AEROTIC

TICKETING AND DELUXE ITEM TRANSPORTATION BLOCKCHAIN BASED SYSTEM

INTRODUCTION

Travelling by airplane has become heavily regulated in last couple of decades, putting a lot of extra work both on airline companies as well as travellers. Many have to bother with intrusive border controls on while simply transferring from one flight to the other or have some other troublesome experience. Even simple things as changing ones name on the ticket takes a lot of effort as well as money.

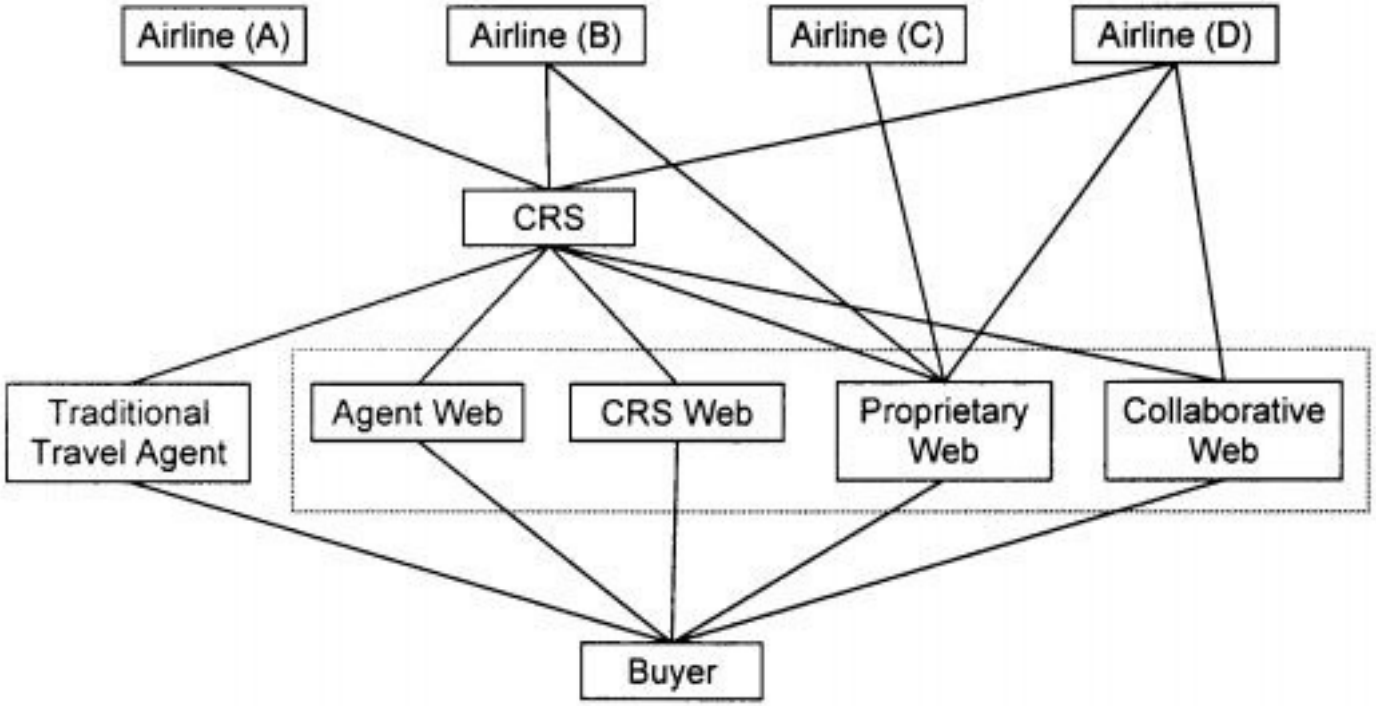
By relying on blockchain, we wish to integrate some of the crucial characteristics of blockchain into the airline ticketing and transportation. Among those are: immutability of the records, their transparency and possibility of simplification of certain processes. We have broken down into two specific segments, that we will handle with our solution – namely ticketing and deluxe item transport

The increased use of Internet has made it easier for new actors to find distribution channels and to sell their tickets over Internet. But still the Traditional Travel Agents play an important role on the market because of their long-term relationships with companies which can offer them loyal business customers. The fact that the new carriers don't have a well known name and don't have any established relationships with the Traditional Travel Agents could make it hard for the new actors to grow. The separate areas of changes described above makes it interesting to examine the intersection of those, namely the combination of new Airlines and new ways of distribution in this industry. The purpose of this study is to examine if ticket sales itself could constitute an entrance problem.

