AGIFORS RM Study Group
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Quantum Pricing success story

Etihad Airways & Sabre partnership

Octavian Oancea
Hunkar Toyoglu

A strong partnership!

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Bhaskara R. Guntreddy
Octavian Oancea
Raghuvir Nallapati
Vipul Karnik
Balqees M. Aljneibi
Rajendra Gawade

Sabre

Hunkar Toyoglu
Ran Li
Lohit Singh
Rasih Ustun
Bita Tadayon
Thomas Dunlay

atpco

Aparna Madamalla
Lana Barkley
Madhusha Bhattiprolu

Agenda

- Why Quantum Pricing?
- Quantum Pricing journey and roadmap
- The problem Quantum Pricing solves
- From seasonal fare changes to departure level pricing
- High level solutions design
- Examples
- Challenges
- Managing risks
- Conclusion

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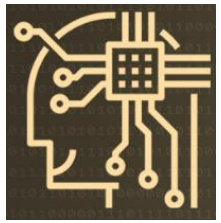
Why Quantum Pricing?

Before Quantum

- Pricing Function was purely human driven
- Manual work and user designed templates
- Error prone
- Little/no science
- Lack of visibility on strategies and market performance
- A lot of time spent to assess & react

After Quantum

- Human-assisted/monitored system
- Embedded logic – uniform approach to Pricing
- Less error prone
- Scientific approach
- High visibility & Tracking mechanisms
- Automation for both fare levels and rules



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The problem Quantum Pricing solves

Value creation through innovation for the Pricing Function.

- ✓ Ensure pricing is implemented in line with the set strategies
- ✓ Read and interpret both fare levels and rules to generate appropriate recommendations
- ✓ Benchmark accurately and gain speed to market
- ✓ Align closely with latest ATPCO developments and roadmap
- ✓ Automate where possible
- ✓ Support Matrix Pricing
- ✓ Bring a scientific and homogenous way doing Pricing across the network
- ✓ Optimize fare ladder upsells
- ✓ Prevent fare errors

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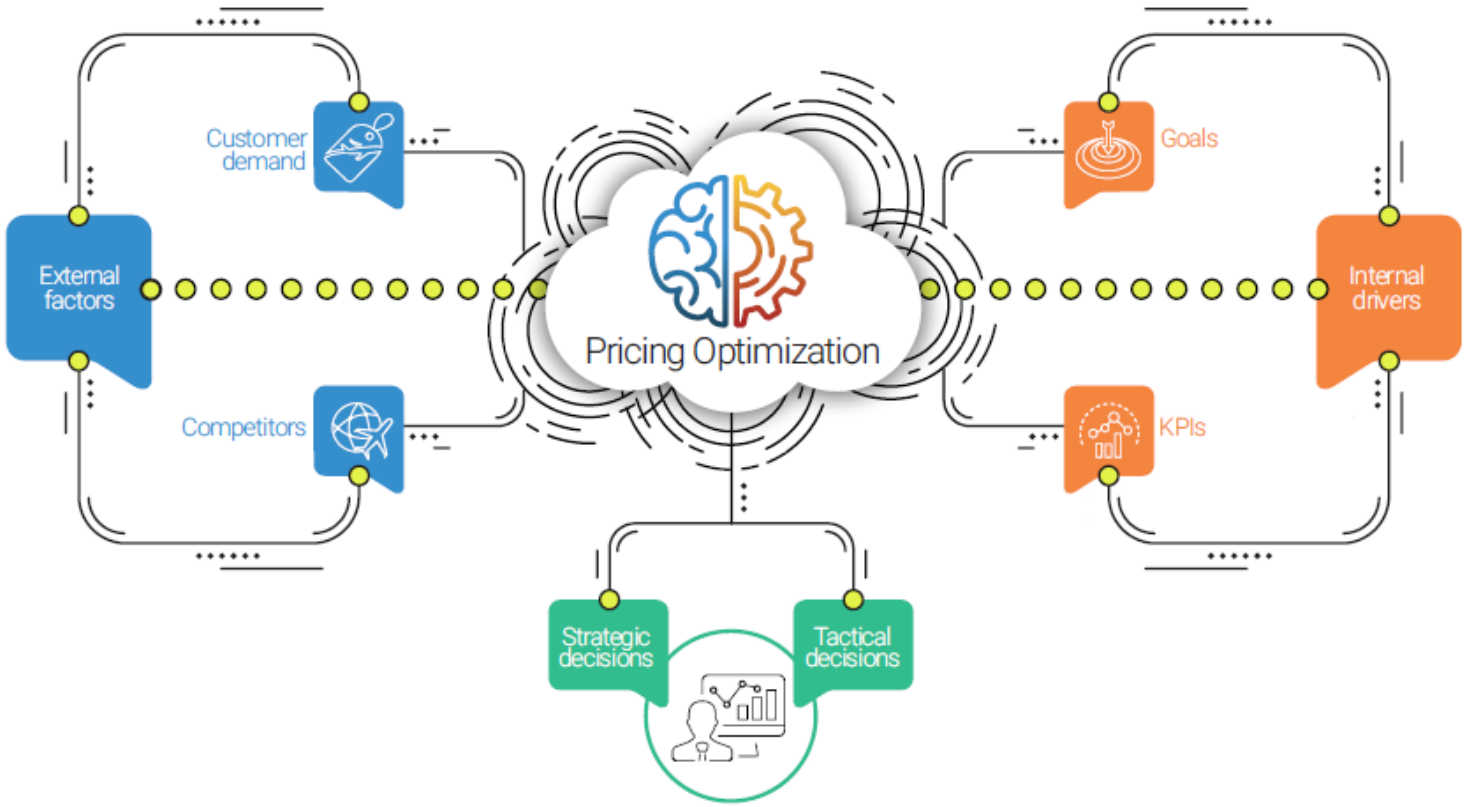
Quantum Pricing bring value through innovation

