Dynamic airline offer creation – is the future here?

A white paper by

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Introduction

Just as the jet engine transformed air transportation, dynamic pricing will transform how airlines create offers for their products and services. Airlines that are first to embrace data-driven pricing and contextual offer generation will gain a competitive advantage over those that continue to rely on the dynamic pricing practices of yesteryear.

This won't happen overnight, therefore we must seek to enable an agile and innovative approach to offer creation while also enabling legacy systems and business practices to continue running reliably – until we prove the difference!

We know filed fares, RBDs, and revenue management systems built for one product and one channel won't get us there. We know the value of data lost, as it is discarded passing to legacy and siloed systems of record. We must get our house in order.

Many of our airline partners are doing just that, investing in offer and order management systems to enhance dynamic, contextual and tailored offers. This enables a shift from channel-centric to customer-centric retail and proving the difference!

Many are building out their data infrastructures to prepare for the enormous volume and velocity of real-time contextual data that will be generated through the ever-increasing volume of digital channels. This will form the foundation, powered by machine learning, which will provide real predictive insights into our customers and their retailing behaviours – enabling us to target the "segment of one".

As our airline partners continue to evolve as digital travel retailers, we continue to support traditional flight pricing and shopping practices while in parallel enabling dynamic pricing for offer optimisation across multiple travel product domains.

This is already demonstrating real value in terms of both customer loyalty and revenue growth, which is why we are pleased to sponsor this Travel in Motion paper as an important platform for discussion on the future of offer management.

Aidan Brogan, CEO, Datalex

Dynamic airline offer creation – is the future here?

Looking beyond rules engines and dynamic pricing to contextual and intelligent offer creation in travel retail.

Abstract

With the advent of the trend towards digital retailing in the airline industry, and the desire for airlines to become the sole source of the offer, there has also been a lot of discussion related to dynamic pricing. This paper aims to demystify some of the concepts and definitions of dynamic pricing and take it a step further - to **dynamic offer creation.**

It is a good time to look into the crystal ball. Technologies such as artificial intelligence, cognitive intelligence and machine learning - all somewhat related - are on the rise. Concepts such as segmentation, personalisation and contextualisation in airline offer creation are taking shape, and in some cases, are quite advanced. With the increasingly competitive market and uses of new tools and channels to make offers and sales, airlines need to rethink their understand of the competition and get a better view on the customer's needs and desires.

This white paper is targeted at an airline audience, particularly decision makers in the commercial and distribution departments, including the revenue management, pricing and ancillary disciplines of the airline. It gives a view beyond what is done today, to look at what will be possible tomorrow. It gives insight into the potential gains that artificial intelligence might bring, and uncovers the benefits of clever use of data and smart algorithms. The objective of this paper is to clear some fog over the often-misused term "dynamic pricing", and to trigger discussions amongst business colleagues on the subject. Perhaps it will also spark some thoughts and ideas on your own airline's future concepts related to getting the best offer to every single request, every time and all the time.

Outline

Expectation vs reality - How Ben is shopping for his business trip

Ben works for a small engineering company. They are rather successful in their niche, and sell their goods to customers globally. They call Ben the flying salesman back at home base – he is on the road roughly 70% of his time. It is nearly time to engage someone to plan his travel. But alas, the company is not ready to do this yet, and Ben still spends his time planning his own travel.

Reality

Today, Ben is planning his trip from his company's central European base to Asia. He has three stops to make in his one-week trip – one visit to a potential customer, one at a plant which uses their machines and one to visit a new distributor of their products. As the presentation to the client is the day he lands in Asia, he is looking for a business class flight to get there well-rested. He needs to arrive before 10am to get from the airport in Tokyo into town in time for the meeting. A quick shower at the hotel would not be bad either. The next day, he wants to find a flight – in coach – to Taiwan. Preferably of course, with the same alliance in order to maximise points earned. From Taiwan, he needs to find a flight in the evening, also in coach, to Singapore. After the meeting with the distributor, he is looking for a flight to finally head back home. According to the policy, it is back of the bus… He has enough points for an upgrade, and is willing to use them. However, he needs to find the right airline with the right fare class at an acceptable price. Planning and booking all this is going to be a nightmare, especially because he has constraints on when he needs to be where and, if at all possible, would like to buy this trip from a single place, including the Narita Express to get into Tokyo. Forget it, no chance.

Ben's dream

While Ben's itinerary, needs and desires may be somewhat more complex than many other travellers booking simple return trips at the lowest possible fare, it is not unheard of. And while many travel agencies will handle the complexity for Ben, even they do not have the tools to do this in a simple way. They too will paste the various offers and trips together, but the process of finding the best possible trip will be tedious. Even in many TMC online booking tools, this is a challenge. As a matter of fact, there are so many combinable possibilities to complete the itinerary, just figuring out the options is one for Einstein. Or Watson. But more on that later.

Ben's vision is to have the ability to tell his preferred airline partner or booking sites what he really needs – and wants. The new, demanding "customer 2.0" combines business class with economy, uses perks such as upgrades with ground transportation, has preferences for collecting points and mileage, and above all, expects a single place to book. All that considering the parameters which cannot be changed such as meeting dates and times, earliest time he can leave home and within the sales budget. And, he wants (needs) this laid out on a silver platter to compare the variations and offers made in such a way that it does not take an MBA to understand. Tall order, is it not? But actually, it is a simple and entirely natural consumer need.

The airline's nightmare

Ben's dream is currently the airline's nightmare. The complexity of putting together the offer Ben is looking for is a nearly impossible task. To make an offer compelling enough to keep Ben within an airline's or alliance's network partners, and to offer the end-to-end experience from a single place is even harder. Airlines do not have systems today to create and view such a complex order. While individual components are easy to figure out, and prices from airline partners can be quoted, there is no way to build the complete offer, and have a certain degree of confidence that Ben will choose one offer over another because it is attractive enough – or more attractive than the competitor's. And lastly, airlines are lacking the systems which help them determine what it is that Ben needs and what he wants, which will make the difference between buying and moving to the next travel website.