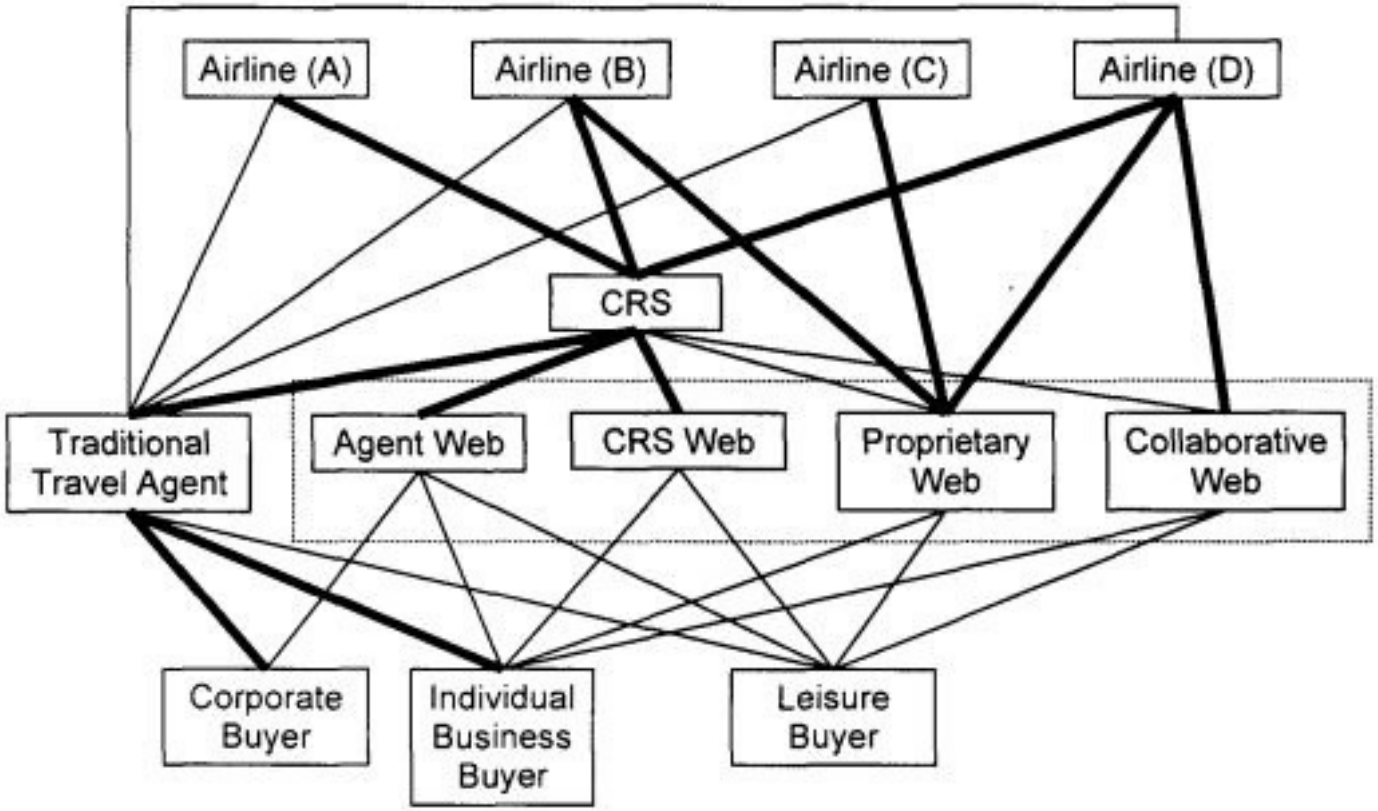
THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM

CRS - Computer Reservation Systems, are the aggregators that gather the Airlines' and other travel producers' offerings in one place and make them available to travel sellers equipped with a suitable computer. In essence, the CRS sell information distribution to the Airlines and information access to the travel agents etc. Traditional Travel Agents refers to the brick-and-mortar travel agents that have a broad range of products in categories such as Airlines, Hotels, and Car rental etc. Web Sellers mainly use Internet as their customer interface. Four sub types in the Web Sellers group have been identified: Agent Web, a travel agent with Internet as the main customer interface and sells many Airlines tickets, makes hotel reservations etc. Some Traditional Travel Agents have a web interface in conjunction with their physical stores. CRS Web, an online travel agent owned by a CRS. Proprietary Web, a web interface owned and operated within an Airline's organization. This Web Seller often only offers its' own tickets. Sometimes other Airlines' offerings are also available; tickets on Airlines in the same alliance are more common to be offered in this case. Collaborative Web, a joint-venture between Airlines with several Airlines' offerings; the owning Airlines' and others. Other actors that are selling tickets, such as Airline's ticket offices, call centers, and consolidators, and tour operators.

THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM



THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM



THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM

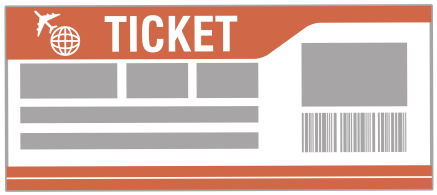
Airlines started to develop CRS jointly in groups of Airlines. For a long time the dominating way of selling Airline tickets was through the CRS to Traditional Travel Agents, like Airline of type "A" in Figure 2. In the mid 90-ties, Airlines started to use web sites operated by them to sell tickets in addition to the CRS channel, depicted by Airline "B". One of the first was British Midland that started to sell online in January 1995. Some chose to only sell through their own Proprietary Web, like Airline "C". It was many times low-cost carriers who did it to cut transaction costs associated with ticket sales. The lowest cost would be when the web site is directly linked to the Airline's inventory. Many Airlines still use CRS, even for their Proprietary Web. (Grenblad & Rosén, 1999) The Internet opportunities also gave birth to a new form of collaboration between Airlines, where they created a joint-venture web site, Collaborative Web. In this case there is a mix of directly connected Airlines and the ones connected through a CRS. Several Airlines tickets are aggregated to one web site and then sold on the web site directly to the end-customer. Airlines involved as an owner in a Collaborative Web is shown as Airline "D". Today, the traditional Airlines use several sales channels simultaneously and Buyers alternate their choice of channels.

THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM

Actors the Airline is depending on are CRS, Travel Agents, booking system suppliers, IATA and credit card companies. The main sales channel for traditional Airlines involves the travel agent. Some Airlines see the travel agent as a sales channel partner and others see them as customers. Difficulties related to these relationships include high costs of the CRS service and travel agents' trust in the Airline. New cost Airlines are more often trying to use Internet as the main channel. Established Airlines often have a diversified sales channel strategy. New Airline have a more focused strategy, probably because of a lack of resources needed to use multiple channels. It has been suggested that the Internet is more suitable for younger customers and travel agents for older. Internet sales are seen as a less costly sales channel.

THE EXISTING SYSTEM - COMPUTER RESERVATION SYSTEM

Future Research > To get generalizable results on the issues of sales barriers in particular, a survey would be suitable with more actors included and perhaps also more respondents at each actor. The industry changes would be interesting to follow with the perspective of markets-as-networks approach. Will structuring take place where use of activities and/or resources is refined to attain better efficiency? Or, will a Heterogenization process happen where new ways of combining resources result in increased effectiveness? > An area not covered in this paper is about the distribution of tickets that are sold. Similar research could be made on this aspect to see if it could be an entrance barrier, e.g. does e-ticketing make it more easy or difficult for new Airlines? What are the resources needed and what are the difficulties in getting access to them? > The dominating position of the CRS could be interesting to study and to see if it could affect the entrance of new airlines.