Quantum Pricing is the first of its kind in the airline industry. Brings **SCIENCE** into pricing



7 months from Idea to MVP

70% Automation

Industry Recognition from ATPCO

0.3% Incremental Revenue 2019 estimate

Smart pricing alignment based on customer shopping & booking activity, competitive positioning, and consumer willingness to pay

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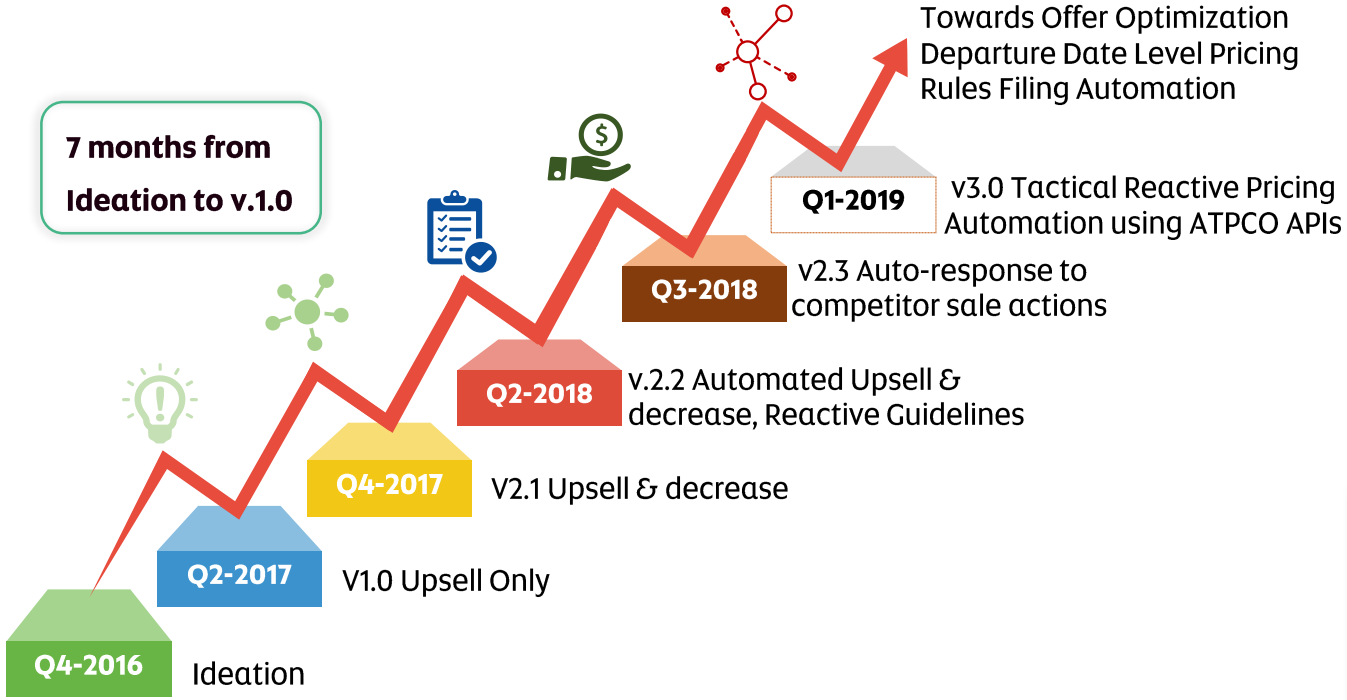
Quantum Pricing journey and roadmap

