sauce on the crust. This is how every single frozen pizza is made. A salad robot? Guess how your bag of salad greens are tossed and filled? Patties made by a robot. This is akin to how your favourite sliders are formed before they are tucked between a bun, sleeved, and sent to your local grocery store. A future of robotic food preparation sidesteps food safety issues like employees forgetting to wash their hands or improperly storing and holding foods. And of course, there is no better way to assure consistency than to eliminate the potential for human error.

Cafe X has opened automated coffee kiosks in San Francisco, which operate like soaped up vending machines crafting personalized espressos and lattes. And Kroger is delivering groceries using unmanned vehicles, which could be considered an advanced form of robots.

Meal online

Innovation has arguably had a greater effect on the customer recently than anywhere else. Not only have there been many new ways to find food, but there have also been easier ways to get it to the customer.

The catering industry has seen a rise in customers choosing to order their meals online and have them delivered. While this might not sound good for restaurants, the way these companies work has made many businesses more popular.

In the past, a business that wanted to set up a delivery service would have needed to recruit, train and pay for the staff and equipment needed. However, with the emergence of the new wave of delivery companies, businesses now only need to arrange a contract with them and provide the delivery boxes for the food. It means that many high street chains have now embraced these companies to help reach those customers that can't get to the restaurant.

Mobile Apps

With the mobile phone now becoming a big part of the way people live, it was probably inevitable that eating would also have a part to play. People are increasingly doing more things on their mobile devices including paying for things, and this has led to a new wave of apps from the big restaurant chains.

These new apps can do more than simply show you where the nearest restaurant is. Many of them can now book you a table, show you the menu, and even allow you to pay for your food at your table without needing anyone to help you. It is this convenience that is helping more businesses attract new customers and retain existing ones.

Food Safety Management

Behind the scenes, there is also a lot of innovation going on. The catering industry is of course extremely serious about food safety and ensuring that all the procedures and training are followed.

In the past, this meant keeping paper records of fridge temperatures and cleaning schedules, but this is now changing to make the process easier and more efficient.

There is now a range of software and mobile applications that can help you keep track of food safety records. These apps allow you to input all the readings into one place and keep the information in the cloud. Not only does this streamline the process, but it also means that the information is available whenever it's needed.

For the larger businesses, it also means they can ensure that all their restaurants are complying without having to physically visit each location as often.

Internet-Connected Appliances

The internet of things (IoT) has not only made the home smarter, but it has also changed the way many restaurants operate. These devices such as fridges can actively monitor the inventory and either alert the manager when stock is low or automatically reorder supplies itself.

There are many benefits to such a system, for example, it will mean fewer occasions when the kitchen runs out of certain ingredients and helps to eliminate ordering errors. It will also ensure a more cost-effective process as you won't be ordering something until it's needed instead of stockpiling.

From a food safety point of view, it also means that foods are less likely to go out of date and there will be less stock to check.

Kitchen Display Systems

The process of ordering the meal and sending it to the kitchen has evolved a lot over the years. There are now fast electronic kitchen display systems that can allow servers to take the order on a PDA device and send it directly to the kitchen screens. This cuts down on the waiting time and is also more efficient.

There are also other benefits to this system, it will help managers understand which meals on the menu are the most popular and gauge preparation times to help manage the staff in the kitchen.

Kitchen Appliances

Along with smart fridges and internet-connected appliances, there are also many new innovations in other areas of the kitchen. These are designed to help increase the efficiency of food preparation, and also ensure that food is kept at the correct temperature.

Friulinox HiChef

This appliance has made a huge difference in the commercial kitchen because it can carry out many of the functions that would otherwise need to be done separately. Imagine cooking and chilling all in one cabinet! It is now a reality with the Friulinox HiChef. It has five functions that include:

- Blast Chilling
- Blast Freezing
- Thawing
- Leavening Retarder
- Slow Cooking

It allows the kitchen to become more efficient and helps with food safety management. These appliances can be supplied by www.freezerdirect.co.uk, just get in touch with the team for more information.

Cook and Hold Oven

This type of oven is ideal for smaller kitchens that do not have a lot of staff. The idea is that you can set the temperature and time for the food to cook, and it will then lower the temperature once the cooking time is over. This will keep the food warm until it is ready to be served.

This can not only cut down on energy costs as these appliances use radiant heat, but they can also be space-saving as they do not need ventilation or a hood.

Innovation in the commercial kitchen is already making the job easier and more efficient, and new ideas in the future will mean even better use of space and time.

Cooking innovations

Nanofood

Nanotechnology is a technology with small particles of matter - nanoparticles measured nanometres (i.e., one billion meters part or 80,000 times per person particle smaller than hair thickness). Using nanotechnology for the food industry, it is possible to enrich food and drinks needed by man body substances, reduce fat, salt, or sugar quantities.

They allow us to improve the flavour, bacterial resistance. The food industry uses nanotechnology to create nanocomponents to improve the colour, texture, and taste of food. Nanoparticles TiO₂ and SiO₂ and amorphous silica are used as food additives. TiO₂ is used to coat donuts in the form of coloured powders in the manufacture of pills. Temperature fluctuations allow longer food storage undamaged.

Nano Salt - Like the common salt, only the crystals are smaller. When microscopic particles are put together, they have a larger surface area than ordinary salt crystals - more in contact with the tongue, making the food tasting salty than it really is.

Oil particles are replaced by water in the production of nano mayonnaise particles coated with oil. In this way, mayonnaise becomes less oily while retaining its flavour.

Nanotechnology can enrich a variety of foods with tiny tasteless capsules of vitamins, minerals, or supplements.

3D Food Printing System

This technology allows to create food complex geometric shapes that would not be possible by hand.

Suitable products for printing:

- fruit puree
- caramel mass
- chocolate
- pancake dough
- other masses

Molecular culinary

Molecular gastronomy is a separate, interdisciplinary branch of science, offering collaboration and the formula for success between chefs and scientific laboratories - the understanding that chemical, biochemical and physical processes determine the taste and quality of food.

Methods used - experimental food preparation and chemical analysis (e.g., chromatography, mass spectrometry, assay oxidation, protein denaturation), physical chemistry (hardness, elasticity, density tests, melting / boiling, colloids, emulsion stability), psycho-neurophysiological methods (eating tests, questionnaires, brain activity monitoring).

Food accessories for molecular cuisine:

- agar,
- claro gelatine,
- egg or soy lecithin,
- ascorbic acid,
- calcium bicarbonate,
- calcium chloride,
- sodium alginate,
- transglutaminase,
- liquid nitrogen,
- dry ice.

8.5. MODULE 5: Wellness innovations

MODULE 5:	Wellness innovations
GLOSSARY	Artificial Intelligent (AI), Automation, Advanced Technology, Virtual reality, Biometric technology, Touchless accessibility, Digital approach, Multisensorial
GENERAL GOAL(S):	This course will introduce adults / students to the innovations in the specialty area of hospitality business. Students will learn about innovations in wellness technologies and guest unique experiences. Students will gain an understanding of the foundation skills and knowledge needed for a successful career in the world’s largest industry. The course introduces trainees to the innovations of the wellness sector of smart hospitality.
OBJECTIVES:	By the end of the module, participants will be able to: <ul style="list-style-type: none"> ● Identify the future trends in wellness. ● Be able to learn new innovative methods to optimize the customer service. ● will become more interested in new digital activities and easily accept innovative methods to use them in their work environment.
METHODS:	Self-training, self-evaluation
DURATION:	3 hours
RESOURCES NEEDED:	computer, internet
ORDER OF ACTIVITIES:	<p>Step 1: (30 min.) – introduction to wellness global trends of innovation</p> <hr/> <p>Step 2: (1 hour) – Innovation in wellness technologies</p> <hr/> <p>Step 3: (1 hour) – Innovation in wellness business and for people with disabilities</p> <hr/> <p>Step 4: (30 min.) – Module Evaluation</p>
EVALUATION OF THE MODULE:	<p>test/quiz (annex no.)</p> <p>close questions</p>
REFERENCES:	<p>2. Innovation in Wellness technologies</p> <p>2.1 Smart toilet and toilet paper</p> <p>https://youtu.be/RRrrhY-rQnI</p>

<https://wisepick.org/best-smart-toilet/>
<https://youtu.be/Du9ItTsEpYE>
https://youtu.be/Cdj_oDECARm
<https://www.youtube.com/watch?v=elwoBHm83PY>
<https://youtu.be/R3NDbZ8wMJg>
<https://youtu.be/cthUjoO2bmE>
<https://youtu.be/CQPckk7EyzA>
<https://youtu.be/DrtkDXVPkoA>
<http://home.howstuffworks.com/home-improvement/household-hints-tips/cleaning-organizing/self-cleaning-toilets3.htm>
<https://patents.google.com/patent/US10064582B2/en>
<http://www.nbcnews.com/id/41889497/ns/health-fitness/t/hips-dont-lie-new-way-calculating-body-fat/#.XEiFEc9KjBI>
<https://www.cnn.com/2019/01/08/kohlers-7000-numi-2point0-toilet-with-amazon-alexa-built-in.html>
<https://thenextweb.com/plugged/2017/04/12/toilet-paper-automatic-smart-monitor/>
<https://oddtymall.com/rollscout-notifies-you-when-youre-low-on-toilet-paper>
<https://www.rollscout.com/>
[https://www.gishgallop.com/samsung-releasing-smart-googlewipe-toilet-paper/\(toilet paper\)](https://www.gishgallop.com/samsung-releasing-smart-googlewipe-toilet-paper/(toilet%20paper))

