

Artificial Intelligence and Blockchain: Teaming up for simplicity



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INTRODUCTION

Travel is one of the most turbulent markets in the world. It is also among the first to deploy the latest trends in technology.

What are the underlying trends and mechanics at play? What will be the key traits of the travel marketplace tomorrow? What is to be expected from artificial intelligence and blockchain technology? What will be the key success factor for players in this marketplace?

This blue paper provides a view on those questions. It is based on opinions from a broad range of experts. No one is in a position to claim to have all the answers in this field – us included. The future of travel is far from gamed out. And yet, despite all the ambiguity, one theme seems to stand out in shaping travel going forward: Teaming up to deliver simplicity.

H1: YESTERDAY

- Focus on bringing travel to the masses, processes and price battle
- Leaving customers on the back seat

MASS TOURISM

During the twentieth century tour operators introduced and facilitated mass tourism by offering standardized tours based on purchasing inventory in large quantities. This was further driven by decreasing costs of transportation.

ELECTRONIC DISTRIBUTION SYSTEMS

The classical age of mass tourism started to end with the introduction and development of electronic distribution systems, initially created by the airline industry in 1960. After the Airline Deregulation Act in 1978 the electronic distribution systems finally went truly global. The deregulation was triggered in Europe merely ten years later and gave birth to systems such as Amadeus and Galileo. These global distribution systems have increased access to travel offerings by facilitating electronic distribution.

INTERNET

The advent of the internet has triggered commoditization of travel and focus on price, leaving customers with overwhelmingly fragmented experiences. Online travel has come a long way since the Hotel Reservation Network launched its first website in 1995. Online travel agencies (OTAs) have created transparency on services and prices. With increasing transparency, the focus shifted to transaction costs. This caused increasing competition in each step in the value chain and players started specializing.

Customers had to take a back seat during those early developments. The initial offering was strongly product driven, with tour operators deciding what to sell; and the later focus on excellence in single-process steps led to fragmented customer experiences.

H2: TODAY

- Quest for scale with customer focus
- However, customer experiences still largely fragmented

The focus of the travel industry is shifting to the customer's experience. Technology is more and more commoditized, making almost everything possible. New players, who have created deep pockets based on online travel agency business models, are fighting for the front-spots along the customer journey. Those players have been driving consolidation since the beginning of online travel.

Overall, the travel space has experienced the rise of various disruptive business models. The advent of the 'sharing' economy has enabled the rise of peer-to-peer platforms is one example. Airbnb opened the market in 2008 to new powerful accommodation providers: private individuals.

Players are increasingly turning to serving customers. While prices are still dominating the game, relevance of offering and convenience of service are gaining importance. Players offer superb customer experiences and know how to make their offerings relevant.

Also some small but innovative players are doing exceptionally well in the market. Due to lower entry barriers, more start-ups have gotten engaged in the travel business. They usually focus on either of these two aspects:

1. A disruptive idea, e.g.
 - Lola: Booking service via messages
 - Etherisc: App that uses a blockchain platform to fully automate the underwriting and payouts of flight insurance policies
2. A limited scoop within the industry, but with superior execution or cheaper offers, e.g.
 - Hopper: Predicting the changes in airline pricing to recommend the best purchase time
 - Waylo: Artificial intelligence program that allows travelers to track the development of hotel prices

However, there is still increasing uncertainty among players. The travel space has developed to a point where businesses can only thrive by either offering scale or a clearly unique niche proposition by leveraging the full potential of ever faster developing technology.

NEW TECHNOLOGIES

At present, artificial Intelligence (AI) as well as blockchain technology, both facilitated by the trend towards data standardization, are picking up speed. Big players are already tapping into the potential of those technologies. However, with hurdles for market entry tumbling, start-ups are having significant impact as well. They are out to disrupt the industry with new products, better offerings and cost advantages.

It is thus worthwhile taking a closer look at the respective benefits and challenges.

DEEP DIVE I – ARTIFICIAL INTELLIGENCE

Short definition: artificial intelligence is a technology which **processes data** to reach a certain goal.