Recommends fare changes based on Pricing Strategy and Competitive positioning



- Leading in innovation
- Quick delivery from ideation to a working product

Industry Recognition

ATPCO special mention in DYNAMIC PRICING advances

One example of automated rapid fare filing is "quantum pricing," which was developed by Etihad Airways. Quantum pricing allows the airline to rapidly adjust its filed fares using automated technology to send those fares to ATPCO for filing.[59] Fares could be changed manually by an analyst setting business rules, or automatically in response to changes in the marketplace. At the limit, a different fare structure could be generated automatically and repeatedly updated for each departure day in each market.

[57] Konanki, R., B.R. Guntreddy, O. Oancea, and G. Komirishetty. 2017. Quantum Pricing: Dynamic Pricing in Action. Proceedings of the 2017 AGIFORS Revenue Management Study Group Meeting, San Francisco, CA.

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Key features of Quantum Pricing

Automatically compares & files fares, rules and restrictions

PRICING ANOMALIES
QP identifies and corrects pricing anomalies.

MARKET COMPETITION
Automatic competitor fare benchmarking and improved reaction time.

OPTIMIZE CONTROLS
Optimized fare structures and better price positioning.

UNIQUE DECISION SUPPORT
Dashboards for executives and analysts to track various KPI's.

CONTROLLED ENVIRONMENT
Configure QP as per business strategy & use control checks.

AUTOMATION
Automate approval process and fare filing.

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Business use cases (The problem Quantum Pricing solves)

Competitor Fare Benchmarking

Automated Fare Filing and Validations

Dashboards and Analytics

Recommending Fare Changes and Automated Fare Approval Process

Alerting Mechanisms

Contingency Management

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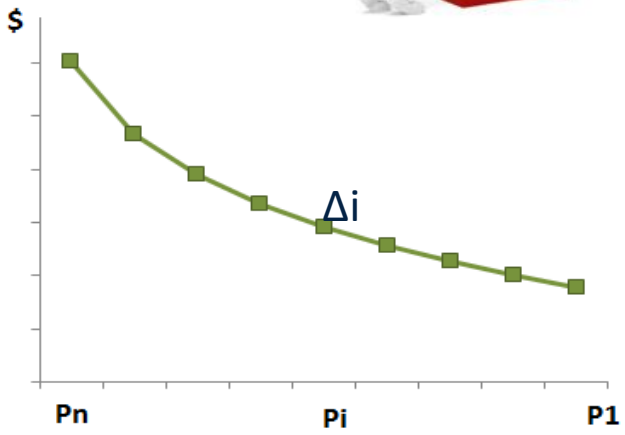
Seasonal Pricing model



- Price p, Seasonal Demand (unconstrained) Q.

$$Q_{Pi} = Q_{min} e^{b(Pmin-Pi)}$$

- Elasticity index : $b = \frac{\ln(\frac{Qhigh}{Qlow})}{ATV_{low} - ATV_{high}}$

The higher, the more elastic, the more price sensitive.

- Product Positioning + Benchmarking Analysis => Lower bound (P_1), seasonal.
- Internal and External Competition Analysis (BidPrice Distribution Analysis/season + Top levels of competitor) => Higher bound (P_n), seasonal.
- Linear Programming:

  Find fare steps $\Delta_i = P_{i+1} - P_i = -\frac{1}{b}\ln(1 - b\Delta_{i-1})$

  such as: $\Delta_i \geq 0;\ \ 0 < b < \frac{1}{\Delta_{i-1}};\ \ \Delta_i \geq \Delta_{i-1}.$

  => Outcome is the seasonal fare ladder.
- System is able to rank by fare changes, so that large changes can be flagged and reviewed first.