2.2 Smart shower, drying hands, water tap, Body drying, hair drying, shower room cleaning, body washes.

<https://youtu.be/xJ7A3cHhRWc>
<https://youtu.be/Mit7b-rhdf4>
<https://youtu.be/DIO7wdqBKQA>
https://youtu.be/9GNFfA_qOoQ
<https://youtu.be/Cv0T2S1Rm9Q>
<https://youtu.be/dl2Riom5VAM>
<https://youtu.be/c-e2ttmf554>
<https://youtu.be/hyv4hD7bpbk>
<https://youtu.be/q8TdIdIbp0U>
<https://youtu.be/-fsKZV3L9pQ>
<https://youtu.be/6jnZdixDDgg>
<https://thesmartcave.com/best-smart-shower/>
<https://www.independent.co.uk/life-style/design/top-10-bathroom-innovations-smart-home-tech-voice-recognition-hovering-mirrors-a8274746.html>

<https://youtu.be/5gTjQ78Yybs>
<https://smartap-tech.com/>
<https://www.smarthome.kohler.com/smart-showering>
<https://www.bathtubplus.com/ariel-bath-platinum-6-kw-steam-shower.html>
<https://www.thermasol.com/digitalshower>
<https://www.dyson.co.uk/commercial/hand-dryers/airblade-wash-dry-short.html>

2.3 Thermal procedures

https://youtu.be/H_cSmVDPT44
<https://youtu.be/G-964IV4QKw>
<https://evadrop.com/>
<https://www.smarthome.kohler.com/smart-showering>
<https://youtu.be/FyicCUUo9FE> (smart spa)
<https://www.smart-spa.com/>
https://youtu.be/TuWb2Zxj_To
https://youtu.be/Y2d_zQhdbP4 (water usage)

4 Cordless hair drying system.

<https://youtu.be/Nf4gZU3cU3U>
<https://youtu.be/MiQ0qEMIGzo>
https://youtu.be/Gd3D_n956dM
https://youtu.be/29m0NZXG8_s
<https://youtu.be/BVVHRQpNaqs>
<https://metro.co.uk/2014/12/30/put-down-your-hairdryer-because-we-give-you-the-eco-friendly-hair-drying-gloves-5004259/>
<https://youtu.be/wT2oMnMLN3l> (digital mirror)
<https://youtu.be/XBKOxrt-iLw> (digital mirror)
<https://www.thecloudcasting.com/iface-digital-mirror/> (digital mirror)

2.5 Medical alert systems – Health & Security observation

<https://youtu.be/mdl4ZOUQ5yl>
<https://youtu.be/uDzRyrA1Z5Q>
<https://youtu.be/tppCcLdvnGg>
<https://youtu.be/mgD0tyQB5FA>
https://youtu.be/_Hp1Ww58Cal
<https://youtu.be/tMda6xUG7x0>
<https://youtu.be/7QokaQsofzs>
<https://youtu.be/JxLIVC12unQ> (body fat analyser - smart scale)
<https://www.theseniorlist.com/best-medical-alert-systems/>

<https://www.trendhunter.com/trends/senior-wellness>

<https://www.trendhunter.com/trends/vitalband>

<https://www.trendhunter.com/trends/vero-scanner>

<https://www.trendhunter.com/trends/time-clock-technology>

<https://www.trendhunter.com/trends/health-pass>

<https://www.trendhunter.com/trends/dermalog>

<https://youtu.be/npWyAFIMDI> (smart digital locker)

3. Innovation in Wellness businesses

3.1 Data management

<https://www.nec-enterprise.com/solutions/Smart-Hospitality-219>

<https://smarthotelsoftware.com/>

<https://www.hiotron.com/smart-hotel-management-system/>

<https://core.ac.uk/download/pdf/145642253.pdf>

<https://hotelfriend.com/b/products>

<https://sapiencia.ualg.pt/bitstream/10400.1/6906/4/big%20data%20warehouse%20framework%20for%20smart%20revenue%20management.pdf>

<https://www.dormakaba.com/resource/blob/1073520/341517afb5988998af837ca568c5fc/dwn-lodging-brochure-data.pdf>

3.2 Artificial intelligence

<https://youtu.be/TFezMcb0cvi> (augmented reality)

<https://www.trendhunter.com/megatrend/artificial-intelligence>

<https://www.dataart.com/media/1888/ai-hospitality-business-travel-and-otasreport-design.pdf>

<https://insightsforgood.mazars.com/wp-content/uploads/2019/07/mazars-2018-ai-in-hospitality-study.pdf>

http://eurdiq.eu/wp-content/uploads/2017/05/3_Presentation-filoxenia-20171.pdf

http://iceb.johogo.com/proceedings/2018/ICEB2018_paper_81_full.pdf

https://www.hospitalityupgrade.com/getmedia/fa7c556c-1aac-4924-9f14-b971a1f453f4/Angie-Whitepaper_Guest-Room-Tech-Consolidation.pdf?ext=.pdf

<https://www.oracle.com/a/ocom/docs/dc/using-ai-enhance-hotel-guest-exp.pdf>

3.3 Smart wellness building

<https://youtu.be/Bc2663p7AHg> (home tour)

<https://youtu.be/9u9kqhHC6Ok> (smart home 2020)

<https://www.ukgbc.org/ukgbc-work/health-wellbeing-productivity-offices-next-chapter-green-building/>

https://pro.villeroy-boch.com/fileadmin//fileadmin/user_upload/Bad_und_Wellness/E-Books/Villeroy_and_Boch_Hotel_of_the_Future.pdf

<https://www.hospitalitynet.org/file/152005443.pdf>

<https://wnus.edu.pl/ept/file/article/view/4900.pdf>

3.4 Guests with special needs

<https://youtu.be/lkv5LR57kFU> (height adjustable sink)

<https://youtu.be/4s9vCFkmabs>

[https://www.textroad.com/pdf/JAEBS/J.%20Appl.%20Environ.%20Biol.%20Sci.,%2005\(6S\)46-49,%202015.pdf](https://www.textroad.com/pdf/JAEBS/J.%20Appl.%20Environ.%20Biol.%20Sci.,%2005(6S)46-49,%202015.pdf)

https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1232&context=grad_conf_hospitality

3.5 Smart fitness

<https://youtu.be/XIAGFRgEhd4> (e-gymnastic machines)

https://youtu.be/mz_9JNyzpHA (e-gymnastic machines)

<https://youtu.be/p95E3op8X-M> (e-gymnastic machines)

<https://youtu.be/rGdAOp1pEwc> (e-gymnastic machines)

<https://egym.com/us/digital>

https://s2.q4cdn.com/857130097/files/doc_downloads/FitBlaze/Fitbit-Blaze-Product-One-Sheet-US.pdf

<https://open.sap.com/files/323e6bb7-1563-411a-af79-cff73371fe3e>

<https://smartfit.rocks/wp-content/uploads/2019/11/SMART-Fitness-Effects-2016-Childhood-Inactivity-and-Obesity.pdf>

Introduction to wellness global trends of innovation

In the last few years, the demand for improvements in wellness technology has increased drastically. The innovations in this field are various and concern every aspect that can be improved, for example:

- Control the temperature of the shower and set the best temperature for all the members of the family. The shower, through facial recognition technology, will remember which mix of cold and hot water is preferred by everyone and set the waterjet at that temperature.
- A full body dryer to save times during the all-days routine. This method, instead of being safer, can help the people to improve their commitment in eco-friendly actions, due to the avoid of the use of towels.
- A device that advises you when the bathroom tools (shampoo, toothpaste, etc.) are close to finished and automatically puts them to the shopping list.
- A height-adjustable sink, toilette and mirror that change their height depending on who is using it. This innovation will help especially for families with little kids.

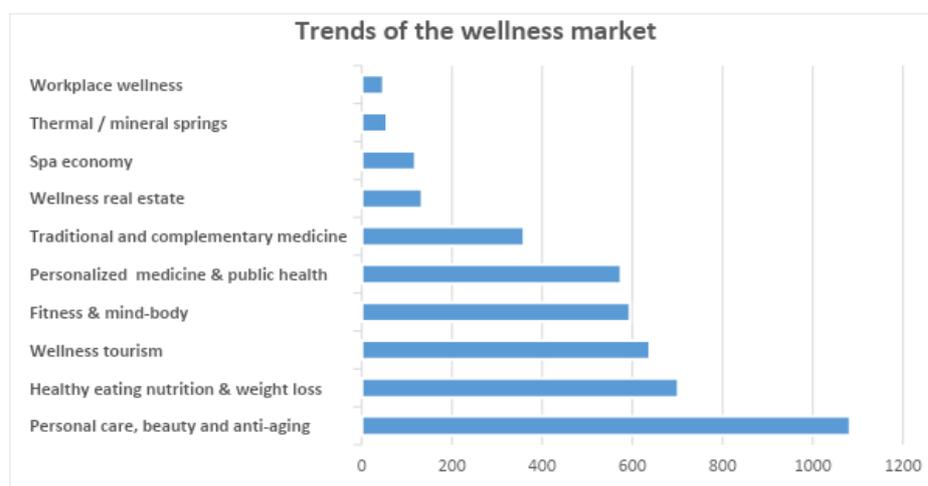
- An augmented reality mirror that shows you how a hairstyle fit you and how to achieve that alone with the help of
- A drone mirror that helps you to style, or cut, the back of your hair with ease.

The demands for a technologic evolution concerning for example the bathroom field does not miss for sure. It is up to the suppliers to find the way to produce the tools as soon as possible to take the monopoly, at least for a brief time, of an innovation so requested.

Due to the COVID-19 crisis it has emerged that mental health can be influenced a lot by wellness technology. In fact, during the lockdown, a better innovation in wellness technology could help the people to spend this difficult moment with more calm. The bad period of the quarantine proved how important mental health and happiness are for the people.

For this reason, the evolution of mental wellness therapies provided by online tools must be supported. These mental problems have been ignored for too much time, especially due the difficulty to aid not in presence. The quarantine has made suffering in silence so many people that cannot be helped. The improvement of the technology concerning mental health therapy can permit that this sufferance does not happen anymore.

Some statistics about trends of the Wellness market, which is valued at \$4.5 trillion and has grown by 12.8% in the past few years.