In essence, AI depicts the capability of gathering, memorizing and processing information with the intent to derive decisions and actions. However, nowadays, we call almost any system which is able to learn from data through neural networks, decision trees or regression models, artificial intelligence.

Artificial intelligence has two main impact dimensions.

1. It can **lower costs**, mainly because it automates processes which were formerly only executable by humans. Examples are robots for room service, check in or baggage storage.
2. It can **improve the offerings** of a company due to superior decision making and unprecedented capabilities in two ways: by improving a physical product or an experience itself. One example of improving an experience would be a personalized online travel assistant.

Due to this capability to improve offerings, artificial intelligence will support the current shift from focusing on transaction costs to focusing on customer experience.

All benefits aside it is important to state that AI is a field of research which still faces several challenges.

A short list of **the challenges of artificial intelligence**:

- Lack of capabilities – Due to the invention of deep neural networks a lot of applications, which were once considered science fiction, are now performed by AI systems. However, AI systems are still comparably dumb and experts expect the arrival of more broadly intelligent systems in around 30 to 40 years.
- Data availability and quality – Current artificial intelligent systems need an enormous amount of data to become intelligent and useful. Additionally, the data quality must be high to ensure a well-functioning system.
- Privacy and data protection – Currently Europe has a very rigid data protection regime, which challenges sharing and collection of personalized data. The specification of those regulations will be decisive factors regarding to what extent AI will deliver benefits in personalization.
- Consumer acceptance – Two dimensions are important: consumers demand privacy protection which conflicts with AI's demand for data collection and some consumers prefer human interaction instead of artificial systems such as Chatbots, robots or personal assistants.
- Shortage of talent – AI developers are currently a very scarce resource. Companies such as Facebook or Alphabet start graduates with low six-digit salaries.

Based on the general technological advances mainly driven by public research institutes and technological blue chips, start-ups develop specific applications for well-defined cases. While some OTAs might consider technology as their core business and want to build their own know-how, others would rather form partnerships to gain this knowledge. For non-tech companies such as big hotel chains the big technology companies offer AI technology ready-to-use toolboxes, e.g. IBM Watson. This strengthens the position of the big technology companies but also helps accelerate industry adoption. Overall, independent on whether they develop AI inhouse or not, most travel companies are convinced of the great advantages of AI.

Examples of artificial intelligence adoption in the travel industry:

A large number of companies have already introduced **chatbots** powered by artificial intelligence: Expedia, Kayak, Booking.com, Skyscanner, Lola, Pana, Hipmunk, KLM, Amtrak, Hilton, Edwardian Hotels, Aloft

Many OTAs use artificial intelligence to make **smart recommendations**, suggesting trips that customers might like to go on based on similar users (e.g. Hopper, Lola, Pana, Hipmunk, Expedia, Kayak, Booking.com)

-> More examples? Read the full report on www.ANVR.nl/traveltomorrow

DEEP DIVE II – BLOCKCHAIN

Short definition: blockchain is a technology to safely perform **transaction exchange**.

Basically, blockchain is an encrypted, distributed, immutable database. While in ordinary transaction systems a central organization validates and secures the content and access to the database, in a blockchain no central validating and controlling organization exists. For any changes to the database, a consensus between the majority of participants must be found. This ensures that no one entity alone has the power to change the content of the database, which makes it very secure against manipulation.

The system is called blockchain because new transaction entries are added to the old database in so called "blocks", which are then again connected to the previous blocks. With every new block, the database grows, becoming a chain. The database incorporates the entire history of all transactions that have reached a consensus with the participants.

A short list of the advantages of blockchain technology:

- Transparent and immutable
- Secure due to consensus mechanisms
- Decentralized
- Ensured data integrity
- Efficient and cost reducing
- 'Smart contracts' can conditionally execute, making collaboration easier

-> For more information about the advantages of the blockchain see the Amadeus White Paper "Blockchain: harnessing its potential in travel" under marketing.amadeus.com/blockchain-technology-whitepaper

Generally speaking, blockchain marks the transition of the "Internet of Information" to the "Internet of Values". This means that value can be exchanged as quickly as information. With blockchain technology a value transaction such as a foreign currency payment can happen instantly, just as how people have been sharing images and videos online for decades. It is suitable for all kinds of data transactions and offers many possibilities besides being used for financial transactions. The Internet of Value will enable the exchange of any asset that is of value to someone, including stocks, votes, frequent flyer points, securities, intellectual property, music, and scientific discoveries. It thus can disrupt businesses which now function as trusted intermediaries. In the case of cryptocurrencies such as Bitcoin, these intermediaries are central banks.