"Picking the correct distribution of fares for a pricing ladder can increase revenue by up to 4.8%." (Currie & Simpson, 2009 JRPM – "Optimal pricing ladders for the sale of airline tickets")

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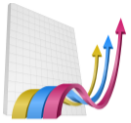
From Seasonal to Tactical Level Pricing

Seasonal Pricing



Set pricing strategies

Respond to structural changes in Fares and Restrictions

Automate fare changes at optimal upsell

Reactive Tactical Pricing

Set reactive guidelines

Respond to sales of benchmark carriers

Automate fare and restriction changes using ATPCO API

Proactive Pricing

Identify opportunities

Customization using ATPCO API

Implement changes using ATPCO APIs

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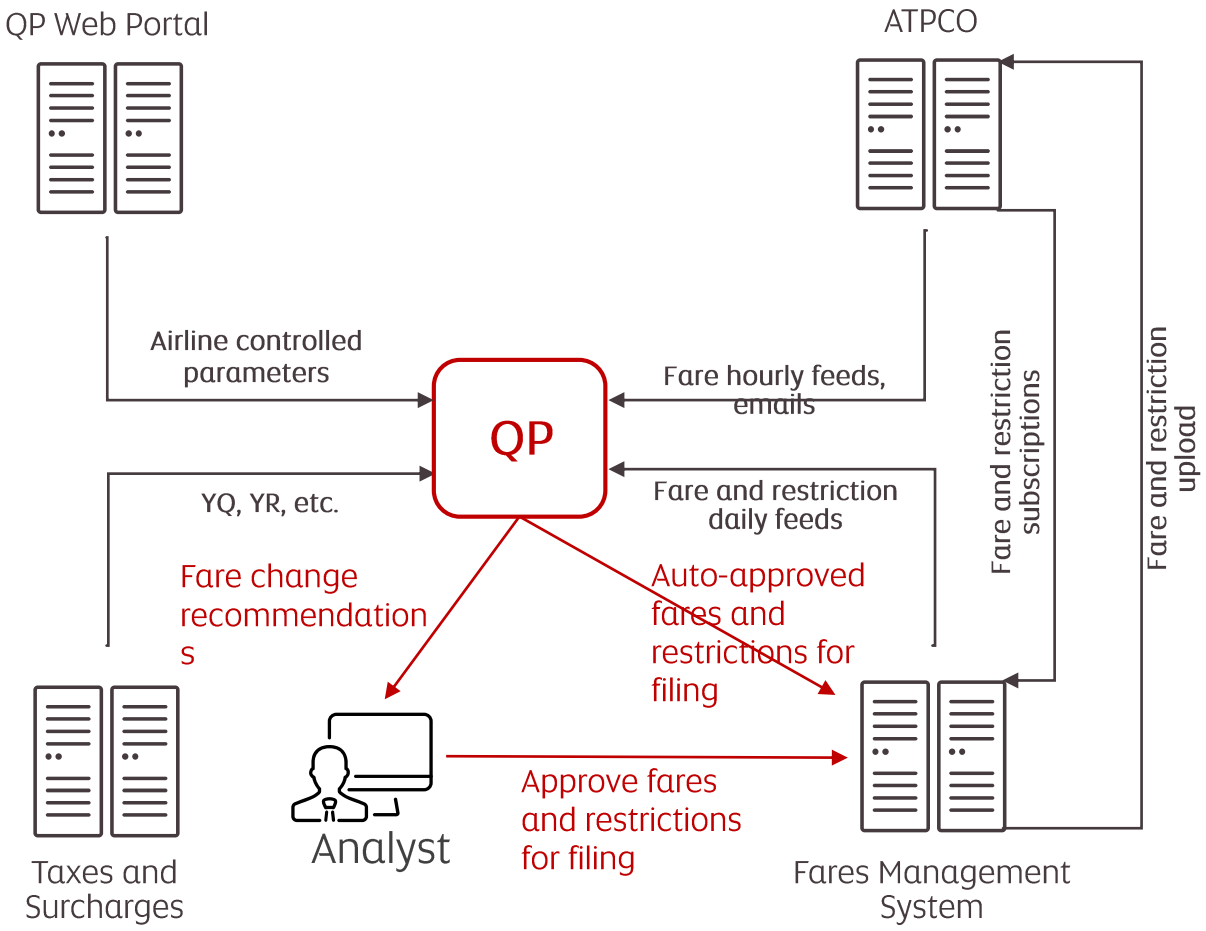
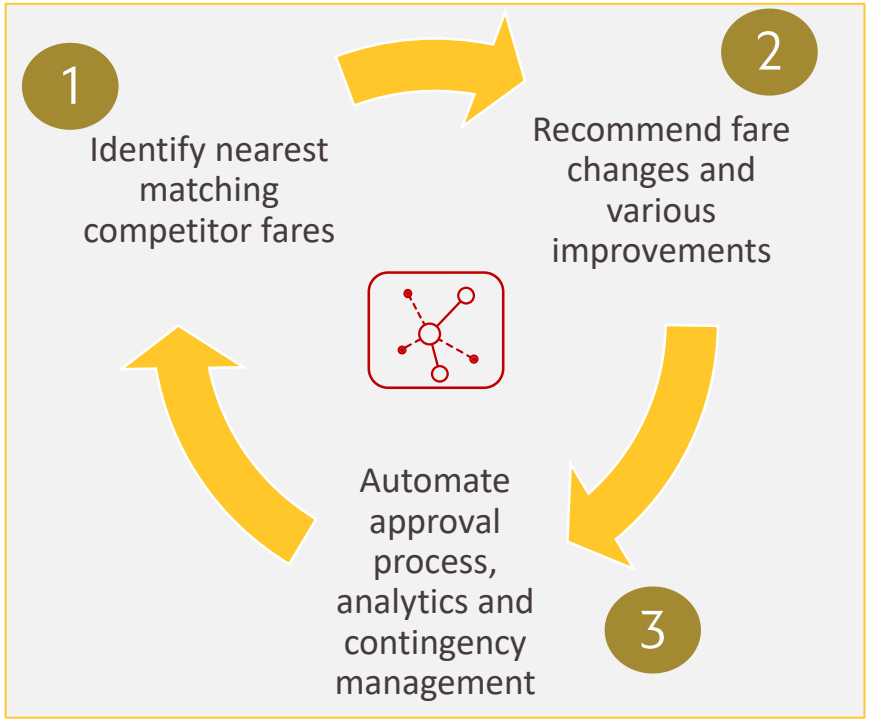
How does QP work? (High Level Solution Design)