**Source: Global Wellness Institute*



**Source: Pixabay/Sponchia*

Innovation in wellness technologies

The innovations are many: from the simple improvement of the experience of the shower to the security tools useful to save lives, every component can be modified and brought to another level. Let us see the different innovations together.



**Source: Pixabay*

Smart toilet and toilet paper

The opportunities to improve the toilet technology are endless. In fact, until now, only a few possibilities are being developed and have been put in commerce. Despite the basic function now there are toilets with heated seats, with self-cleaning systems, with antimicrobial seats and with auto-perfume dispensers.

Some models developed by big companies can check health issues of the user. The intelligent toilets connected to Amazon Alexa can measure a person's body fat or the Google's recent toilet can measure the blood pressure.

The multidimensional approach of the smart toilet can cover fields like health, people with disabilities and relaxation.



**Source: Pixabay*

Smart shower room

The field of the smart shower is maybe the most advanced regarding the development of wellness technologies regarding the bathroom. There are already some companies that, realising the high potential of the market, are investing in this technology. But before talking about the different options offered by these companies let us focus on the improvements and the frequent issues regarding smart showers.

First at all to understand everything we must classify the different types of showers:

- **Standard shower:** a normal shower that have some handle that you can pull or push or twist to control the temperature.
- **Thermostatic valve:** like the standard one but different because there is a thermostatic valve that mixes the water to find the temperature and maintain this one constant. Useful to avoid situations where a family member flosses the toilette and causes problems for the shower temperature.
- **Digital shower:** the digital shower includes the thermostatic valve with some type of button or screen to control the temperature instead of twisting or pulling something. This type of shower could include a temperature routine set for every member of the family.
- **Smart shower:** this type of shower takes everything of digital shower and adds smart home connectivity. The users can set every type of issue concerning the shower (temperature, jet pressure, duration, etc) with mobile devices like smartphones or through vocal commands.



**Source: Pexel/Karolina Grabowska. Pixabay*

What are the benefits of having a smart shower?

The benefits of taking a smart shower are different and can make fast and more comfortable the routine action of taking the shower:

- **Safety** – Scald prevention: with the possibility of setting the temperature that you want you can prospect the most vulnerable persons of the family (kids or elder) to extreme temperatures. In fact, some types of showers provide a maximum set of temperature that doesn't permit you to scald accidentally.
- **Create your ideal shower experience remotely** – you can prepare your shower experience just downloading the app that your provider company chooses. In this way you do not have to mix the water by yourself, but you can only press the button in your smartphone.
- **Voice activation** – to make your life easier you can set the temperature or choose your shower pre-set directly with your voice.
- **Reduce the time of your morning routine and reduce water and electricity consumption** – some smart showers allow you to select the duration of the shower to reduce the water used and the electricity, as well as cut the time for your morning routine. The savings of water can arrive at 3% for a month and some companies say that it could arrive to save 50% a year.

Useful questions to do before buying a smart shower.

- **What is the temperature range?** Depends on which brand you are going to choose. For the `U` by Moen the range is from 15,56°C to 48,89°C. For SmarTap, instead, you can go below, from 10°C to 45°C.
- **Does it require electricity?** Yes, the smart shower requires electricity. It can be a problem for the installation, but we will see after. To remove any concerns about being stacked in the shower if the electricity falls, the shower can be provided with a little battery that allows you to not stay alone in the dark and without water.
- **Anyone is qualified to install the smart shower?** Since it is a new technology, the installation can be an obstacle for the purchase. To install your smart shower, you must hire a plumber, an electrician, and a carpenter separately. And the fact that they are not used to this installation can require an extra feed for the work.
- **How many outlets have the shower?** Depends on how many functions the shower has. The more options your smart shower has (showerhead, handheld shower, body spray system, etc) the more outlets you need.



**Source: Pexel/Daria Shevtsova*

Smart showers systems available

- **U by Moen:** is the first cloud based shower and presents so many technologies features that will ensure to have the perfect shower experience. With his elegant design and his 5-inch LCD screen is easy to understand and allows you to set your perfect temperature, choose your shower duration, create a shower pre-set and many other things. All these functions can be activated by the sound of your voice, through an app on your smartphone or pressing a button allocated in the shower. U, furthermore, support Alexa by Amazon, Apple Home kit and Google assistant. In conclusion, U by Moen is provided by the pause shower system that stops the flow of the shower once the ideal temperature has been achieved and adverts that your shower experience is ready through a notification to your smartphone or your smart assistant.
- **Kohler DTV+ with KOHLER Connect:** is the perfect solution if you want to have a spa experience in your house. Consisting of three components (a digital control panel, an electronically controlled thermostatic valve, and a smart module) and with his luxury style is created to impress. His main quality is the possibility to control 4 elements (water, music, steam,

and lighting) in order to achieve the spa experience and all can be activated by the most common home assistants (Alexa, Google assistant and so on). Its 11 pre-set spa treatments give you the best experience possible. The only obstacle is that all the tools that are useful to recreate the spa sensations are sold separately.

- **SmarTap:** is an impressive smart technology product. It works to prevent leaks and to avoid the freezing of the pipes during winter. Furthermore, thanks to its smart technology, it adapts the temperature and the other aspects of your shower to your habits. In contrast with the previous examples, SmarTap has two controllers, one for the shower and one for the sink that can be used together or separately. This model is self-sufficient thanks to its built-in self-test (BIST) that ensures that the programs are working and its 5 years guarantee. One of the most impressive functions is hydrotherapy that can help to fight some diseases.

Drying hands: due the discussions involving the use of the towels and the electronic dryer, during the ISSA InterClean exhibition have been presented hands dryers taps over the sink, self-cleaning hand dryers and a combination heat and towel unit. The future of this technology is coming soon.



**Source: Pexel/Burst*

Drying water tap: this tool has been launched by Dyson and permits to avoid the waste of water putting the dryer directly on the sink, without the necessity of moving from that. A sensitive sensor recognizes the hand and dries it after washing. This east technology can be the future even of the great distribution.

Body drying after shower: one of the most interesting innovations that can be brought to reduce drastically the use of paper and classics towels.

Hair drying to avoid the use of the classic hair dryer, uncomfortable and not eco-friendly, the solutions that are being developed consist or in a glove that does not hurt the hair or to rechargeable hair dryers that consent to the user to move and avoid waste of electricity.



**Source: Pexel/Cottonbro. Karolina Grabowska*

Shower room cleaning: the eco-friendly shower room aims at the wellness of the client. The characteristics of the shower room are multiples: a night light that helps you during the dark hours; a warm seat to give you the best comfort; a water jet that clean your parts without being intrusive; a carbon filter that eliminates the bad smells; and a built-in dryer that dry your parts without necessity of toilette roll. The remaining space of the bathroom will be cleaned by a robot that can be linked to home assistants, that at the end empty himself in a bin that can contain 30 bins of dirt. In this way the owner doesn't have to worry about the bins for weeks.

Health and security observation gadgets and applications (medical alert systems)

A medical alert system is a useful tool that can permit you to stay relaxed if you usually must take care of elder person in your family. Thanks to these useful tools, the person that finds some difficulties to call services in case of emergency can easily request an intervention. There are different types of systems and the costs range based on his functions.

The most basic solution uses a landline and consists of a base unit and a help button that can be brought around the house. There are also GPS models and systems that call the emergency numbers when a fall is detected, as well as systems that remind when to take the medicine.

In-home systems are dedicated for people who rarely leave the house although the mobile systems, thanks to the GPS functionalities, are more useful for people who maintain an active life that can be reached everywhere the emergency happens. That is like the cellular emergency system that permits, at one more elevated cost, respect to the landline ones, to install the service directly into the mobile phone.

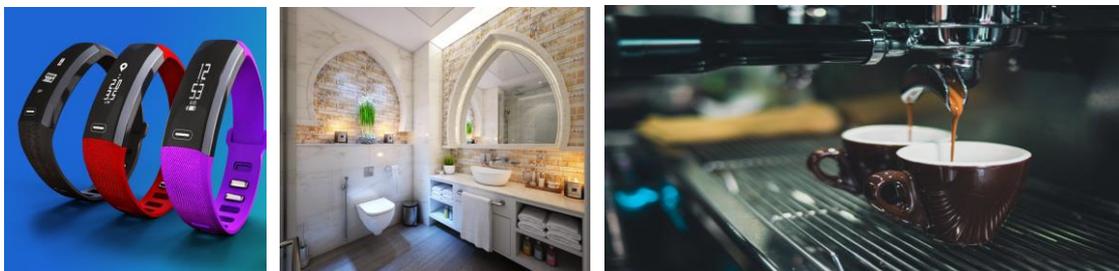
The activation of the security system is simple, you just press the emergency button, and it is done. For 20-40 seconds there will be some loud beeps and after you will be in contact with an operator. If you are not able to talk with the emergency operator, he will call all the persons in your emergency list. In case no one of your emergency contacts can be reached, the operator will call 911 directly the 911 and will send some help to your position.

Most of the systems do not provide a monthly subscription but usually only for all the year, someone even for more than one year. The prices range from €25/€35 per month for landline service, €35/€45 per

month for cellular in home, €65/€75 per month for mobile service (with sometimes a one-time €150 fee for the device).

Another useful tool can be a lockbox that can be put outside the door of your house, that can be opened only by a combination. Inside the box there is a key to enter in your house. When you call the emergency services you will give the combination to open the lockbox to the rescues. In this way they don't have to break down the door and can easily enter in your house to rescue.

Real time health monitoring: there are some devices that can help to monitor a person in every moment and wherever it is. For example, the new apple Watch has a sensor that permits monitoring the heart rate of the user. Furthermore, thanks to an algorithm, the watch can detect if it is a user, it is fallen and, if it doesn't detect movements for 1 minute, call the emergencies.