However, the utilization of blockchain also faces challenges and obstacles. They usually do not prevent utilization but must be kept in mind during installation and usage.

A short list of **the challenges of blockchain technology**:

- Scalability – The blockchain technology was originally not developed to manage the enormous amounts of data traffic which projects need today
- Transparency – Although also on the short list of advantages, transparency is not always desired
- Regulation – The blockchain technology is currently unregulated which causes uncertainty and hinders investments
- Collaboration – A blockchain system can only work if the participants work together, e.g. competitors have to share data and participate in the system to use it effectively
- Governance – Particularly for public blockchains, new governance, business and incentive models are yet to be developed
- Acceptance by customers – With the rising concern about privacy, it is not yet clear to what extent customers will embrace blockchain-based services

Blockchain is a very recent technology and use cases are still in their infancy. It experienced its breakthrough with the emergence of the Bitcoin in 2008, a cryptocurrency, which was also the first publicly distributed blockchain. Blockchain still faces the challenge of defining true value for all stakeholders, and convincing them to adapt their business models. Where artificial intelligence broadly augments businesses, blockchain applications oftentimes fundamentally challenge existing business models. Thankfully, the recent popularity of cryptocurrencies based on blockchain technology ignited new ideas for the utilization of blockchains. However, established use cases focus on private blockchain solutions. Use cases for public blockchains are still developing and have not escaped the experimental phase yet.

Examples of blockchain use cases

- TUI Group case
TUI intends to use blockchain technology to manage its hotel inventory. It transferred its hotel inventory into its own blockchain, although not all aspects of the supply chain have yet been integrated. .
- Winding Tree case
While TUI use a private blockchain to manage their own inventory, Winding Tree, operated by a non-profit, wants to disrupt the entire industry with an open-source blockchain. The objective is to build a decentralized travel industry, in which the whole inventory is stored and distributed over one open-source blockchain.

-> You can find more examples and highly-appealing blockchain applications for the travel industry in the full report on www.ANVR.nl/traveltomorrow.

And on <http://marketing.amadeus.com/blockchain-technology-whitepaper>

H3: TOMORROW

- Orchestrating towards customer benefits
- True focus on the customer at last

With this, it is time to dare looking forward to future travel. There are five general trends on customer demands that will shape tomorrow's world and also impact the travel industry. These have to be taken into account for the future.

1. Relevance

More people are travelling today than ever before. While in the 1950s only 25 million international arrivals were counted, in 2016 this number had risen to 1.24 billion. While today travel & tourism (according to the WTTC) supports 9.6% of total world employment, this number is expected to rise to 11.1% in 2027.

2. Experiences

Experiences and their distribution are the drivers of the modern consumer. Thanks to social media and the sharing economy, sharing experiences have become mainstream.

3. Simplicity & speed

Consumers constantly suffer from information and options overfeed and crave simplicity. They seek the best solution without browsing through thousands of available choices and adjusting hundreds of possible settings.

4. Sustainability

People are becoming increasingly aware of environmental issues and are starting to make more conscious decisions to protect the planet. Travelers will be more interested in the environmental, economic and social impact they're making at the destination they visit and are likely to support companies that embody these values.

5. Personalization

Travelers expect to be seen as individuals and want to receive information and offers built on their preferences. Success for travel companies will depend on their ability to engage their audience and provide contextual content. At the same time, there is increasing regulation against building up the kind of data that is required to fulfill this expectation, presenting somewhat of a conundrum.