"Our objective in improving the Netflix recommendation system is to create a personalized experience that makes it easier for our members to find great content to enjoy. The ultimate goal of our recommendation system is to know the exact perfect show for the member and just start playing it when they open Netflix. While we still have a long way to achieve that goal, there are areas where we can reduce the gap significantly."

Netflix Blog "To be continued"

Complicating things

The consumer is changing, as is consumer shopping behaviour. The media and channels used, and the expectations of the experience are all different than five or ten years ago. They will continue to change as the spark of innovation continues in mobility, communications and customer interaction. As airlines differ considerably in the products that they offer and how they offer it, the consumer's need for comparison is increasing. The airlines are also changing how they want to present their offering. It is no longer just about figuring out the lowest available airfare. Rather, it is about understanding who is asking for something and in which context. Knowing these key pieces of information, the airline can (or at least, should) tailor the offer to the needs of the traveller or buyer.

While there is a widespread conviction within the industry that airlines are somehow "different", this entire scenario is in fact not unlike consumer retailing or telecommunications. Retailers understand consumer behaviour very well, and tailor offers to their needs. While the pricing of these offers is not real-time like airline offers, there is a relationship in terms of how retailers customise individual offers to consumers. A frequent example is that of a major retailer in the UK, which identified that female consumers purchasing certain vitamin supplements were likely to be pregnant, and after a given time were made offers for diapers, baby food and other suitable products. No one told the retailer that these women were pregnant – it was derived from available information, aggregated and analysed to identify patterns. Similarly, Amazon and other large online shopping marketplaces understand a consumer's past purchases as well as current interests, and make real-time comparisons with other consumers which have been categorised into the same segment. This is how the famous "others bought…" offers come about. Similarly, many telecommunication and insurance providers are rather clever about offering the right products at the right time. This is also based on behaviour, localisation and other factors.

Netflix determines content based on your viewing behaviour. Amazon Prime, iTunes or Spotify suggest music similar to other music you have listened to. These are all behavioural, contextual offers to improve the service and offering to the customer.

During a Black Friday sale, Amazon, for example, will change prices of their highly competitive items several times per day[i]. They match the various sale prices of other online retail and brick and mortar stores where there may be a door-opening sale in the morning, and a final sale in the last hour before closing.

Some of the current practices may not be dynamic in terms of pricing (and an online clothes store will not have such a dynamic range of prices as an airline), but they can be dynamic in terms of bundling the offer and perhaps providing a rebate or voucher or perhaps free shipping or discounts for additional products.

But what about travel?

How is all this relevant to the airline and travel industry? We have all seen the airlines unbundle their offerings. Even airlines which a few years ago would have said "never" to unbundling are doing this today. There is no "full-service" airline model any longer. There are always additional pennies to be spent, and better ways to satisfy the customer's needs.

As airlines unbundle their offerings, which in some cases serves the passenger well, there is also the need to re-bundle in many cases. It is not so much about the dynamic price – or continual price, as will be discussed later. While the pricing (dynamic or otherwise) may be a factor, it is largely one which adds more value to the airline than the customer. The customer does have one key desire though, and that is to only pay for what they need and want, and to get the best possible offer for that, although "best possible" does not necessarily mean the cheapest.

The airline business model is changing, and the airfare itself is being taken apart in new ways. The unbundling of airline products does not just mean that seat selection, meals and baggage are upsells. In some cases, airlines are taking apart fare components even further. Is refundability a product? What about flexibility? Fare families today would certainly indicate that this is the case. Put simply, the logic being applied is the "need and desire" philosophy. Airlines are offering to fulfil a need at a base price. At the same time, they are identifying possible desires,

such as the ability to refund a ticket, to select a specific seat, or to be picked up by a chauffeur. But who receives which product offerings? Different people have different desires as well as a differing ability and propensity to spend.

There are three ways to approach this. There is the mainstream restaurant on the corner, offering all that is available in the kitchen on a huge, difficult-to-read and often sticky, smudged menu. While this method does present everything that is on offer, it often results in frustration and lower conversions due to the sheer amount of menu items presenting too much choice. Alternatively, there is the current approach used in the airline world, which is very similar to how the automotive industry sells cars. There is a base model, and then there are the "SL" and "SLX" versions, which both have certain add-ons packaged in a price. Nonetheless, it is still possible to select the massaging rear seat, a child-silencing DVD player and other additions. This way of offering products relates closely to the fare families used by airlines to define certain base products, while still giving the ability to purchase several ancillaries beyond that. Finally, there is what is now the talk of the town - understanding who is asking for the offer based on segmentation or personalisation, and using the context of the inquiry to dynamically put together the offers which are most likely to be purchased.

Various industries are using personalisation and, more recently, artificial intelligence to provide a better customer experience. One example which many people may well have experienced themselves is Netflix, the movie streaming service. Netflix discusses in a blog article[ii] how they are working on identifying a user's intent when logging in. Does the customer want to continue watching a movie which they previously started? Or is it more appropriate to suggest a new show? And if so, which one? What is the person likely to want to watch at this time of day? These recommendations, and ultimately the underlying decisions, will at some point in the future be made by artificial intelligence. If there are several shows and movies which have been started but not watched to the end, the recommendation engine will sort the shows by what it determines the consumer will most likely want to watch.

OPINION: The better customer offer

Full service carriers have invested heavily into different seat configurations as well as a variety of services and product features to establish a product differentiation.

While these investments aim to attract the consumer, legacy carriers find themselves limited by the capabilities of third party distribution systems. Global Distribution Systems and Online Travel Agencies primarily focused on showing the lowest price and individual service aspects are not readily available in these systems. Thus the low-price focus makes it difficult for airlines to achieve a return on their investments, as service and product features are not communicated throughout the shopping process.

Pressure from low-fare competition led full service airlines to unbundle their product offering. Separating the seat price from other chargeable ancillaries such as bags, lounge access and chauffeur service allows the airline to offer an attractive base fare. This approach is however again largely hampered by a distribution environment dominated by low-fare search. Selling ancillaries therefore often remains limited to the direct distribution channel of airlines.