**Source: Pixabay/Pearlsband, Joye, Clivanon*

Other wellness technologies (Internet-Connected Appliances)

Interactive smart mirrors: a mirror/display useful to do so many tasks (Displays Personal Google Calendar; Displays news; Plays music, YouTube videos; reams video from door camera; and so many others)

Smart Coffee Machines: developed by Vodafone, is an app useful especially for the suppliers of coffee. They can be informed about the point that necessitates a recharge or if some machines are damaging.

Body composition monitors: monitor the level of fat in the user in every part of the body and at the overall level. Furthermore, it can check the progress after training and how muscles have worked. All the data will be put and collected in an excel file inside one SD card. In the future, thanks to this technology, it will be possible for the computer to set a diet or to provide an alimentation path thanks to the information collected (vitamin needs, carbs, proteins, etc).



**Source: Pexels/Ketut Subiyanto. Rodolfo Clix. Pixabay.*

Thermal procedures

The thermal procedures regard the aim of reducing the use of energy and becoming greener while maintaining the level of satisfaction of the clients or even improving it.

Energy: the hotel industries are willing to improve their technology level to reduce the costs and to embrace a more ecological approach. For this reason, Premier Inn, the biggest hotel company in the UK, is opening 5 new 'smart hotels' that allow the guests to order all the food with room service, to book their thermal services and to control the temperature of their room with their smartphones. All these new approaches are improving the comfort of the guests, but will achieve a greener consumption?

Savings: to achieve the best amount of savings can be a solution uses the Buildings Energy Management Systems (BEMS) that offer to cut the consumptions with some easy solutions: automatically reduce the temperature and the intensity of the lights at night; cut off the temperature condition in the empty rooms (up to 40% of savings) and with a system of movement recognition to turn on the light only the time necessary.

Hotels: an even more accurate job respect to the precedent cited is top-end domestic heating's control systems. Other than the control of the temperature and the movements sensors, this program can anticipate the return of the host to pre-heating the room a few minutes before and concede to the staff to control which rooms are empty thanks to a display at the reception to turn off lights and temperature.

Heat boss: is a wireless system for commercial buildings that allow the owner to control the temperature and the lights of every room. This intelligent system can save the 30% of the costs of energy bills controlling: radiators; underfloor; electric; hot water; BMS. Until now the hotels where this system has been applied have saved 30% of bills costs and the feedback from the clients has been largely positive.

Smart fitness

Some experts believe that fitness is experiencing a rise of personalised, perspective, and adaptive technology. Thanks to the many instruments that can be connected to monitoring apps, the fitness equipment is elevating his wellness function. The fitness journey now can be modified and monitored step by step depending on the needs of the athlete. Let us see some examples of this technology.

The new KOMPAN Fitness bike: the new product of the Company merged the importance of fitness with fun. In fact, thanks to his Bluetooth connection, this tool can be connected to your smartphone, and you can play minigames while you are training. In this way everyone can stay fit with his friends without losing the goal of fitness.



**Source: Pixabay. Pexels/Karl Solano*

EGYM Trainer: thanks to the EGYM Trainer app programming the training for your clients will be so easier. In fact, the app provides you with a complete database that helps you to monitor your clients and a useful platform when communicating with them. Furthermore, you can choose between 1000 exercises provided by the app, to build the perfect training plan for your subscribers.

EGYM Cloud: this useful tool permits to control and monitor your athletes directly from the app. Thanks to this function you can provide the best fitness plan to all your clients based on their needs.

Smart Cardio: allows your members to constantly monitor their heart rate while they are following the training plan. That is possible thanks to 3 functions:

- Gamification: thanks to the EGYM training curve the member can check the correct workout load and duration, as well as motivate him to perform the exercise correctly.
- Regular Tests: using regular tests, the device calculates and provides a personalized cardio program to the member.
- Hydrothermal areas: even this sector is benefiting the progress of smart technology. Thanks to a continuous check of the level of the CO2 in the area, the system could reduce the temperature or the humidity to give a perfect experience to the client and to not waste energy during the process. All these new improvements in the spa sector are transforming that in a magical experience for all the clients.



**Source: Pixabay/JanBaby*

Innovation in wellness business

Starting point: Data

Artificial Intelligence needs a large amount of data. That is fundamental to permit the system to elaborate and create a database useful for the preparation and development of the best customer experience possible. To achieve the result the system must transform social actions into qualified data. It consists in collecting a large amount of data from different sources and processing through IoT devices. Thanks to this operation it is possible to create a detailed customer profile that is useful to improve the conditions of your hospitality business (restaurants, hotels, etc).



**Source: Pixabay/Geralt. Pexel/Francesco Ungaro. Pixabay/Sattysingh*

InterContinental Hotel Groups was one of the first that understood this concept. Collecting data from so many different sources (reservation system, surveys, loyalty program and social media data) they improve their service.

Nowadays with the fall of the cost of sensors, it is possible to move up the level. In fact, thanks to this technology it is easier to set up the preferred temperature of the food or of the room or to develop connected rooms (that can be modified directly by the customer with his smartphone).

Some examples of companies that are working on this technology to improve their service can be:

- Hilton 's connected rooms allow the clients, through the Hilton app, to change them to TV, set the temperature and turn off the lights directly from the smartphone.
- Marriott: allows the clients to skip the front office desk and go directly to the reserved room, opening it without a key but only with the app on their smartphones.
- Vita Mojo: is a restaurant that permits the clients who have booked the dinner to choose their meal and to control the number of carbs and protein that the dinner contains.
- Orchid Hotels: these hotels, thanks to a sensor, collect the data on the use of energy and allow the directors to select the amount of power used, to not waste energy.

Creating Smart Hospitality industry with AI

After the collection of the data, the AI systems can develop a personalized experience to customers, with a constant improvement of the service following the different needs of the subjects. Usually, improvements in the hospitality industries are slow but the AI seems to be a different case. Big and small industries are developing different systems concerning restaurants, hotels, and conference centres. The following list reports some examples:

- Allora: is an AI technology developed by Avvio that uses reinforcement learning from every online interaction to offer the best prices for hotels rooms. Understanding the behaviour of individual bookers optimise their conversion.
- Connie the Concierge: adopted by Hilton, is a robot developed by IBM Watson that suggests the best activities, restaurant, or attractions to the guests.
- Chatbots: is a robot-like Connie that in addition to offering tips for attractions, activities and restaurants allows the guest to have information about hotels, trains, and airports.
- Flippy: empowered by Miso Robotics, is a kitchen assistant for fast food that can assist in the cooking and preparations of hamburgers.

- Allset service: used by Allset company, allows the clients to pre-order their meal and be served once the clients arrive at the place. Furthermore, the systems give information about the peak hours when the restaurants are more crowded and the capacity of the restaurants, to avoid the reservation in busy restaurants.

These are only a few examples of services delivered by AI technology that have been implemented. All the industries, small or big, are facing this new technology so we will expect an improvement of this type of service in the future.



**Source: Pixabay. Pexels/Taryn Elliott*

Smart wellness building

Smart building controls are delivering a way to wellness.

Recent studies showed that a considerable percentage of staff employed in the hospitality sector retain that their work is damaging to their wellness. These feelings in the workplace can cause health issues such as depression, anxiety, and less productivity.

The British Council for Offices (BCO) report pointed out that less than half of the interviewed think that their workplace environment has a good influence on their wellness and 17% think that the workplace is damaging their wellness. Despite this, the loss of morale can influence in a bad way the productivity and this brought to a loss of gaining in the long period, as well as the growth of health issues for the staff.

Following these dates, it emerged that a better work environment can bring to impressive outputs in terms of gaining, celebrity, and capacity to attract well instructed personnel. The role of technology and of more interactive systems can be the key to achieve these outputs.

Lighting, heating & comfort

“Health, wellbeing and productivity in offices: the next chapter for green building” is a report issued by the World Green Building Council that highlights the importance of good lighting conditions, thermal comfort, minimisation of unwanted noises and good indoor quality as main tools of a healthy and productive workplace.

Without doubt, smart buildings can help to achieve these results, thanks to a more personalized environment for the clients that allows the staff to embrace in a better way the ideal conditions. This reduction of issue will be accompanied by a reduction of the costs that the smart buildings allow.

Through the reduction of the use of lights, for example, the company will save money in the long term and can take back the investment made for the application of the smart system in a few years.

It is normal that this modernization can bring more results to some fields than to others. For example, the sensor can check the quality of air, soil, and humidity as the main elements for a hotel or a restaurant. This may also improve the quality of the workplace environment ensuring a good level of the measurable factors, but it is not sure that can improve the feelings of the personnel.

The market is expanding, enriching it of new products every day more.



**Source: Pexels/Breaking Pic*

The doubts about smart buildings

Even though the smart buildings' technology seems to be the solution for an improvement of wellness hospitality there are some doubts that should be cited:

- **Missing of centralized platforms** is one obstacle that can slow the embracement of this system. In fact, the lack of a centralized platform where the data can be stored reduces the impact of the data collection and, as a result, slows down the outputs of the strategy.
- **Privacy:** the debate on the privacy matter is one of the central themes of these days. The people could be scared knowing that some company is collecting their personal data and can declare them against this procedure. Even so, knowing where a person is exactly located during an emergency can improve the effectiveness of the rescues. In general, the law takes the parts of the persons and can be difficult to convince the guests that their information will be used only for research purposes.
- **Future:** smart buildings strategies rely on the satisfaction of the guests and the personnel. If smart buildings help to improve this environment it will be easy to convince the owners to do some investments, especially because the decision will be made using the Triple Bottom Line of person, planet and (the most important for the entrepreneurs) profit. If this improvement cannot be demonstrated, it will be difficult to convince the owners to spend some money on this technology.

Guests with special needs

During the last 10 years the development and spread of tools like Alexa by Amazon, Siri by Apple or Cortana by Microsoft was impressive. These vocal assistants can be recognized like a useful tool for

people with disabilities, permitting these persons with special needs to bypass the barriers that they have. One of the fundamental aspects is related to the accessibility to their house. With the development of smart houses these persons with special needs can live alone or need only a few amounts of help.