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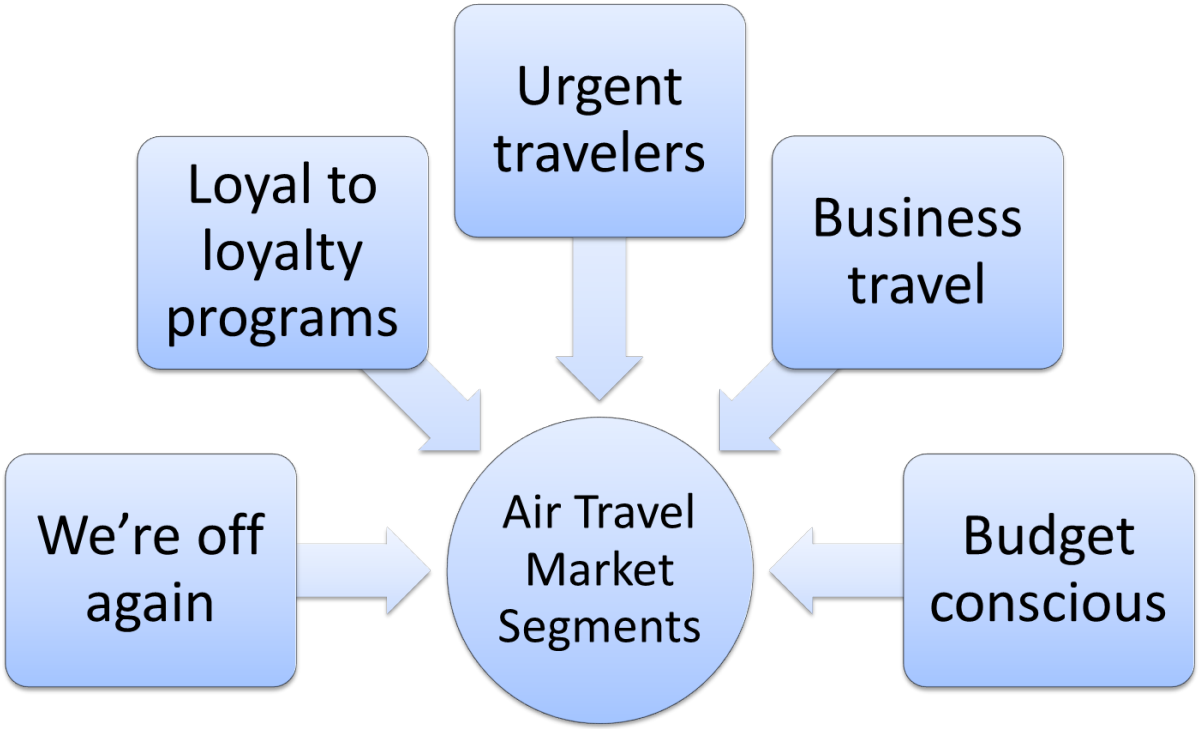
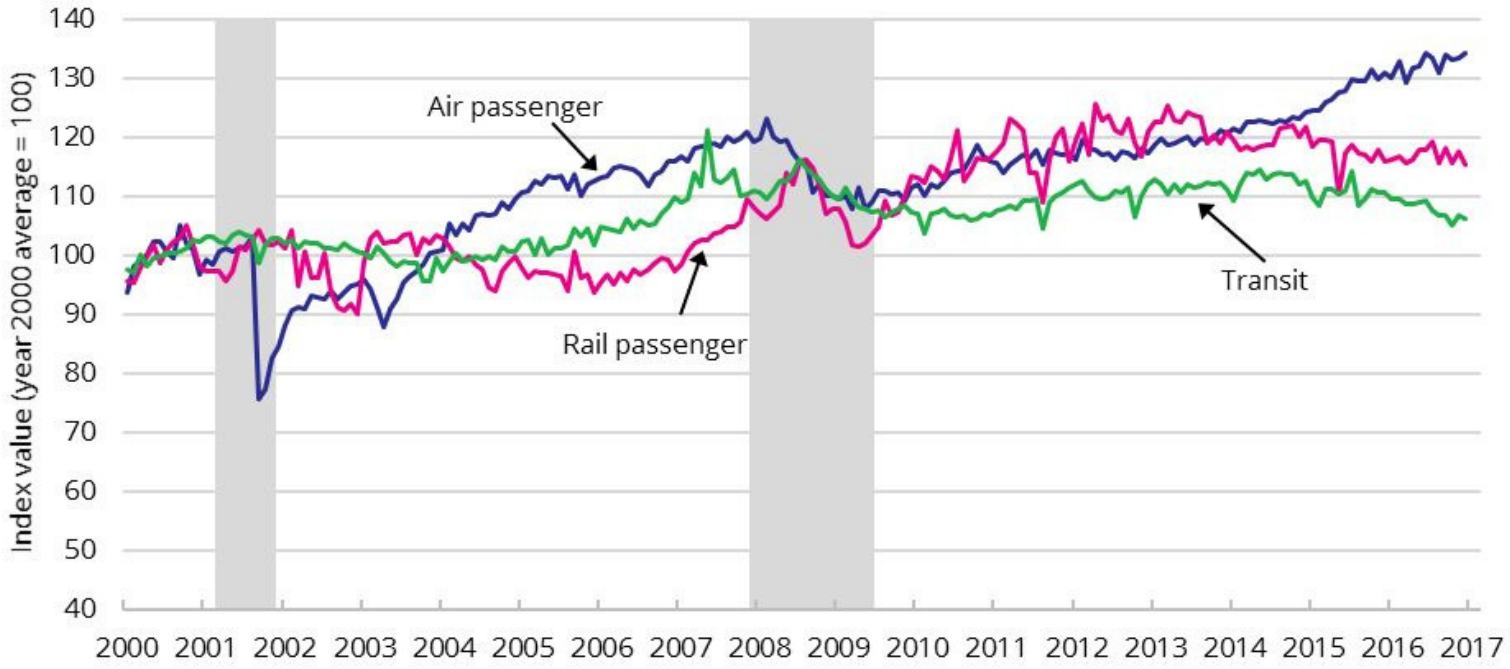