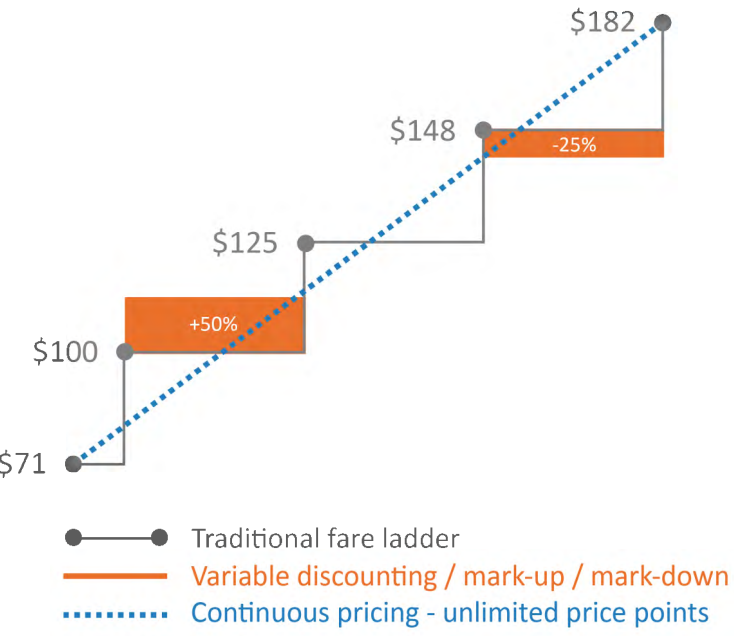
IATA's New Distribution Capability (NDC) provides the foundation to overcome this limitation. Based on this communication standard, enriched content can be provided as part of an interactive shopping process. Since the NDC standard is publicly available, distribution systems can make use of the same protocol and become content-enriched providers of the airline product portfolio. With this foundation in place airlines will be able to offer their unique products across a large set of distribution channels as well as tailor offers to suit the individual needs of the consumer. Furthermore it will allow them to increase the customer touch points including social media and mobile devices.

Inevitably, this will significantly impact the way airlines present their products to the consumer – moving the shopping process from lowest-fare-searching to searching for the best value for money. Airlines will develop sophisticated methods in order to identify the needs of their customers at each touch point in real-time and to present an offer that supports the buying decision. Modern merchandising capabilities will make the investment of airlines into product features worthwhile, while also encouraging them to become more creative by offering new ancillaries. It will also result in the removal of features currently offered by airlines for which the consumer is not willing to pay.

Enriched and personalised distribution based on behavioural analytics is the future to providing the consumer with the right information to make an informed choice. For airlines this opens up great opportunities as they will be able to effectively sell the services for which they have often invested large amounts of money. Nevertheless, airlines should be careful with over-engineering the shopping process, since this could result in consumers no longer trusting the offer presented to them. In the end, the success of value-selling depends on the consumer's trust in the shopping process. Mistrust will turn the value proposition into a doubtful deal, which would make the entire process fall apart.

Dieter Westermann, VP Revenue Management, Etihad Airways

All views expressed above are those of Dieter Westermann, and may not be aligned to those of his employer, Etihad Airways.



Lifting the fog

While this paper's aim is to go beyond the topic of dynamically determining airfares and flight prices, we do feel the need for clarity on the topic of what is widely referred to as dynamic pricing. Different people will have different definitions of dynamic pricing. Thus, in the context of this white paper, it is probably wise to establish what it means to us. And here is the surprise (for some, at least): almost all airlines do dynamic pricing today. Really? Yes, really. Let us explain...

Dynamic pricing in its most basic definition is the ability to automatically determine a price based on various parameters. Using airline revenue management systems today, this is basically what is already done. There are various fares and fare levels defined in a catalogue (for example ATPCO). By evaluating parameters, classes are opened and closed by the revenue management system, then the corresponding fare is matched. This process is, in fact, pretty dynamic. However, and this is the point, the determined price itself is not fully dynamic, or continuous. There are predefined ladders, or steps that need to be aligned to. That means, airlines are either selling up to the next level, or selling down to the lower level. To select the perfect and optimal price, we would need to get to the price points between the steps. With the current pricing methodology (and the underlying systems and processes), the price is either rounded up or down from the optimum.

By definition, any airline using the combination of filed fares, reservation booking designators (RBDs) and a revenue management system is already dynamically determining pricing. Unfortunately, the term dynamic pricing is a term used today to describe something different – something revenue management guru Karl Isler (see ***"Opinion: Why continuous pricing and what is the benefit"***) refers to as "continuous pricing". Both are just terms; it is important to understand what is really meant is the next level of airline pricing maturity. The evolution to this concept will allow airlines to optimise revenues even further, as the gaps between the fare ladders – or rather the steps in the ladder – will disappear. While initially this may happen by marking up (or down) a filed fare by any percentage as determined by the revenue management system, the premise in the future will be to remove all dependency on filed fares for the sake of price determination in an offer.

The RBD challenge

Of course, it is not that easy for several reasons – first and foremost because we have a structure of RBDs which are aligned to the fare ladder. We have fares filed for and with other airlines, as for the most part we are currently not able to get a fare component for a partner airline flight segment in real-time. While there are now concepts in place such as bid price exchange and IATA New Distribution Capability (NDC) interline to address that, their use is scarce to non-existent. Only when these challenges are overcome will it become possible to move away from the use of filed fares for offer determination, and hence eliminate this somewhat static component of our "dynamic" pricing today. That will not be a quick or easy task. While the industry is slowly embracing the concepts of NDC, we are far from the mature state we would require to remove RBDs and fully exchanging partner-prices or bid-prices with interline partners.

The commercial challenge

Further challenges for many airlines are contractual obligations which prevents various channels from having differentiated pricing. By moving into a continuous pricing model, it will be challenging to ensure that the same price is determined through each channel under the same circumstances. We have witnessed some traditional airlines recently achieving a higher grade of flexibility in determining their fares and prices in various channels. This is a trend we believe will continue, and must continue should airlines want to move to an offer creation concept which allows for the fully flexible creation of bundles and product offerings considering personalisation and contextualisation, and using intelligence to create the ideal offer for the traveller.