This technology is getting every day more popular and the devices already available are multiple:

- **Amazon Echo:** this device permits you to control everything in your house using only your voice. If you download the Alexa app too you can set alarms, do internet research, add stuff to the shopping list and so many other things without using your hands.
- **Smart lock:** this is a useful tool, even more of the classic keypad, that allows you to choose the phone of someone else (nurse, family members, etc) and give him access to your house. You can set the number of times that this person can enter, check when it logs in and in case remove the access to the person.
- **Smart doorbell:** created especially for people who are confined in a room or in a hospital bed, this application allows, thanks to a camera and a motion sensor, to see who rings the bell and to decide if to open the door or not.
- **Smart Thermostat:** allow you to choose the temperature in your house directly from your smartphone and keep it constant. Created especially for persons with brain damage that preferred a warm house, is useful for everyone. You can select your temperature when you are outside the house and lower the temperature when you are not at home, in order to save energy.
- **Smart Lighting and Outlets:** with this device you can choose the intensity of the lights depending on your needs or activities.
- **Smart Curtains, Shades or Blinds:** with these devices even a person with disabilities can afford actions that normally were difficult. Using only the touchscreen of his smartphone, it has the possibility to control curtains and slide them as it wants.



**Source: Pixabay/geralt. Pexels/Marcus Aurelius*

Apple watch

This useful tool developed by Apple can really change the life of persons with some disabilities. One of the features is AppleVoiceOver, for people who are blind or nearly, that allow them to navigate on the internet using only vocal commands. This feature, that is supported by the Taptic Engine technology, allows the user to be informed about any message, notification or call those incomes in his phone with some sound that comes from the watch. Thanks to this technology even people who are deaf or partially deaf or deaf only from one here can have a music “experience”. In fact, for partially deaf persons, Apple have developed a Bluetooth headphone that allows the user to listen to music in a stereo way.



**Source: Pixabay/Fancyrave1. Pixabay/ds_30*

The future of Accessibility

The devices for people with disabilities are growing in number everyday more but it will be impossible for these tools to become accessible for all expecting a top-to-down choice from the companies. For this reason, the change must be developed from the bottom.

An example can be a small start-up named Hz Innovations, developed by a deaf man named Greyson Watkins, that has created the technology Wavio that allows to the deaf people to “hear” the sound that happens in their houses. Thanks to a sound recorder, all the sounds of the house (alarms, microwave, doorbell, smoke detector, and so on) are registered and sent to his watch or smartphone through notifications.

Another example is WeWalk by Vodafone that allows blind people to receive notifications, like calls and messages, directly to this device that reads that for the user.

Finally, another example can be the height adjustable sink that allows the people on wheelchair to wash their hands in a comfortable way without any help from anyone.

8.6. MODULE 6: Local transportation innovations

MODULE 6:	Local transportation innovation
GLOSSARY	Local transportation, electric cars, self-driving, flying-car, navigation, biometry, safety
GENERAL GOAL(S):	The course is dedicated for self-educating tourism service providers to learn advanced local transportation technologies and techniques, related to inside and outside hotel/airport/train station access innovations. Here is achieving knowledge on electric cars, self-driving vehicles, flying cars, autonomous navigation, biometry access to hotel facilities and safety issues. The target is to assure convenient contact-less self-service in transportation from large transport points to the living room in the hotel.
OBJECTIVES:	By the end of the module, participants will be able to: <ul style="list-style-type: none"> • Skills of innovative thinking on local transportation arrangements. • Knowledge on innovating transportation means and technologies. • Attitude for exceeding innovation of local transportation.
METHODS:	Virtual Self-training, Self-assessment
DURATION:	3 hours
RESOURCES NEEDED:	computer, mobile phone, internet
ORDER OF ACTIVITIES:	Step 1: (30 min.) – Transport innovation virtual trends Step 2: (1 hour) – Virtual Self-Assessment on local transportation innovation Step 3: (1 hour) – Local transportation technical mean innovation Step 4: (30 min.) – Safety and security on local transportation innovation
EVALUATION OF THE MODULE:	test/quiz (annex no.) close questions
REFERENCES:	Paulauskas S. Circular economy 3:00: tourism service case/ Management - Journal of Management. Lithuania business university of applied sciences, ISSN 1648-7974. Klaipeda, Lithuania. 2018, № 1(32). -P.91-97. Tourism service Self-Assessment tool -

Transport innovation virtual trends

Transportation is a technology dedicated to physically pass a guest from geographical point A to B and to C with help of some transport means. The point A means living room, point B – hotel location and C – large transport transfer point as airport, train station, bus station, etc.

For virtual modelling of transport qualitative transition, we use trichotomic virtual trend, which quality stages have logics of: A) Thesis, B) Antithesis and C) Synthesis (Fig. 8.6.1).

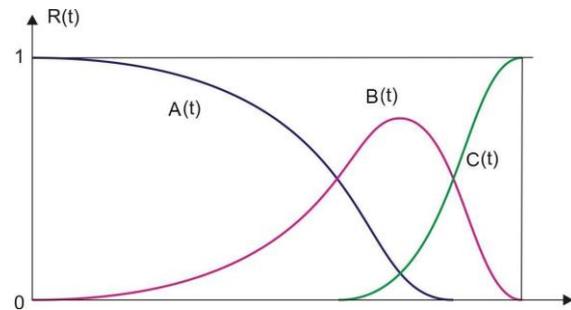


Fig. 8.6.1. Transportation virtual qualitative transition trend.

General development trends of transportation are transiting from 1D (roads, railroads, tram, underground, tube, etc.) dimension to 2D (busses, water, etc.) and finally to 3D (air, space, etc.) earning more freedom and quickness. From no road’s transportation is accommodating in roads, which need special construction work, and finally – no roads in future.

Table 8.6.1. Qualitative transition of transportation qualities.

Quality	Thesis	Antithesis	Synthesis	Earnings
Dimensions	1D	2D	3D	More freedom, quickness
Kind	No roads	Roads	Space	More freedom, quickness
Mode	Personal	Public	Individual, board	More freedom, quickness
Power	Biologic	Combusting	Electric, solar	Safer environment, cheaper
Drive	Driving	Navigation	Virtual, Robotics, drones	Safety
Purpose	Special	Choice	Universal	Efficiency
Windows	Glass	Glass packets	OLED walls	Less energy, less pollution,

Virtual Self-Assessment on local transportation innovation

Starting point of tourism local transportation innovation is tourism service provider’s virtual Self-Assessment with help of iSAT as a special virtual tool prepared for tourism service innovations.

iSAT is the virtual Self-Assessment tool worked out during Erasmus+ project Smart Hospitality implementation. After answering a whole of questions, a learning person will receive conclusions on the quality level of tourism service growth: physical, economic, green, sustainable, and smart. The program will calculate how much of material, energy, office costs and manual work can be reduced. The map will help a service provider to compare its own innovation quality with other geographical tourism service providers. The Self-Assessment tool has functions of perfection on tourism service innovation through repeating Self-Assessment and comparing progress.

Local transportation technical means and technology innovation

Global transportation between points C traditionally is arranging between far geographical locations. Firstly, it was animal forced - donkey, bulls, horse, camel, elephant, and other transport. Invention of power engines enabled to speeder and longer transportation by roads, railway, vessels, and airplanes. In the next stage we see growing innovations on vertical taking-off spacecrafts (SpaceX), flying cars, capsule transport means, etc.



Fig. 8.6.2. Autonomous taxi is reality now, 2020.

Local transportation is specified by geographical dimension and time transportation of a guest with a luggage around maximum one hour for go from point C to point B hotel location. Traditionally, there could be used bus, train, tram, underground, taxi and other means.



Fig. 8.6.3. Autonomous wheelchair in hospitality²²

Transportation innovation technologies lead to avoid human transportation service and give opportunity for travellers for self-service on transport means. This is rent of a car, use of shared vehicles, etc. They mostly are ecologically safe and equipped by navigation systems. The top local transportation

²² <https://newatlas.com/automotive/waymo-one-fully-driverless-phoenix/>

means are self-driving cars and flying cars, which do not need transport management abilities from a guest.

A, or indoor transportation previously was connected to use physical work of a guest on going and bringing together luggage from the enter till a room. In some hotels bringing luggage and a guest till a room was served by a hotel employee. Innovative indoor transportation concept requires to automatize full guest way without any manual or informational support of hotel staff.

Biometric person recognition system should recognise a guest, to propose an autonomous wheelchair for transportation of a person and luggage through corridors, elevators, room door until inside of a room automatically²³. Personal travel virtual assistants should have the opportunity to keep permanent contact with all involved service providers and assure convenient personal contact free movement indoor and outdoor of a hotel.

Security and safety on local transportation innovation

Security of guests, their property and personal information is assured by personal biometric access to connection points of a hotel system. Hotel's security system must meet a guest and provide it through corridors and elevators till the room expecting avoidance of transportation accidents, proper operation of a wheelchair, biometric recognition devices, health of a guest by measuring temperature, heath rhythm and normal movement of body parts, anticipate possible inappropriate actions on the part of others, and to take satisfaction signs from a face when guest reach the room of destination.

Guests with special needs must be recognised and special support must be provided for them.

This is important in night-time in parking places, in territories near hotels, in corridors, steers, etc., where security of a guest could be damaged. Hotel security systems must permanently expect and recognise each not registered person to avoid him access to hotel facilities and guest rooms.

Special tracking systems and security programmes must be provided for cases of quarantine or pandemic situations, when it is obligatory to have masks and keep distance between persons in corridors, stairs, elevators, etc. In case of abnormal action some alarm systems must remind guests on security issues.

After recognition of health or crime problems related to guests, hotel expectation systems must immediately invite emergency or security officers to assure immediate help to a guest.