TRENDS, ANALISYS & STATISTICS

Transportation Services Index (TSI), January 2000 to March 2017



TRENDS, ANALISYS & STATISTICS

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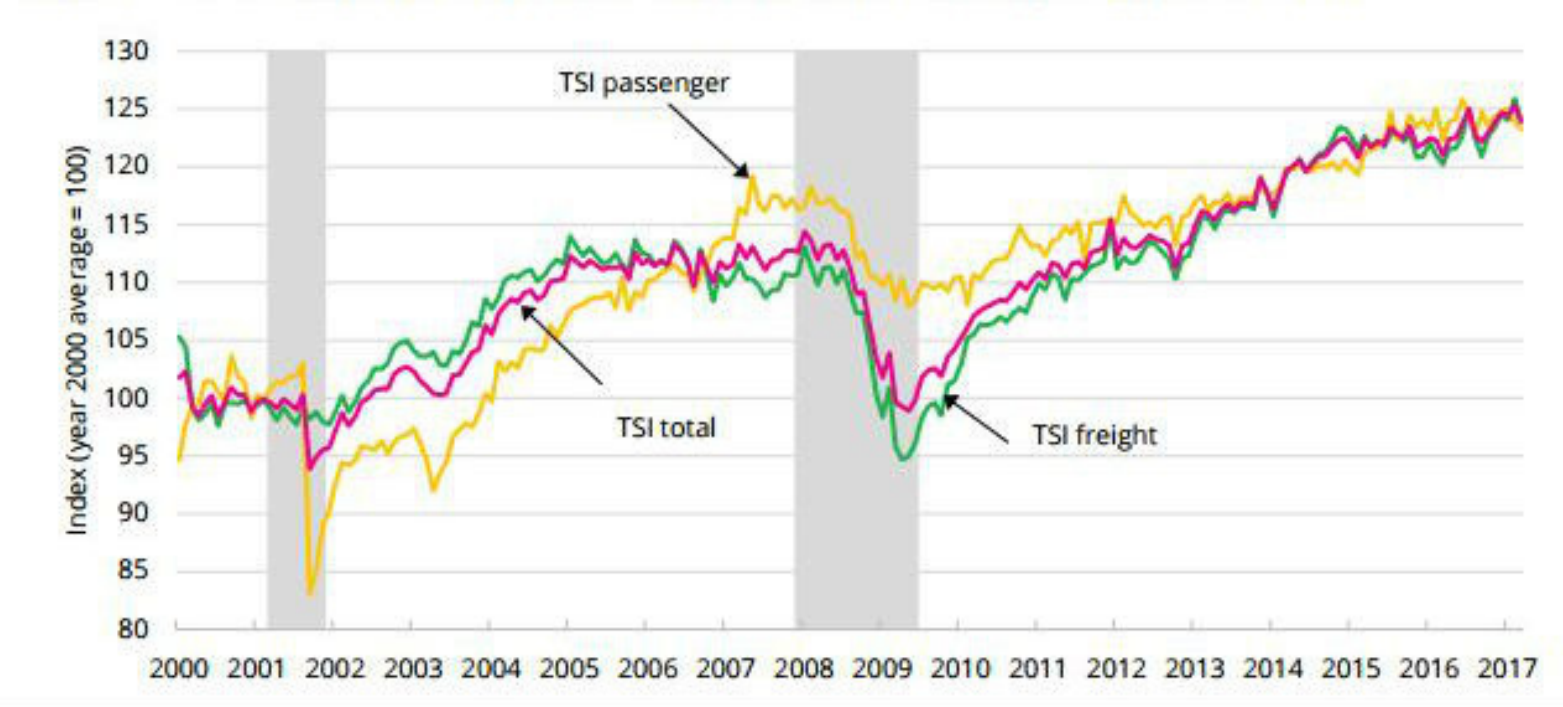


TRENDS, ANALISYS & STATISTICS

TSI PASSENGER - EUROPEAN UNION

Selected Countries and Economies

Country	1970	2016	
Austria	511,400	14,724,774	
Belgium	1,366,200	12,545,322	
France	9,108,000	65,362,743	
Germany	6,498,000	124,743,942	
Ireland	1,476,300	125,648,741	
Netherlands	2,881,100	37,652,448	
Spain	6,347,400	66,674,868	
United Kingdom	15,568,800	145,120,984	
European Union	63,336,700	709,688,233	