OPINION: Why continuous pricing and what is the benefit?

With continuous prices airlines could adapt to customer characteristics and opportunity costs, as well as their changes over time, in a much more targeted and subtle way. Prices would not be constrained to the filed price points so that price differences, which can appear quite abrupt today, would be much smoother. What is more important however is that booking control, which is constrained today to use 26 booking classes only, opening and closing groups of fares, could be generalized to true dynamic pricing at any price point.

We estimate that this would bring revenue improvements comparable to the gains airlines get from moving to origin and destination control, an investment many airlines have done by now.

What is quite remarkable also is that the customer can benefit from this too, as has been discussed recently in the literature by G. Gallego[iii] *(AGIFORS 2016). He argues that dynamic pricing is a win-win situation for airlines and customers because it increases customer surplus as well. When price changes can be made arbitrarily small, the airlines don't have to jump to the next higher booking class value immediately, but can charge a more moderate mark-up when opportunity costs rise. These differences may be small, but for several passengers like group bookings, the total amount can be substantial.*

We also believe that the pricing processes will become much simpler and less complex when continuous prices are implemented. Fewer fares, if any, have to be published and legacy constructs like booking classes, albeit very useful in the past, can be abandoned.

Karl Isler, Owner Karl Isler Consulting GmbH

Segmented Contextual Personalisation

A further point of discussion and, in some cases confusion is the distinction between segmentation, personalisation and contextualisation. While for many it is clear, for just as many, the differences are not apparent.

Segmentation

In this paper and typically the work we do with our clients, segmentation – at least in the context of marketing - is defined as grouping of people with similar traits and properties. A tier two member of a loyalty programme, a couple on a city-trip, a family on a beach vacation are all examples of segments. These can be as fine-grained or as coarse as needed.

Segments are often used to determine similar behavioural groups, and can be a first step in creating offers which add value to a specific segment. These could be, for example, the comfort package, the fast-travel package or the celebration package. The packages themselves will typically be static in content and price, perhaps with differentiation on the flight component of the price, depending on availability. Business rules engines will be used to determine the correct customer segment, and offer the pre-defined packages to the customer accordingly.

Marketeers have defined a new, fancy term for segments in the past years and often refer to "demand spaces". The Forge talks about demand spaces as "the shiny new toy…"[iv]. They also go on to state some of the challenges of using demand spaces, especially when they are not applied correctly. Essentially, the demand spaces are used to define categories of customer which behave in a similar way. If defined and applied correctly, they may be a simplification of traditional segments, but with a higher level of sophistication.

Personalisation

The term personalisation is often a trigger of sweaty hands, nervous foot-tapping and stuttered explanations. Personalisation refers to a "segment of one". We can identify the individual we are having a conversation with, and use that unique identity to understand what this person may be looking for, need or desire.

A lot of people fear personalisation and see it as an intrusion into a very private space. Others see it as a great way to get better service or to buy better, faster and easier. The aim of personalisation is to make customers feel valued and connected, and should always result in a positive experience. More and more, customers will reward retailers and service providers with more information and ongoing loyalty if the science of personalisation is applied correctly. Personalisation is the key to suggestive selling, and has been proven to improve conversion, revenue and profits. Baynote has found[v] that by using personalisation for recommendations in multi-category retail, 15% of site revenue comes from the recommendations. Users in a multi-category retail environment were 225% more likely to convert after they had clicked on a recommendation than on other products. How that applies to the travel industry remains to be seen, but there is a clear indication that personalisation drives conversion. A paper by BCG[iv] even states that "Brands that create personalized experiences by integrating advanced digital technologies and proprietary data for customers are seeing revenue increase by 6% to 10%...".

Contextualisation

Contextualisation goes beyond segmentation and personalisation. It is the attempt to understand the context of any given query or interaction. The context of a query is very important, as offers and interactions may differ based on the interaction context. Dictionary.com defines context as "the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood".

Context can be used together with personalisation and segmentation to refine the actions determined, regardless of whether this is the response to a shopping request, answering a social media query or making an unsolicited offer pre-flight. Travel in Motion believes that taking the context of every request into account during the offer creation process is as important a factor in successful conversion and meeting customer demands as segmentation and personalisation. While static rules engines allow us to enable software to identify context to an extent, this is where artificial intelligence and cognitive processing will add the most value in the future.

"...moving the shopping process from lowest-fare-searching to searching for the best value for money."

Dieter Westermann, Etihad Airways

Taking big steps

So far in this paper, we have established that consumer behaviour is changing, and also that most airlines do dynamic pricing of sorts. So all is well? No, not really. Aside from changes in consumer behaviour, there are additional factors affecting how and what airlines sell today. With the technology and data currently at the industry's disposal, it must be admitted that airlines are not making the best use of it. Revenue management has advanced over the years, and the market leaders have continuously matured their capability. However, several factors are not being taken into consideration today. The data currently available is not in the optimal structures and formats. There are new parameters which should be considered in revenue management and the determination of the fare. In fact, it is apparent that airlines need to rethink what revenue management actually does. Rather than looking at systems which determine the best fare, the industry really needs to be looking at systems which create the best offer. So, while it may not be fair to criticise the current revenue management systems, it is perhaps time to start thinking about the new generation of systems that are needed. Fortunately, there are vendors who are already well advanced in their research and even in the development of these systems. The question is whether we will skip a whole generation of systems and move right into a world of artificial intelligence to do this, rather than a purely analytical approach using data and static rules? Let's not get ahead of ourselves. Later in this paper, we will glimpse towards the horizon. But first, let's look at where we should be today, and going forward to the era of dynamic offer creation.

The new revenue management parameters

Today, the omnipresence of social media and digital interactions, data and powerful analytics systems theoretically allow the use of vastly different data in offer determination. Revenue management systems today typically use sophisticated algorithms that combine data related to flights, frequency, booked loads, historical patterns, outlooks, and so on, combined with competitive data and factors such as presumed (forecasted) demand. They do not, however, focus on behavioural or environmental factors, nor on the customer's digital footprint or even the overall segment or demand space purchasing behaviour.