All trends aside, economic and political uncertainties appear to be the only given certainty. Current political movements which advocate nationalism and inward-looking tendencies could curb the globalization trend. Stricter travel rules in the short run and less economic prosperity in the long run could decrease traveling possibilities and tourism around the world.

ROLE OF NEW TECHNOLOGIES

Artificial Intelligence and blockchain are both key technologies for companies that want to adapt to prevailing customer trends such as personalization and simplicity. Blockchain technology will ensure the trustworthiness and completeness of travelers' data. If blockchain systems prevail it will lead to ecosystems in which data is stored and work is done in a decentralized fashion. More reliable services and truly seamless customer journeys will be possible. This will not only improve the offerings of incumbents, but it will also allow the sharing economy to flourish, Alongside, with the abundance of trustworthy and complete traveler data artificial intelligence systems will be able to truly understand a consumer's demands and personalize

offerings accordingly. Furthermore, AI applications such as personal assistants will simplify and speed up the booking process and become the new gatekeepers to the internet.

-> More information about future scenarios for travel companies is available in the in the Amadeus Paper "Online Travel 2020 – Evolve, Expand or Expire"

POSSIBLE USE CASES FOR AI AND BLOCKCHAIN

In workshops with experts, various use cases for artificial intelligence and blockchain have been discussed to tackle pain points experienced by the industry and frequently mentioned in the customer survey, like e.g.:

The use cases were assessed based on the following criteria: IT effort, business effort and potential impact.

More than 5000 Dutch people were asked what they would like to see improved when it comes to booking a trip or the service during the trip¹.

These were the most frequently mentioned cases:

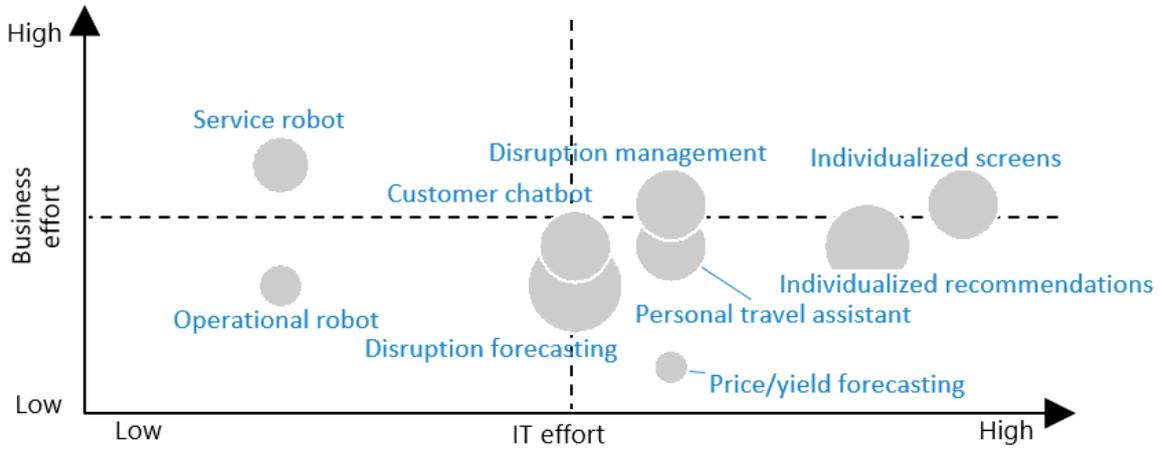
- Communicating the price of the travel product including all mandatory additional costs. (45% of respondents want this to be improved)
- Queues for check-in and security. (33.5%)
- Informing all parties within your journey (taxi, hotel, restaurant etc.) in case of disruption or delay. (29.7%)
- Entering the same data within the customer journey over and over again. (28.7%)
- Easier finding the right trip by showing less offer, but exactly fitting my wishes. (17.2%)
- Receiving more information about activities, nice restaurants and interesting places at your holiday destination based on your interests just before and during the holidays. (16.7%)

To tackle these issues of the sector, workshops with experts have looked at how Artificial Intelligence and Blockchain can contribute to a solution. Various applications have been devised which have subsequently been assessed on the basis of the following