TRENDS, ANALISYS & STATISTICS

TSI PASSENGER -NORTH AMERICA

Selected Countries and Economies

Country	1970	2016	
North America	173,629,292	908,355,426	

North America

Country	1970	2016	
Bermuda			
Canada	10,180,300	85,406,426	
United States	163,448,992	822,949,000	

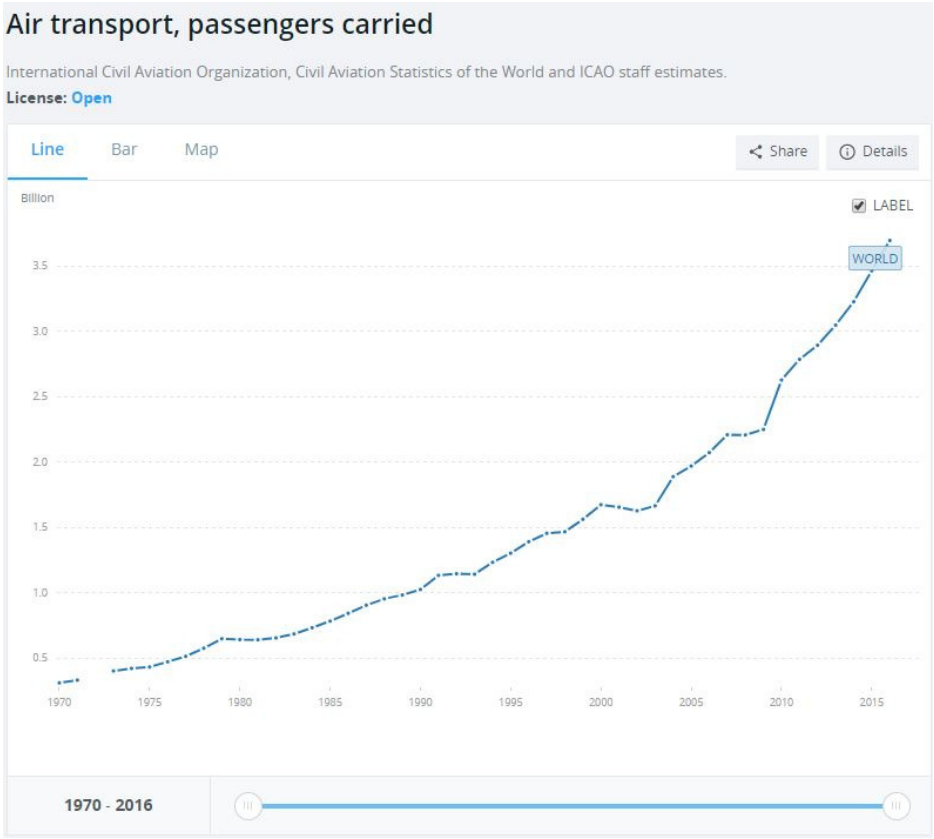
TRENDS, ANALISYS & STATISTICS

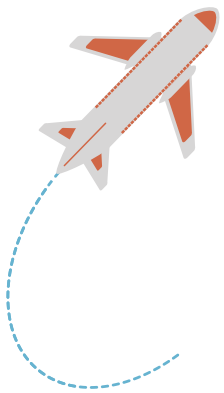
TSI PASSENGER -EAST ASIA & PACIFIC

Selected Countries and Economies

Country	1970 (thousand)	2016 (thousand)	
Australia	7,318.70	72,597.70	
China		487,960.48	
Indonesia	826.40	96,529.13	
Japan	16,315.10	117,706.00	
Thailand	764.20	60,455.20	
East Asia & Pacific		1,151,610.30	