As mentioned earlier, in creating offers it is possible to go beyond just determining the price for the flight segment from A to B. It is possible to construct offers addressing both traveller needs and desires. It is also possible to construct offers related to the flexibility of a purchase, or to ancillary products and services. Aside from the traditional factors, the offer creation process can also consider parameters such as weather at the departure or arrival location, news, events, trends and even personal preferences and hobbies.

Social media and a person's digital footprint are a great way to understand who we are dealing with. Admittedly, it is not always possible to access this information, but studies[vii] demonstrate that consumers are actually willing to give up this data in return for better offers. Data from the digital social footprint can include hotels or restaurant reviews and preferences, sports or other interests, hobbies, types of meals, movie preferences and which trends or brands they follow. Understanding these factors can greatly help in determining the type of products to consider when creating an offer. This could include recommendations and offers for products and services during a trip, or the time spent at the destination, or revenue generators or loyalty boosters that are completely independent of the trip.

News and weather information, be it at the origin or destination of a journey, can play a role in the emotional propensity to buy. Travel purchases, especially for leisure travel, are highly connected to emotions and desires, while business travel is more related to a need. A bad weather period at home may increase one's willingness to spend if the outlook of warm and sunny Rome is an option. Geopolitical events in one place will typically drive a change in demand and traveller behaviour, for example by reducing the willingness to use a specific country or airport as a transfer point. Today when these things happen, it is not a matter of hours or days in which the world knows. It is instantaneous, and so is the need to react. As well as reacting by price, it may also require reacting in terms of what is included in the offer, and what is or is not appropriate.

Another angle to consider is looking at trends and events. Are these the new, big upsell opportunities? Will a football fan be more willing to fly to London if there is a great combined offer for a ticket to the game and a hotel near Wembley? Would a business traveller spend personal time and money to visit the FIFA Museum in Zurich if he is visiting the city anyway? Will an inexperienced traveller be willing to pay a differentiated price if the transportation from the airport to the hotel is included? How much is this person influenced by combined offers, and is it even worth making them? Is there even an offer which the buyer is willing to consider, or are they just seeking inspiration?

There has been much talk of personalisation and segmentation in the past few years, partly also sparked by NDC and the opportunity to potentially know the customer better through additional information that is (potentially) available with the new messages. However, airlines today are typically not really doing much in terms of segmentation, and even less in terms of personalisation – at least, not at the offer creation level. The jury is still out on the success of personalisation and segmentation in the airline industry, and it is not clear how closely travel relates to, for example, the consumer goods industry. Having said that, a case study of Cartera by Evergage[viii] indicates that there are indeed considerable positive effects on engagement traffic, especially through personalised recommendations. In any case, airlines should not underestimate the effect a good, relevant and personalised offer can have on the customer experience, which drives customer loyalty and retention.

But what do we do with first-time visitors for which we have no further details from logins, social profiles or other means? In such cases, segmentation, context and behaviour are key.

The context and behaviour during searching and shopping can give the airline a great deal of information to work with, ranging from which device is being used, to dwell times, to the actual search parameters. All the information that is being collected is worth evaluating. Is a mobile phone being used on a Saturday evening to search for a weekend trip for two from Charlotte to Miami? That is a very different context than a search on a desktop-based browser from Michigan to San Diego for a week, with the flexibility to travel during the week. And very different again than a request coming from a corporate travel agency for a trip to Sao Paulo leaving Madrid on Monday and returning on Friday. These are only small examples of context, and while the conclusions that can be drawn from the context is not immediately apparent to the casual observer, we now have technology which can make sense of this information and use it to make informed decisions.

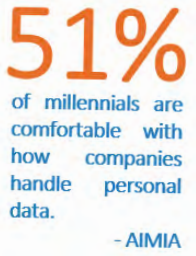
From a behavioural perspective, how long does one spend time searching? How many times is the same request made from (presumably) the same person, perhaps via different channels? How interested is the searcher in other information related to the destination and flight presented on the website? Or in a specific aircraft type, or cabin class perhaps? Is the person willing to register with a profile, or a social media account? Which channel is being used by the potential customer? These are factors which today rarely get consideration when determining a price and constructing an offer.

Of course, there are always two ways to approach these things. Either a person is looking for a specific destination, and it is up to the offer creator to understand if there is an upsell opportunity or a better offer to make. Or is the shopper just looking to go somewhere, anywhere, and it is up to the airline to determine which combination of destination and offer the couple will select for their extended weekend getaway. But sometimes it need not go that far – in some cases, it is as simple as understanding what the potential buyer is willing to pay to get from A to B, and to pay for refundability and flexibility to change plans.

What ONE Order can enable

While we have touched on the New Distribution Capability in this paper, we have not yet mentioned the IATA ONE Order initiative, and how this may or may not be helpful in creating the ideal offer. It may seem strange to put ONE Order into the context of offer creation, because as we know, that is NDC "Offer Management" territory. ONE Order, you may think, comes into play only after the offer has been converted into a purchase.

Well, not really. There is considerable value which can be provided by ONE Order, or for that matter, any system which manages the complete order in a unified, retailing manner – independent of the usage of ONE Order standards. The concept of having a sole source for each complete offer, a source that is closely linked to a traveller's journey and a customer profile can bring great benefits in the creation of future purchases. Storing the offers that were made with the order that was ultimately created can be extremely valuable for future recommendations and determining preferences. Such information will help understand each individual, and also the context in which an individual is purchasing within. Emotional purchases, patterns, needs and desires can all be derived from the data, not just for an individual, but even for a segment to an extent. The more frequently a customer travels, the better the airline's ability to identify patterns. Sampling an individual pattern with the collective data from customers within the same segment or demand space can increase the success rate for recommendations. Finally, improved data as well as the addition of behavioural data can improve revenue management and pricing predictions, especially related to purchases and prices. This can then be optimally aligned to the customer's propensity to pay for any given product or service, leading to value-based selling.