²³ <https://news.itu.int/self-driving-wheelchairs-debut-in-hospitals-and-airports/>

Appendix1: Smart hospitality best practice examples

The toolbox with Smart hospitality best practice examples could be found on the link:
<https://www.eksponente.lt/SH-O2-1-best-practice-data-2020-11-02.pdf>

Appendix 2: Test question matrix.

1. Course outline, methodology and virtual tools

	Topics	Q	A1	A2	A3	A4	Correct A
1.	Smart hospitality Self- Improve ment methodo logy	The Technogeny is:	The science on technologies	The science on technical devices	The science on origin and development of skills and arts	Gene engineering	3
2.		What is the learning unit?	The action programme of a Human	One schoolboy	One education subject	One education institution	1
3.		The learning is:	Self-Improvement on the genome basis	Teaching by a teacher or professor	Education	Differently for different people	1
4.		The purpose of a game is:	Learning through mental simulation of action programmes	Wasting of time	Spending of a time	Imitation of something	1
5.		The learning form transits from to:	From the Education to the Self-improvement	From the Self-improvement – to the Education	From the Education to the Virtualics	From the Learning to the Metaphysics	1
6.		The learning content transits from to:	From the Metaphysics to the Virtualics	From the Virtualics to the Metaphysics	From the Metaphysics to the Education	From Self-Improvement to Virtualics	1
7.		Which is the Synthetic stage of learning?	Autocratic face-to-face education	Democratic Blended learning	Liber Self-Improvement	Differently for different cultures	3
8.		Future belongs to:	Group education	Individual Self-Improvement	Individual education	Group learning	2
9.		Future knowledge is:	Verbal	Writable	Virtual	Visual	3
10.		Future schools are:	Big buildings	Virtual surrounding	Home	Library	2
11.		Future educator is:	Designated teacher	Chosen mentor	Chosen teacher	Designated mentor	2
12.		Future cognition is:	Analysis	Synthesis	Compilation	Assumption	2
13.		Future World outlook is:	Sphere of things, element-atom	World development spiral, Universum-leap	The reality given by senses	Physical World	2
14.		Future Methodology is:	Scholastics	Virtualics	Cybernetics	Genetics	2
15.		Future logics is:	Formal	Dialectical	Virtual	Digital	3
16.		Future Ethics is:	Loyalty	Responsibility	Digital	Block-chains	2
17.		Future business is:	Smart Innovation	Sustainable development	Economics	Virtual modelling	1

18.	Virtual Self-Improve ment portal	The purpose of the virtual Self-Improvement portal is:	Learning and training	Training	Examining and certifying	Learning, training, examining, and certifying	4
19.		Which works with questions modes are available?	Review, train, exam	Train	Exam	Train and exam	1
20.		How many questions it is enough for one training session?	10	1	20	5	1
21.		How to train and keep exams?	Try until 3 times in row receiving 10 - excellent only, then start keep exam	Up to you	Try until 1 time receiving 10 - excellent only, then start keep exam	Try at first, exam – when ready	1
22.		How different are train and exam modes?	In train mode is visible theory, in exam - no	In exam mode is visible theory, in train - no	Sometime differs	Not differs	1
23.		The best Self-Improvement goes through:	Reading theory, reviewing questions and answers, trying to answer till highest mark	Trying answer to questions, reading theory	Trying answer to questions, reviewing of questions	Reviewing and answering questions	1
24.		Is it useful to save sessions results?	Obligatory, for watch self-improvement history and progress	Not necessary	Up to you	In exam mode only	1
25.		Which is a Self-Improvement target mark?	3 times in row receiving 10 - excellent only	Positive: 5-10 once	As higher as better	Depends on learning time	1
26.	Psychological Self-Improve ment on Innovation iGenius	Who is Genius?	A human exceeded the time	Born with extremely developed some own positive features	Born with extremely developed some own features	Marked in history celebre person	1
27.		Can any person become a genius?	Yes	Only born as Genius	When his geniality becomes important to humans	With permission of authorities only	1
28.		Who is the opposite to Genius?	The slave	Human with limited intelligence	Non successful person	Hired worker	1
29.		Which set of features is obligatory for becoming the Genius?	Smartness, innovativeness, expediency, flexibility, and reality	Having rich parents and a lot of money	Having a lot of influential friends	Hawing success	1
30.		Is it possible to improve own features of geniality	Yes	No	Sometimes	Having a lot of money	1

31.		How to become a genius?	To follow questions and further instructions of the portal iGenius	It's impossible	To wait until your original features will be accepted as genial	To create own understanding of a geniality	1
32.	Smart hospitality SME Self-Improvement tool iHsat	What is the purpose of iHsat self-assessment tool?	To help a hospitality SME to develop towards smart hospitality level	Self-assess on Smart hospitality	To see own place in hospitality market	To learn how to improve smartness in hospitality sector	1
33.		What is “smart hospitality”?	Achieved highest level of hospitality business innovation	Smart owner of a hotel	Smart employees of a hospitality entity	Hotel for smart consumers	1
34.		Which steps lead to smart hospitality quality?	Physical, economic, green, sustainable, and smart growth	Design and construction of the smart hotel	To disseminate in tourism market, that you are smart hospitality entity	To name your hotel as smart	1
35.		How iHsat helps to increase the smartness of your entity?	Permanently self-assessment on basis of iHsat question's introduction of advanced novelties	Permanently self-assessment on basis of iHsat questions	Permanently self-introduction of advanced novelties	Once self-assessment on basis of iHsat questions	1
36.		How does it need to innovate the smart hotel?	Once to introduce the best innovations	Permanent update your SME, seeking always will be the most innovative in entire world	Permanent update your SME, seeking always will be the most innovative in your region	Permanent update your SME, seeking always will be the most innovative in your town	2
37.	Smart hospitality SME business innovation tool iProject	The purpose of the virtualized innovation tool iProject	To create, to assess and to monitor implementation of an innovation project	To learn, how an innovation is creating and assessing	To examine an innovation on appropriateness	To demonstrate an innovation for an investor or owner	1
38.		Which an innovation assessment tools are used in iProject	Novelty, smart innovation, market demand and business profitability	Market demand and business plan	Novelty and smartness	Smartness and business profitability	1
39.		What is the novelty?	Ongoing trend of the product or service, comparing to outgoing	What is not exists in the entire world	What is not exists in your region	What is not exists in hotel	1
40.		What are the economic criteria of a smartness innovation?	Higher work productivity – less manual work	Less pollution	Longer life span of people	Happiness of consumers	1

41.		Which marketing indicators help to assess appropriateness of an innovation?	Acceptable demand, price, place and promotion of a new product	Acceptable price of an innovative product for consumers	Acceptable place and time for delivery of an innovative product	Acceptable promotion of an innovative product	1
42.		How much years ahead must provide your business model?	Till 10	5-9	1-4	As needed	1
43.		What net accumulated profit is provided in a tool as positive innovation choice?	More as 1 million euro after 10 years	More as 10 million euro after 10 years	More as 100 thousand euro after 5 years	More as 100 thousand euro after 5 years	1
44.		Acceptable innovation is when:	It is new, smart, have demand, is implementable and profitable	It is implementable and profitable	It is profitable	It is smart and new	1

2. The Smart hospitality subjects

	Topics	Q	A1	A2	A3	A4	Correct A
45.	Smart hospitality genesis	Extremely need of European Union is:	The peace	The growth	The stop climate change	The stop of arming	2
46.		The methodologic ground of Smart hospitality is:	Circular economy 3.0	Circular economy 1.0 and 2.0	Economics	Sustainable development	1
47.		The highest principle of economy is:	The smartness	The save of the environment	The health of people	Biggest GDP (Gross Domestic product)	1
48.		The resources of physical growth are:	Materials and energy	Office and manual work	Clean technologies	Smart technologies	1
49.		Applications of green growth are:	Marketing	Wind, solar, electric mobility, smart houses, etc.	Wellness, gene engineering, organ regeneration	Artificial intelligence, robotics, virtual reality	2
50.		Indicators of sustainable growth are:	Economic, ecologic, social and responsibility	Economic and ecologic	Happiness of people	Economic	1
51.		The feed-back of the smart growth is:	Profit	Climate safe	Lifespan of people	Happiness	4
52.		The ground of the artificial intelligence is:	Human self-management cycle	The best thinking	The meaning of majority	The best scientific achievements	1

53.		The main actor of hospitality business is:	Large holdings	Small enterprises	Medium enterprises	Family business	4
54.	Tourism business sustainable innovation	Which is the stage of the innovation cycle for SMEs practice?	Commercialisation	Basic research	Applied research	Development	1
55.		Who is the main actor in the smart hospitality business?	Consumer	SME	Tourism association	The State	2
56.		Hospitality cycles consist of:	Marketing, communication, accommodation, catering, wellness, and local transportation	Planning, decision-making, implementing and control	Market research, service design, service implementing, profit counting	Booking, accommodation, catering, and wellness	1
57.		Hospitality business progress main indicator is:	Work productivity	Number of visitors	Turnover	Business profitability	1
58.		Where the highest smartness is needed to reduce:	The office expenses	The manual work	The energy	Materials	2
59.	Tourism business smart innovation	Which sentence belongs to synthetic stage of tourism qualitative transition:	Physical tourism is wellbeing	Physical tourism is too polluting and risky for travellers	Virtual tourism allows to achieve all tourist demands avoiding travel and pollution of environment	Any travel abroad is funny	3
60.		Which technical solutions temporarily limit virtual tourism now?	The vision and hearing	The taste and touch	The smell	The touch, taste and smell	4
61.		Please choose the correct sentence:	VR, includes technologies such as Augmented Reality (AR), Extended Reality (XR) and Mixed Reality (MR).	AR, includes technologies such as Virtual Reality (VR), Mixed Reality (MR) and Extended Reality (XR)	XR, includes technologies such as Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR).	MR, includes technologies such as Augmented Reality (AR), Extended Reality (XR) and Virtual Reality (VR).	3
62.		How is the immersive feeling in VR?	Is mostly created by using sight and sound.	Is mostly created by using sight and sound yet, in some cases, smell and tactile stimuli	Is created with an engineering manual system.	There is no immersive feeling in VR.	2