TRENDS, ANALISYS & STATISTICS





BLOCKCHAIN

Category	Question	Bitcoin's approach	Other ways
Data storage	How should data be stored?	A blockchain	A database (could be replicated across multiple data centres)
Data distribution	How should new data be distributed?	Peer-to-peer	Client-server, hierarchical
Consensus mechanism	How should conflicts be resolved?	Longest chain rule	(Not needed in trusted networks) 'Trusted' or super-nodes
Upgrade mechanism	How do the rules get changed?	BIPs (for writing the rules) Vote by hashing power (for implementing the rules)	Centralised upgrades Contractual obligations
Participation criteria	Who can submit transactions?	Pseudonymous, open	Trusted, pre-vetted participants
Participation criteria	Who can read data?	Pseudonymous, open	Trusted, pre-vetted participants
Participation criteria	Who can validate transactions?	Pseudonymous, open	Trusted, pre-vetted participants
Participation criteria	Who can add blocks?	Pseudonymous, open	Trusted, pre-vetted participants
Defence mechanism	How to prevent bad behaviour?	Proof-of-work	(Not needed in trusted networks) Proof-of-stake, other 'proofs' or costs to add blocks
Incentivisation scheme	How to incentivise block-makers?	(only expensive in Bitcoin because of proof of work) Block reward, to be replaced by transaction fees	Contractual obligations 3rd party funding
Incentivisation scheme	How to incentivise blockchain data storage?	Not considered	Contractual obligations 3rd party funding
Incentivisation scheme	How to incentivise transaction validators?	Not considered	Contractual obligations 3rd party funding

DIGITAL IDENTITY

"Imagine never having to worry about your digital security ever again. It's a massive problem in the world. Which is now estimated to cost the industry about $18.5 billion annually, according to a report released Thursday by Distil Networks. That means for every $3 spent, $1 is going to ad fraud. Blockchain technologies make tracking and managing digital identities both secure and efficient, resulting in seamless sign-on and reduced fraud. Be it banking, healthcare, national security, citizenship documentation or online retailing, identity authentication and authorization is a process intricately woven into commerce and culture worldwide. Blockchain technology offers a solution to many digital identity issues, where identity can be uniquely authenticated in an irrefutable, immutable, and secure manner. Current methods use problematic password-based systems of shared secrets exchanged and stored on insecure systems."

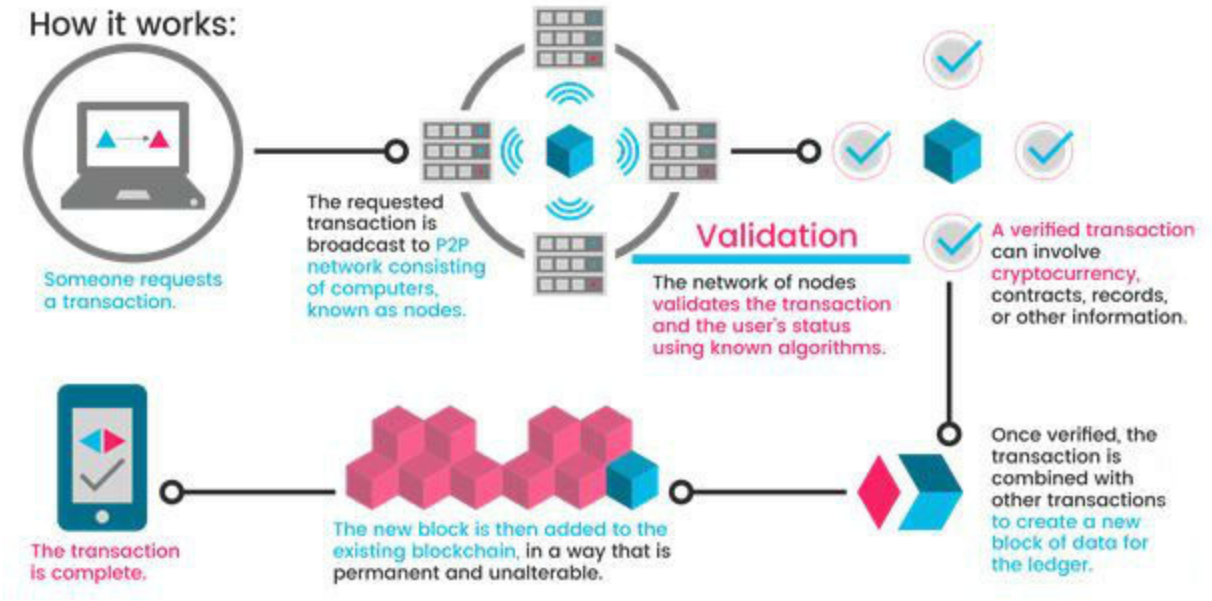
Blockchain Identity Use Cases

Blockchain technology can be applied to identity applications in the following areas:

- Digital Identities
- Passports
- E-Residency
- Birth Certificates
- Wedding Certificates
- IDs

ShoCard is a digital identity that protects consumer privacy and is as easy to understand and use as showing a driver’s license. It’s optimized for mobile and so secure that a bank can rely on it.