Hi Lisa, Where are we going today?
Search: Monday between 09.15 - 10.45 to New York
Result: Flight to New York (JFK) at 09.30
Add Gourmet meal?
Add Free Wifi?
Add Uber waiting at arrival?
Would you like to stay the weekend with your partner Mark on us?
It is all about the offer.
Datalex
You get a better view of people from here.

"Brands that create personalized experiences by integrating advanced digital technologies and proprietary data for customers are seeing revenue increase by 6% to 10%..."

BCG, Profiting from Personalization, 2017

Artificial Intelligence: the capacity of a computer to perform operations analogous to learning and decision making in humans.

Cognitive: of or relating to cognition; concerned with the act or process of knowing, perceiving, etc.

Machine Learning: a branch of artificial intelligence in which a computer generates rules underlying or based on raw data that has been fed into it.

OPINION: How leading retailers use price to drive more than just revenue

At Datalex, we see a common theme across the airlines that we talk to, they are evolving into travel retailers. Airlines are moving beyond the traditional construct of "ancillaries" to create a marketplace of products and services which will expand revenues and enhance margins. When looking at how leading retailers leverage price across many different verticals, it's interesting to see the successful strategies that they employ and how these could equally be leveraged in an airline context. What successful retailers understand is that price - while important - means nothing on its own, it's all about the offer. An offer is what ties the product, the price, the value proposition, the customer and the retail context together.

We see pricing and offer creation as a lever for three parameters. These are:

- *Price as a revenue driver*
- *Price as a lever to control supply and demand*
- *Price as a driver of loyalty*

Overall, retailers – and retail-focused airlines – are using personalised pricing in a more strategic way today. Leading retailers optimise the price for a given transaction to maximise margin. But this is just the first rung on the ladder to profitability. These retailers play the long game with their most valuable customers, measuring things such as share of wallet and customer lifetime value to maximise long-term customer revenue share. In short, they pass up short-term tactical gains in favour of extracting the optimal medium to long-term strategic value from these customers.

Airlines to travel retailers - pricing based on need or want?

Airlines have traditionally been in the enviable position of having a product - the ticket - that is driven by necessity. In general, when a customer goes to one of the airline's channels to purchase a ticket, it is because they need to travel somewhere in a particular time frame.

This fact is why airlines were the original trailblazers of dynamic pricing and are still used by many retailers as the first proof point of why dynamic pricing works. As airlines continue their evolution into broader travel retailers, they have started to expand beyond the traditional ancillary products such as checked bags. They are now selling more and more experience based products such as airport services (e.g. lounge access, fast track security, priority boarding) or on-board services (e.g. extra legroom seats, enhanced meal options, on-board Wi-Fi).

The nature of these products is different. They are not needs based like the air ticket, they are discretionary purchases. The travel retailer, in our case the airline, must make them "want". It is in this area that airlines should take note of what leading retailers are doing to promote their products and stimulate demand, and the part that price can play in delivering the most compelling offer at the perfect time.

There are many aspects involved in making a compelling offer for a discretionary product. The best retailers use data and systems to generate personalised offers, dynamically priced in the right context and presented using the principles of behavioural economics. These are the areas of expertise that we at Datalex are helping airlines to exploit through our Digital Commerce Platform.

Alan Dunne, Chief Innovation Officer, Datalex

OPINION: The use of cognitive intelligence in the offer optimisation process

Delivering a personalized travel experience means making offers that are:

- *Specific to each traveller;*
- *Offer more options with the flight;*
- *Include more non-air services;*
- *Presented at more points of the journey;*
- *Are priced right.*

Just a single flight will have hundreds of millions of personalisation possibilities. Even the best of today's rule-based merchandising systems will not be able to keep up.

With cognitive offer optimisation, the digital commerce platform "understands" the offer context – customer, itinerary, behaviour, past experience and other factors. It applies machine learning to find patterns and similarities between customers (known persons or anonymous) and uses real-time behavioural data to drive insight and continuously learn.

Repeated for thousands and millions of offer transactions, it relentlessly improves its understanding and ability to select the best offer from millions of possibilities. For the airline analyst, rather than spending hours on manual rules, they will monitor the cognitive engine's learning and decisions, adjusting control parameters as needed.

More importantly, they [the airline staff] can be marketers, focusing creativity on new products, new partners and a deeper understanding of customers.

How does cognitive work?

The cognitive engine includes learning algorithms that analyse transaction data to map factors that influence outcomes across many contextual situations. For example, [`number_in_party`] and [`connect_time`] are strong factors for lounge pass purchase.

The learning algorithms can manage many factors, across many scenarios and with many possible outcomes. They can also integrate third party data, for example Twitter, Uber, searches, booking and loyalty data, to drive personalised marketing and incorporate it into the learning process.

To optimise an offer, the cognitive engine first establishes the context of the offer, things such as who the customer is, the channel, the itinerary, etc. Then, the context is matched to past learning and a "cognitive score" to each offer option.

The cognitive score, of course, includes a probability of acceptance, but there is more. The algorithms also assess the quality of the past cognitive learning.

If past learning indicates many observations and low variability, the system exploits the highest probability of acceptance. If past learning indicates lower quality, the algorithms will systematically explore by selectively choosing different options to enhance learning.

With each offer, the cognitive learning cycle continues. It will not stop.

Does it produce results?

This is a new application of cognitive optimisation and still in early stages of deployment.

In a recently conducted live pilot test, cognitive offer optimisation was matched against a modern promotional marketing system for email promotions.

Dividing the mailing list into comparable control and test groups, three monthly promotions were conducted. Each system selected the promotional destination and content for each customer.

After three promotional cycles the cognitive system outperformed the rule-based platform:

- *Higher rates of promotion open*
- *20% more bookings*
- *44% more revenue*

Other proof-of-concept projects have shown comparable positive gains for personalised booking offers, paid seat price optimisation, cruise package offers, and more.

Bringing personalisation to travellers is a daunting challenge. Applying cognitive offer optimisation will provide a critical core capability for success.