				may be added as well.			
63.		Virtual reality is only in connection with the gaming industry:	Yes	No	Frequently	Sometimes	2
64.		Which is the correct definition of augmented reality (AR):	AR is a form of digital payment.	AR is a technology that overlays computer generated content on a real-world environment.	AR is a technology that connects the real world with the computer world.	AR is a computer system for hotels.	2
65.		How many technologies are included in the term (ER) extended reality?	Only one, the extended reality itself.	There are 2 technologies involved.	It is an umbrella term that includes Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR)	There is no technology involved in this term.	3
66.		Choose the right sentence:	Mix Reality uses our real environment, but the environment can be significantly transformed by adding digital objects that are anchored to the real ones.	Mix Reality transforms the environment of the space to transform into virtual reality.	Mix Reality was born because of default technology when VR was created.	Mix reality can create a virtual world for users in the same company system.	1
67.	Smart principles of tourism SMEs innovation	Who are sides of communication in hospitality service?	Service provider-consumer	SME-the State	Owner- the staff	Consumer and the cash	1
68.		What is the responsibility principle in sustainable innovation?	Responsibility of consumer against property of a hotel	Responsibility of the SME against local law	Responsibility of service provider and consumer against nowadays and future generation	Responsibility of staff against the owner of a hotel	3
69.		Complexity of hospitality service mean:	Care for all service cycle from marketing, communication, accommodation, catering, wellness, till	Care for accommodation only	Care for accommodation and catering	Care for accommodation, catering, and wellness	1

			local transportation				
70.		Holistic approach takes care for covering:	Accommodation and biogenic only	Biogenic, safety and health, communication, self-esteem, and self-expression demands	Accommodation and communication	Accommodation and safety and health	2
71.		Smartness of business growth should be grounded on:	The leap of physical, economic, green, sustainable, and smart growth stages	Cyclically operating a technical and social Self-Management system including software, artificial intelligence, and innovation service.	Introduction of health and secure for employees and consumers work conditions.	Introduction of clean technologies seeking to reduce pollution of the environment and expenses related to waste treatment and recycling.	1
72.		Technical applicability requires of:	Existing technical solutions of an innovation considering hardware and software equipment.	Interest of consumers	Interest of SMEs	Interest and legislation of a society	1
73.	Smart hospitality innovation solutions and applications suitable for tourism business	Smart marketing is:	Local	Regional	National	Global	4
74.		Smart communication is:	Virtual	Face-to-face	By phone	By email	1
75.		Smart accommodation is:	Virtually self-operating	Manually controlled	Automatized	Up to consumer	1
76.		Smart catering is:	Virtually personalised and automated	Manually served	The buffet	Up to consumer	1
77.		Smart wellness is:	Virtually personalised and automated	Manually served	Automatized	Up to consumer	1
78.		Smart local transportation is:	Virtually personalised and automated	Manually served	Automatized	Up to consumer	1
79.	Benefits of smart	Smart hospitality	Yes	No	Partially	Sometimes	1

	hospitality innovation for tourism business and society	leads to rise of work productivity?					
80.		Smart hospitality leads to rise of increase of high-tech jobs:	Yes	No	Partially	Sometimes	1
81.		Smart hospitality leads to rise of business profitability:	Yes	No	Partially	Sometimes	1
82.		Smart hospitality leads to rise of social responsibility:	Yes	No	Partially	Sometimes	1
		Smart hospitality leads to rise of clean environment:	Yes	No	Partially	Sometimes	1
83.		Smart hospitality leads to rise of life span of people:	Yes	No	Partially	Sometimes	1

3. Smart hospitality innovation

	Topics	Q	A1	A2	A3	A4	Correct A
84.	Marketing innovation	The smartest tourism market mostly consists of:	Permanent clients of a service provider	Local – national clients	Global – dedicated for Worldwide customers.	Depends on season.	3
85.		The smartest tourism marketing mostly is:	Search for customers	Advertising of hospitality service	Investigation and formation of a market	Poll of guests	3
86.		The smartest marketing you prefer?	Well known, approved by own practice marketing	Each new season to seek to learn lessons from previous years	Permanent search and use of innovative marketing experience	The most innovative – exceeding the time	4
87.		The most innovative market research is when:	The market is being investigated by the manager	The market is being investigated by our own marketing specialists	The market is being investigated by a specialized company	The market research is constantly carried out by the network of tourism services	4

88.		The most innovative market service formation is when:	Tourism services are developed by the leader	Services are created by your own marketing specialists	The service is developed by a specialized company	The attractiveness of the service helps to establish a global tourism network	4
89.		Which demands of consumers you take for your service formation	Which were in past years	The latest	Nowadays demands	Future demands	4
90.		The most innovative pricing is when:	Service prices are set by the manager	Service prices are set by your own marketing specialists	The service price is determined by a specialized company	The tourism network helps to set prices of our services	4
91.		The most innovative advertising is when:	Advertising is taken care of by the manager	Advertising is operating by own marketing professionals	Advertised by a specialized company	The tourism network helps to promote our services	4
92.		The most innovative guest polls are when:	At the departure of the guest at the reception	We send emails to guests	Guests are questioned by a specialized company	Guests are questioned by the network of tourism services	4
93.	Communication innovation	The smartest promotion is:	Directly, face-to-face	By phone	By email	Virtually by internet	4
94.		The smartest booking is:	Directly, face-to-face	By phone	By email	Virtually by internet	4
95.		The smartest communication during the stay in the hotel is:	Directly, face-to-face	By phone	By email	Virtually by internet	1
96.		The smartest additional services can be offered:	Directly, face-to-face	By phone	By email	Virtually by internet	4
97.		The smartest feedback during the stay is:	Directly, face-to-face	By phone	By email	Virtually by internet	4
98.		The smartest informing guests is:	Directly, face-to-face	By phone	By email	Virtually by internet	4
99.		The smartest issuing invoice is:	Directly, offline	By letter	By email	Virtually by internet	4
100.		The smartest payment is:	In cash	By bank card	Advance bank transfer	Virtually by internet	4
101.		The smartest check of payment is:	Directly, face-to-face	By phone	By email	Virtually by internet	4

102.		The smartest feedback after the stay is:	Directly, face-to-face	By phone	By email	Virtually by internet	4
103.		The smartest accounting is:	Manual accounting	Using the software	External bookkeeping services	Virtually by internet	4
104.		The smartest accounting reporting is:	Sending reports	Using the software	External bookkeeping services	Virtually by internet	4
105.	Accommodation innovation	The best building for accommodation is:	Worn out	Pretty old	Renovated	New construction	4
106.		The best building energy class is:	G-H	D-F	C-B	A	4
107.		The smartest electricity supply is:	Centralized from the electricity network	More centralized electricity supply	More Own Electricity Production	Own electricity production	4
108.		The smartest electricity source is:	Fossil fuel burning	Nuclear energy	Biofuel burning	Wind, solar, water energy	4
109.		The smartest heat supply is:	Centralized heat networks	Local centralized heat supply	Electric heating in rooms	Smart climate control	4
110.		The smartest heat source is:	Fossil fuel burning	Biofuel burning	Geothermal energy	Wind and solar energy	4
111.		The smartest refrigeration source is:	Natural	Exhaust ventilation	Air conditioner	Smart heat pump	4
112.		The smartest air ventilation is:	Exhaust ventilation	Centralized ventilation	Air conditioner	Smart ventilation system	4
113.		The smartest climate control is:	Provides hotel staff	At the guest's discretion	Automatic heating / ventilation control in the room	Smart climate control	
114.		The smartest door lock is:	Mechanical lock and key	Code lock / electronic card	Unlocked with smartphone support	Person recognizing lock	4
115.		The smartest light source is:	Incandescent lamps	Daylight lamps	LED lights	Smart lighting system	4
116.		The smartest lighting control is:	Unregulated lighting	Centralized lighting control	Mechanical lighting control in the room	Automatically adjustable lighting	4
117.		The smartest window Curtains is:	Curtain fabrics	Closed shutters for blinds	Automatically adjustable blinds	Tweaking glass panes	4
118.		The smartest room cleaning is:	Manual	With vacuum cleaner	Robot vacuum cleaner	Smart cleaning system, dirt free surfaces	4
119.		The smartest Fire alarm is:	Not installed	Central fire alarm system	Fire sprinkler system	Integrated with the	4

						smart home system	
120.		The smartest bed and bedding are:	For sleeping only	Comfortable for intimate relaxation	Individually adjustable bed	Smart adjustable bed	4
121.		The smartest linen change is:	Washable linens	Disposable bed linens	Disposable bed linens made of paper or plastic	Automatic roll sheet change	4
122.		The smartest garbage is:	Collected by housemaid	To the bin	Waste self-managed by guests	No garbage	4
123.		The smartest waste collection is:	To landfill	To sorting	To processing	No waste	4
124.		The smartest wastewater is:	Not counted	To the treatment facilities	Recycled	No wastewater	4
125.		The smartest wastewater heat	Not counted	Reused by heat pumps	Selling	Returned to the heating system	4
126.		The smartest mice catching :-)	Up to the guests	Rodent catching devices	Cat employed	No rodents	4
127.		What is the meaning of customer experience (CX) technology?	It is a digital experience inside every guest hotel room.	It is a personalised system for the hotel staff	It is a technology that puts a personal concierge in the pocket of every guest.	It is an automatic open doors system for hotels.	3
128.		Is a digital concierge able to handle a conflict with hotel clients?	Yes	No	Frequently	Sometimes	2
129.		Digital Concierges can help guests with:	B Booking and In-Stay questions.	B Pre-stay and post stay actions.	Taking the bags from the guests to the room.	The tasks written in options A. and B.	4
130.		What it is a Robot? (choose the most complete answer)	It is a machine that physically looks like human-like android	Is a machine, which has been designed to automatically perform specific tasks accurately.	It is a virtual machine that does some basic tasks.	It is a system that has information on it and provides information to the humans.	2
131.		It is the following phrase correct? „Tactile Robots innovates hospitality because they can deliver the room service to the	Yes	No	frequently	Sometimes	2