BLOCKCHAIN SYSTEM



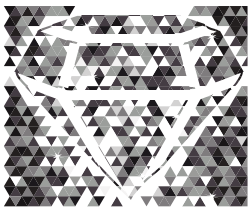
BLOCKCHAIN BASED SYSTEM

1. Ticketing

Airplane ticketing systems represent a crucial system for passenger transportation. There is a considerable and precise amount of information someone has to enter in order to even be eligible to board a plane and/or enter specific countries via air transportation. Someone's basic information and information such as criminal record, health record etc all play a part here. While we want to make it easy for someone to identify themselves, at the same time we want to satisfy the need for the protection of certain personal data, according to new and upcoming legislation like EU's GDPR. Hence the blockchain. It allows for the creation of unique digital ID's for every passenger be it either for permanent or just one-off use. Service will be similar to Keybases digital ID (www.keybase.io), where each and every passenger will get his or hers unique passenger ID, which would be both immutable and trusted by all interested parties. It would speed up on boarding procedures as well as provide all the interested parties with the »need to know« info in order to make any inquiries (such as TSA in the USA) go faster.

2. Deluxe item / VIP passenger transportation.

Item transportation is another issue to be tackled. Here we need to merge the need to provide a higher level of security while also creating a level of anonymity to the specific item or a VIP passenger. While those cases might be rarer, it is their level of complexity, that requires handling with care. For example, certain medical items, that need urgent (fast) transportation must not (under any circumstances) be delayed at a certain point of control. Hence the blockchain and the immutability of the records put onto it come into play in this segment. All the records should also be anonymized (not just pseudo-anonymized), where someone, which is not part of the people that were given access to, could not easily identify the nature of such transportation. Same goes for VIP passengers and/or diplomatic corps and foreign dignitaries. In order not to cause international faux pas, there should also be an added level of security on the flight manifest put onto the blockchain, that anonymizes these persons too. Last but not least, there would be a possibility to use the metadata of each flight and related services in order to improve service in the future, although this would require another modular upgrade to the system in the future, giving all the stakeholders even better results.



BLOCKCHAIN BASED SYSTEM

Valuable cargo is defined by IATA as goods valued at over $1,000USD per kilo. This commonly includes jewels, crystals, diamonds, jewelry, cash, medical equipment, bank documentation, high couture fashion, but mostly precious artwork.

Ideal for private art collectors, museum curators, and auction houses, as well as specialist freight divisions dealing with valuable cargo, CAL VAL offers safe and quick transportation with personal service for each and every customer.

As an issue to the needs and of “ frequent flyer network” we created special “de luxe” product - slots (lines) for personal jets, which can be used also for transportation of special deliveries.

Unique digital identity - unique ID for every item; transportation paper will be delivered for every object.

Luxury objects - jewelry- as well as artistic objects - paintings, sculptures, precious and unique hand made objects, are equipped with blockchain certificates. Transportation of those works can be tracked more easilly thanks of that technology, protection of data is secured.

BLOCKCHAIN BASED SYSTEM

Description, special features of works, exact dimensions, technique, media production are included in a certificate with ID. (sculpture, painting, aquarelle, graphics, categories 2d Arts, 3D Arts, categorization as utilized at a prototype noravision.mitv.si.)

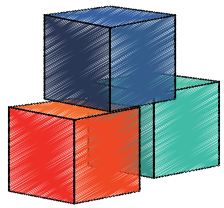
Smart contracts between collectors - buyers and artists can be established, all inclusive in “De luxe” application of Aerotic app, which can - at the same time be a platform for the international art auctions.

Expositions, history of accomplished trades can be also added to the rating of an artist, and all that facts contribute to the evaluation process of an artist and his art - works, speaking for living artists as this process can be very dynamic whereas yet historically proven names - works - are already stocked in protected hangars directly on the aeroports. Here a lot of links are also to accomplish for security as well as insurance policies (smart contracts).

BLOCKCHAIN BASED SYSTEM

As people have their id cards which are absolutely indispensable also for “human” transportation even artists should have their special ID card to which has to be linked all his work and life as the project as well, in most cases, life is a vital part of an artist.

That means, that luxury and Art objects, graphics with certain limits of prints as well as some immaterial works as performances, videos, (copies) should be linked to this special unchangeable ID certificate that aligns all transactions.



SUMMARY

“Transcending limiting barriers we commit ourselves to enliven invisible and yet unseen, merging Arts and Arts therapies, Technology, and Education, bringing together Parallel Realities and enabling a continuum of unique and original evaluation of material and immaterial Art or Research work also through decoding system and transparency of blockchain.” Nora