Kevin Haskins, Associate Partner Travel & Transportation, IBM Global Business Services

See the horizon

While moving from a more or less dynamic fare structure concept to a more continuous fare determination is a considerable step, we believe that we need to look beyond. The industry must adapt to evolving consumer shopping behaviours. Offers must be made in context, and based on the needs and desires of a consumer.

In the previous sections of this paper, we established the value for the use of segments, context, behaviour and the ability to create offers dynamically. However, with even more intelligence available and a continued understanding of what the market wants, we can improve substantially. This is where we call upon Dr. Watson and his friends, since we now need to begin to consider cognitive computing, artificial intelligence and the ability of machines to learn.

Not all the requests and corresponding offers are highly complex or need magic behind the scenes. There are cases in which, even for anonymous requests, behavioural and contextual information can be determined based on analysis of the request. It has been mentioned a few times: travel is always based on either a need or desire. I need to go on a business trip - I may desire to travel up front for comfort. I desire to go to Rome for a long weekend - I may need to be back at the office by Monday afternoon for an important meeting. How do we value needs and desires in the context of creating an offer? And what is an offer in this sense? The offer may simply be what is required to cover a need. Based on the context of the request for an offer, it may, or may not make sense to address the desires as well. And this is where intelligence is needed to provide some assistance. We need to understand a customer's intent and their propensity to purchase. Both are somewhat determined, in many cases, by emotion as well. And emotions can be influenced by which offers are presented to whet a potential customer's appetite.

This is where artificial intelligence (AI) comes in. But first things first: what is artificial intelligence? We should not confuse business intelligence and data analytics with artificial intelligence - they are two clearly different disciplines. For a lot of what has been discussed in the previous section of the report, we apply business intelligence and analytics. Artificial intelligence goes further – it is defined as "the capacity of a computer to perform operations analogous to learning and decision making in humans". The ability to make decisions based on various factors, and learn and improve upon the decision-making process is key, and is what differentiates AI from utilising a rules engine for a given task. Cognitive, a word also often used these days, refers to the act of perceiving – understanding what may happen, or what may be needed, wanted or requested.

Watson and his circle of friends

Artificial intelligence and cognitive computing become omnipresent – most recently in conversations related to innovation and the future not only of computing but also communications and man-machine interactions. IBM's Watson is perhaps the most mentioned of these, although there are several others. Using Watson as an example, the first chatbots have been deployed by airlines, mimicking a real world, text-based conversation. But that is the (relatively) straightforward part, and Watson and his friends are beyond that - far beyond, in fact.

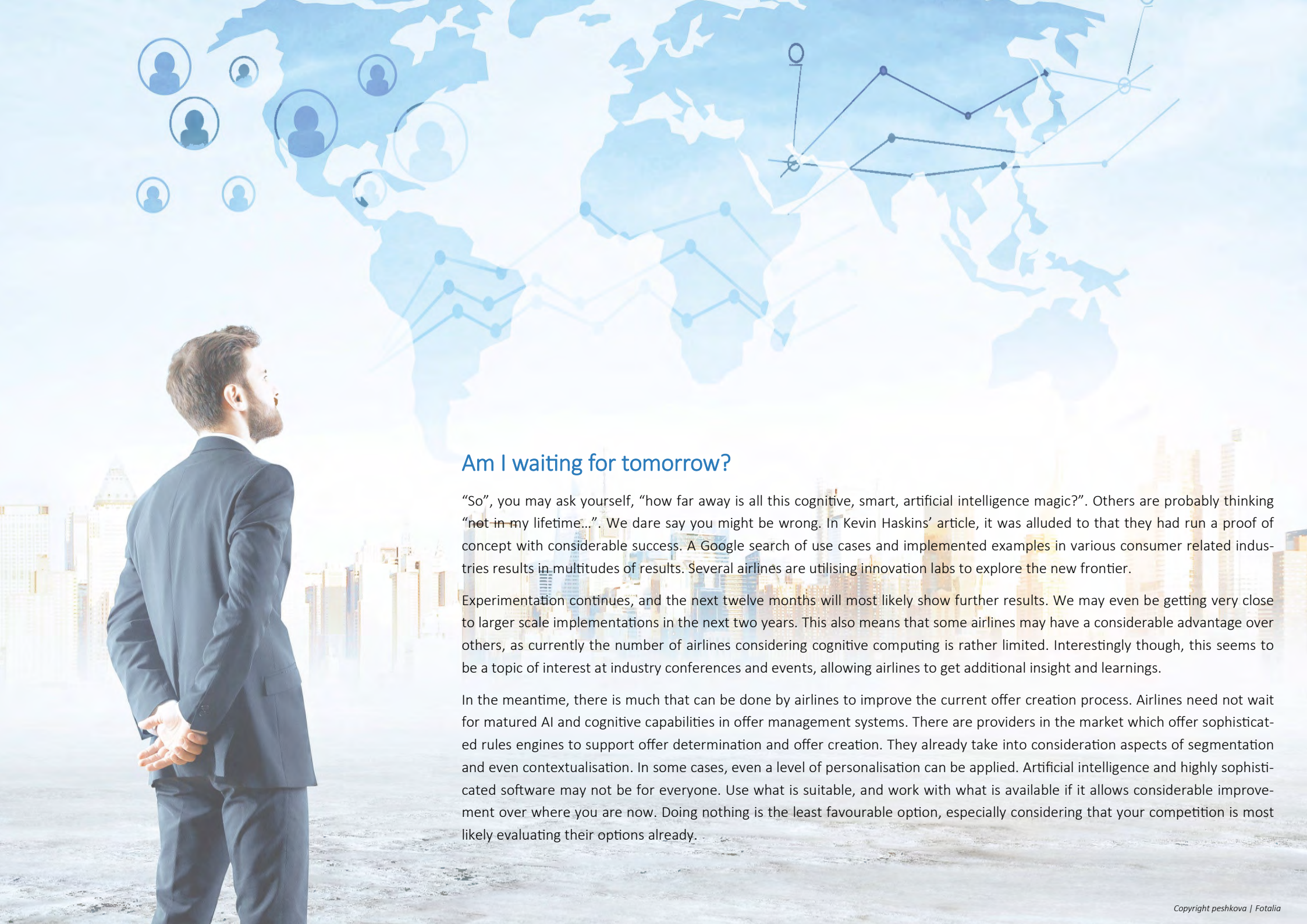
Cognitive computing and cognitive offer creation is all about breaking away from the rules engines used today. While some airlines may use simple rules engines and others complex ones, they will never be able to match the power of cognitive-supported software or artificial intelligence. One reason for that is that the new software never stops learning. It constantly teaches itself to get smarter – making offers which get better and better. Every offer that is created is measured and tested against others that the machine has made. With each offer made, and each offer accepted, learnings are put into the artificial brain. What makes this technology so powerful is that if we feel the need to add a new parameter into the mix, we can simply define that. Every time we get data related to that new parameter, the software knows more, and more, and more…