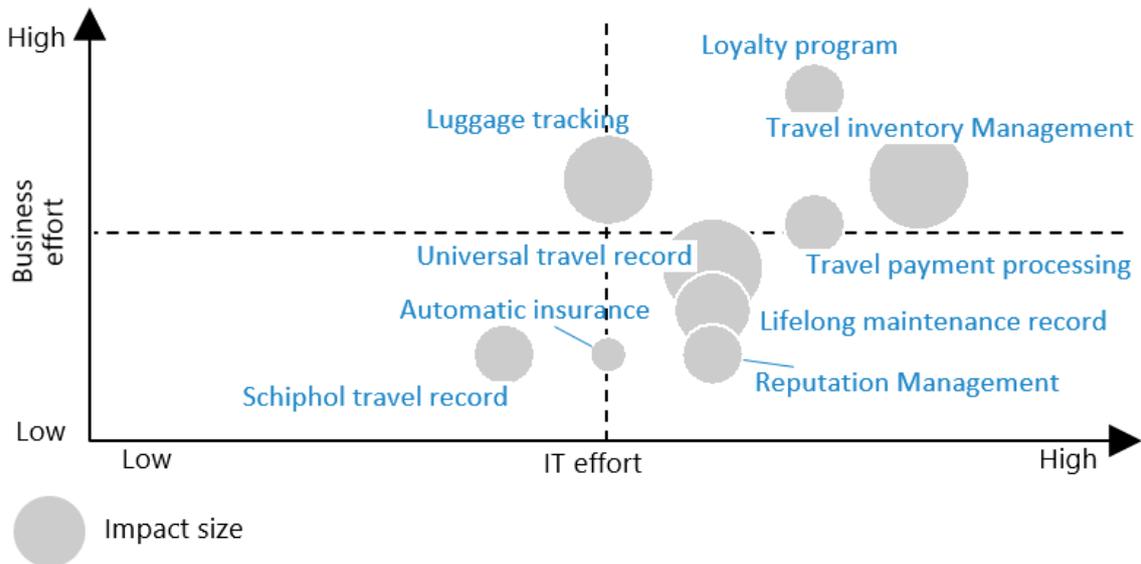
criteria: potential impact (what does it deliver), IT effort and business effort (what does it cost)?

¹ ShoppingTomorrow research by Gfk, october 2017

Figuur: AI use case matrix



Figuur: Blockchain use case matrix



H4: CONCLUSION

– Teaming up for simplicity

TEAM UP!

When looking over the horizon of the travel industry, we can deduce a few conditions from the past and present. The first lesson for businesses to be drawn is that they should stay focused on their core business and make sure they excel at it. In a world where, technologically, everything is possible, focus becomes more and more important. New technologies are already influencing the industry today, and will have an even greater impact in the future. As a result, demand for talent polarizes between specific expertise and broad skill portfolios. Companies should enter partnerships for everything outside their core. These partnerships no longer mean weakness. They are quite the opposite: a key enabler rather than a weakness. Companies orchestrate and contribute to a network of partnerships. It is that network which allows them to excel by jointly delivering simplified customer experience.

SIMPLIFY!

Simplicity is turning from a competitive edge into a prerequisite for businesses success, on both proposition and price.

In the travel industry of the future, simplification is a key driver in order to keep up with customer expectations. Let us take a step back to clarify this thesis.

The travel industry is expected to continuously grow in the near future. However, this growth will differ from the developments in the past in several ways: the rise of OTAs has shown the important role technology plays within the travel industry. Furthermore, data standards and metasearch engines simplify and at the same time accelerate booking processes. The new "transparency through technology" lowers prices and hot topics like AI and blockchain will further fuel the current industry shifts.

Customer needs are shifting, too. Millennials are willing to share their data for the sake of simplifying their travel experiences. In 2020, 44% of the European population will have grown up with digitization, and OTAs are pushing towards integrated packages rather than single components in order to avoid "lock in" scenarios.

To stay ahead of the game, brands have to embrace simplification, since the less focused a company is, the larger the risk of being mediocre and fighting a lost battle. In the travel marketplace of tomorrow, there will be no space left to be a "jack of all trades".

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