		rooms of the clients and the hotels can significantly increase their costs. „					
132.		Why did Henna Hotels „fire” the robots 2 years after?	They could not answer basic questions of the clients.	They could not print the passports of the guests.	Due to their bad working, the hotel was needing more humans to resolve robots’ mistakes.	All other answers.	4
133.		Which of the following it is NOT Physiological biometrics.	Fingerprint	Iris	Voice	Hand	3
134.		Behavioural Biometrics are:	Keystroke	Signature	Voice	All other answers	4
135.		Which of the phrases it is related to Fingerprints Biometrics?	After capturing the print, sophisticated algorithms use the image to produce a unique digital biometric template.	By measuring the unique folds of these muscles, biometric authentication tools can confirm identity with incredible accuracy.	Infrared lights pass through the skin surface where they absorb into deoxygenated blood.	Measurement of hand characteristics like the length and width of fingers, their curvature, and their relative position to other features of the hand.	1
136.		Which of the phrases it’s related to Iris Recognition?	After capturing the print, sophisticated algorithms use the image to produce a unique digital biometric template.	By measuring the unique folds of these muscles, biometric authentication tools can confirm identity with incredible accuracy.	Infrared lights pass through the skin surface where they absorb into deoxygenated blood.	Capture capillaries deep within the eye by using unique near-infrared cameras.	2
137.		Biometric technology differentiates unique characteristics to confirm identity and improve security.	Yes	No	Sometimes	Frequently	1
138.		What it is the most important item of a hotel room?	Window	Wardrobe	Bed	Mirror	3

139.		Complete the phrase: “Smart, innovative interior design ...”	“...only pleases the eye and makes for a great guest experience.”	“...not only pleases the eye and makes for a great guest experience, it also improves your hotel operations efficiency, driving up the profitability in your bottom line.”	“...improves the amount of work needed to do by humans.”	“...makes the hotel operations less efficient and are too expensive, making it hard to be profitable.”	2
140.		Choose the most correct answer: What can a smart mirror do that normal mirrors cannot do?	Show your shape on it	Having your calendar, weather, email, music, social media, video streaming, home control, live TV and more to the bathroom mirror.	See a movie while you are in the sauna.	See the weather while you wash your teeth.	2
141.		With Smart Lighting Technology some companies have managed to improve energy costs by 75 percent and reduced productivity by 20 percent by converting to a smart LED lighting system.	Correct	False	Sometimes	frequently	2
142.		What can Smart Energy Management Systems do?	They use sophisticated machine-learning algorithms to continuously analyse historical thermodynamics, local weather patterns and peak demand loads to optimize energy consumption in real-time, all year round.	Enables hotels to better understand their energy needs, automate their consumption and adapt to real-time to changes in occupancy.	Enable hoteliers to monitor, track and optimize energy consumption, predictive maintenance allows them to use sensor data to identify wasteful or hazardous trends and alert maintenance staff before a given issue escalates into a much costlier one.	None of another answers.	1

143.		Air Source Heat Pumps...	... businesses a two-fold opportunity: to reduce energy consumption from the grid and sell excess production back into that grid.	...allow hotels to save on powering devices whenever they are not in use.	...make it possible to transfer heat from outside a building to inside it (or vice versa).	collect data related to runtimes for each unique room and assign them efficiency ratings.	3
144.		Is it a Smart Water Management a necessary requirement for life and every hotel relies on the stuff just to keep afloat?	Yes	No	Frequently	Sometimes	1
145.		Choose the most correct answer: Which smart technology/-ies will be reshaping the hotel industry in the very near future?	Smart Lighting Technology, Smart Energy Management and Smart Water Management	Solar Panel Technology and Automatic Shutdown Sockets	Air Source Heat Pumps and Predictive Maintenance	All the previous answers.	4
146.	Catering innovation	The best way to assure food and production quality?	To provide more qualitative trainings for staff	To employ more staff	Provide more frequent employees supervision	To eliminate the potential for human mistakes, use innovations in the catering business	4
147.		What are the main cooking innovations?	Maxifood and molecular culinary	3D food printing system, molecular culinary and nanofood	Molecular culinary and open fire roasting	3D food printing system, Frulinox Hichef and molecular culinary	3
148.		Innovations in catering business make these tasks more efficient:	Ensuring cleanliness	Recording of fridge temperature	Faster ordering of food for customers	All of the above	4
149.		What determines food quality and taste?	Chemical process	Biochemical process and physical process	Number of spices used in preparation	Biochemical, chemical, and physical processes	4
150.		What are the main cooking innovations?	Maxifood and molecular culinary	3D food printing system, molecular culinary and nanofood	Molecular culinary and open fire roasting	3D food printing system, Frulinox Hichef and	2

						molecular culinary	
151.		The smartest breakfast is:	Snacks	Buffet	A la carte	Individual pre-orders	4
152.		The smartest food delivery is:	Delivery	Cooked in the kitchen	Serviced in the room	Processed with 3D printer	4
153.		The smartest food waste is:	To landfill	To feed animals	Recycled in bioreactor	No food waste	4
154.		The smartest Frying oil is:	To landfill	Used as engine fuel	Selling	Not used	4
155.	Wellness innovation	The smartest toilet paper is:	To treatment	To sorting	To processing	Not used	4
156.		The smartest toilet is:	Toilet	Toilet and bidet	Toilet with bidet	Electronic toilet with body washing and dryer functions	4
157.		The smartest shower is:	Shower in a bath	Shower cabin	Shower cabin with body jets	Smart shower with dryer	4
158.		The smartest thermal procedures are:	Hot shower	Bathhouse with shower	Complex of bathhouses and body jets	Smart bathhouse	4
159.		The smartest drying hands is:	Towel	Paper towel	Hand dryer	Water taps with dryer	4
160.		The smartest water tap is:	Manual	Touchless	Automatic	With dryer	
161.		The smartest body drying after shower is:	Cloth towel	Disposable towel	Hot air dryer	Smart shower with dryer	4
162.		The smartest hair drying is:	Cloth towel	Disposable towel	Hot air dryer	Smart shower with dryer	4
163.		The smartest shower room cleaning is:	Manually, with mechanical wipes	With chemical cleaning agents	With natural cleaners	Dirt free surfaces	4
164.		The smartest body washes are:	Not provided	Disposable soap, shampoo	Regular shampoo on the wall	Smart shower system	4
165.		The smartest health and security observation in Hotel/SPA is:	Not installed	Observed by personnel/lifeguard	Centralized health and security observation system by video cameras	Health monitoring with wristwatches	4
166.		The smartest guests with special needs service are:	Not suitable	Assigned personnel	Special rooms	Smart Guests with special needs help system installed	4
167.	Local transportation innovation	Local transportation includes:	All traveling from home to hotel	Indoor transportation in hotel only	From a large transition center till	From large transition centre till a hotel	4

					room in a hotel		
168.		Which transportation qualitative sequence is correct?	Personal, public, individual	Public, personal, individual	Individual, public, personal	Public, individual, personal	3
169.		Why transport driving transits to self-driving quality?	Looks innovative.	Humans cannot drive safety.	More convenience	Not for all people	2
170.		Will it be direct contacts with hotel administration in a Smart hotel?	Yes	At the customer's choice	In emergency case only	No	3
171.		Will it be possible to disconnect from the smart hotel tracking system?	Yes	No	On writable agreement with administration only	I can do it at my own.	3
172.		The smartest local transportation is:	Up to guests	Paid transportation services	Free of charge transport service	Free of charge smart transport	4
173.		The smartest fuel used is:	Gasoline, diesel	Fossil gas	Biogas	Electricity	4
174.		The smartest car wash is:	Manual	Car Wash tools and means	Auto wash	Dirt free surfaces	4
175.		The smartest service for guests with special needs is:	Not suitable	Help with a wheelchair	Provided electric wheelchair	Self-driving electric chair is provided	4
176.		The smartest elevation is:	Stairs	Mechanically controlled elevator	Code controlled elevator	Guests recognising smart elevator	4

Conclusions

Smart hospitality Academy is an advanced sample of how the highest smart approach could be applied to nowadays one of the most challenged fields of tourism service and education.

Facing economic stagnation, climate change, migration, wars and serial pandemic, especially nowadays COVID-19 hospitality business service meets giant troubles and needs innovative approaches and changes. European Innovation Union suggestions to use scientific innovations are the most actual and applicable in the hospitality sector.

In this case Lithuanian, Estonian, Greek, and Spanish adult learning developers initiated this learning methodology for trainers under Erasmus+ project support.

The methodology consists of smart hospitality business service and learning essence, structure, links discovering and positioning on historic qualitative trends from Past, through Nowadays and Future.

Applied Circular Economy 3.0 approach enabled specific quality leaps of physical, economic, green, sustainable, and smart growth of tourism entities, to form smart tourism principles and advanced innovation of overall service cycle innovation steps: marketing, communication, accommodation, catering, wellness, and local transportation.

Trainers were armed with clear education and Self-Improvement virtual models enabled to apply its flexibility in the learning process depending on the situation and target groups.

The content of SH learning presented as a transition from academic scholastic to virtual self-improvement. The form of SH education is presented in face-to-face, blended learning and virtual self-education. Practical part of the programme consists of 24 academic hours course, which consist of 6 SH learning modules: marketing innovation, communication innovation, accommodation innovation, catering innovation, wellness innovation, local transportation innovation.

The toolboxes with large best practice materials, simulators and self-assessment tools lets trainers to arrange advanced learning and self-improvement courses on Smart hospitality.

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