If we wanted to consider an example of this, let's assume that we would like to understand where people like to sit in the airplane. Not just aisle or window – or middle seat (ok, just kidding) – but also towards the front or back of the cabin, near a toilet, away from a toilet, aisle in the centre row, or any number of other factors. And can we understand what is that seat, or seating area worth to a customer? This value may not be something the airline would necessarily like to turn into money, but could be a customer experience topic. If we let the machine evaluate not just a purchased seat, but (free) seats chosen during reservation or check-in, the software over time will learn the value of the seat to an individual. Measurements of success help to determine how suitable the choice was – either by direct customer interaction or monitoring, for example, repeated deliberate acceptance of the choices made.

Another important aspect is related to testing the responses. Artificial intelligence is self-learning. Every time the software creates a response, it gives the response a probability score – the probability with which the software thinks it has provided a "correct" response. If the software is correct, and for example the offer was accepted by a consumer, it knows that for this scenario, the probability of this response being correct can be increased. If not, the probability score is reduced again and the machine realises it needs to learn more, or become better at its job. Testing itself against its probability score means that the AI constantly measures its own success. It also means that as trends and consumer behaviour change it is not static, but constantly evolving to meet the changing needs.

Some may think that we are far away from systems which automatically create offers for travel consumers using artificial intelligence, cognitive or self-learning software. However, several proofs of concept implementations, albeit on a smaller scale, have been run. As the opinion piece by IBM's Kevin Haskins shows (see ***"Opinion: The use of cognitive intelligence in the offer optimisation process"***), considerable value has been identified in terms of increased bookings and improved revenue.

With machines developing all that power to learn more and more about us, some may find this a somewhat scary prospect. Will the computer take over? Will we be able to control artificial intelligence? How do we prevent the software from spiralling down if other AI systems are doing the same? Currently, we firmly believe that even this intelligent software needs human interaction – someone to guide the software, and keep it in check. It is the concept of checks and balance. We are still in early days, and will continue to require human intelligence to overlook artificial intelligence for the foreseeable future.



Am I waiting for tomorrow?

"So", you may ask yourself, "how far away is all this cognitive, smart, artificial intelligence magic?". Others are probably thinking "not in my lifetime…". We dare say you might be wrong. In Kevin Haskins' article, it was alluded to that they had run a proof of concept with considerable success. A Google search of use cases and implemented examples in various consumer related industries results in multitudes of results. Several airlines are utilising innovation labs to explore the new frontier.

Experimentation continues, and the next twelve months will most likely show further results. We may even be getting very close to larger scale implementations in the next two years. This also means that some airlines may have a considerable advantage over others, as currently the number of airlines considering cognitive computing is rather limited. Interestingly though, this seems to be a topic of interest at industry conferences and events, allowing airlines to get additional insight and learnings.

In the meantime, there is much that can be done by airlines to improve the current offer creation process. Airlines need not wait for matured AI and cognitive capabilities in offer management systems. There are providers in the market which offer sophisticated rules engines to support offer determination and offer creation. They already take into consideration aspects of segmentation and even contextualisation. In some cases, even a level of personalisation can be applied. Artificial intelligence and highly sophisticated software may not be for everyone. Use what is suitable, and work with what is available if it allows considerable improvement over where you are now. Doing nothing is the least favourable option, especially considering that your competition is most likely evaluating their options already.

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What next?

While this paper is not a detailed, scientific study of the future of revenue management, or a prescriptive piece on where artificial intelligence may take us, it is aimed at airlines as a thought starter. There are vendors in the marketplace which are beyond the experimentation phase. There are several airlines which are also beyond just having the vision.

If, with this paper, we have been successful in informing a part of the audience on where the industry is, and where it is going in terms of content offering mechanics, it is a success. If we have stimulated some thinking amongst airline commercial executives as to how their future work environment may look, the paper is a success. If the paper has helped airlines understand how far advanced the industry is to a new world of offer management, it is a success. Should this paper have motivated the audience to contact a technology company in order to engage in discussions on the future of revenue management, offer creation or artificial intelligence to learn more, it is a success. Our aim is to move the industry forward, and ensure that airlines engage in future thinking today, not tomorrow.

As a part of the series of white papers related to airline transformation to digital retailers and the digital retail ecosystem, dynamic offer creation is just one piece of the puzzle. Having said that, perhaps it is one of the more important pieces as it is very closely related to revenue success and customer experience.

We look forward to writing the next paper in the series, and hope you continue following our publications.

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Datalex is a market leader in digital commerce for travel retail. The Datalex platform is used by some of the world's most innovative airline retail brands to drive their revenue and customer experience. Datalex is headquartered in Dublin, Ireland with five office locations across Europe, USA and China. Datalex is a publicly listed company and trades on the Irish Stock Exchange (ISE:DLE).

Airline customers use the Datalex Digital Commerce Platform to dynamically control and optimise all air and ancillary offers to over one billion shoppers on every device across every digital sales channel and at every touchpoint in the travel journey, covering every corner of the globe.

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>1.5 Billion

Shoppers use the Datalex Commerce Platform annually to shop for their travel needs

$20+ Billion

Estimated revenue transacted by global retailers through the Datalex Commerce Platform

>50 Global Brands

Established customer and partner base across all global continents.

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