QP is not an FM system, but it complements it.



QP continuous process



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Examples

Quantum Pricing Engine Recommendations (*With Fare Thresholds*)

MARKET	CATEGORY	CABIN		FBC	DOW	EFFECTIVE DATE	DISCONTINUE DATE	FIRST TICKET DATE	LAST TICKET DATE	TRAVEL FROM DATE	TRAVEL TO DATE	CURRENCY	SEASON NBR	BLACKOUTS NBR	Total Fare Before	Fare Change	Total Fare After	% Fare Change	YQ	YR	Q	Airport Taxes
AAABBB	STRUCTUR..	J	W	WLAPRTRU	Null	04-Oct-18	31-Dec-99	01-Jan-18	31-Dec-99	01-Jan-18	31-Dec-99	EUR	18	0	1,903	422	2,325	22	318	0	0	68

Users can also easily investigate the benchmarking and ladder calculation

Users can also modify sale/travel restrictions and seasonality on the fly

			Market	Fare Basis	FTN		Base fare before	Base fare after	Fare Change			
1	10753649	09-Dec-18	AAABBB	LLRTDE	2N	EUR	489	489	0	09-Dec-18	New	VALID
				VQP0ADE	**60**			312	**312**			
				UQP0ADE	**60**			201	**201**			
				EQP0ADE	**60**			107	**107**			
				TQP0ADE	**60**			51	**51**			

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Challenges

Airline Challenges

- ✓ **Automation** – First airline to use the ATPCO APIs for automatically filing of seasonality, sales and travel restrictions, blackouts, day of week application.
- ✓ **Change management**
- ✓ Specific POS requirements..
- ✓ Manage user expectations - Take into account QSI, class mix, new trends, discussion with Sales, impact on the private fares…
- ✓ **Mindset change**
- ✓ …and the RM system in all this?

Technical Challenges

- ✓ Implement changes not just to fare levels, but also to rules
- ✓ Manage 3 teams:
  - Airline Fare Manager System
  - ATPCO
  - Quantum Pricing
- ✓ Time to market!
- ✓ Ensure product version is also in line

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Managing risks

- **Technical challenges** of automation – engaged early with ATPCO and Sabre Operations Research Consulting. First Airline to develop and use such automation.
- **User acceptance & adoption** of the solution – built confidence by constant collaboration and ensured specificities of markets are addressed.
- **Timelines** – delivered in an agile framework, respecting tight deadlines.
- **Quality** – used the model operation in production with no errors/failures.
- **Manage multiple teams** – Etihad (Pricing Solutions, Pricing Distribution, Market Management, Sales, Finance, Senior Leadership); Sabre (Operations Research Consulting, Product Development), ATPCO.
- **Cost** – ensure efforts are well estimated and as per scope of MVP
- **Benefits** – ensure benefits are tracked and targets are achieved.

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QP is the next generation fully automated pricing solution

Quantum Pricing to Fares Optimizer

Sabre productized Quantum Pricing as Fares Optimizer

90% reduction in time compared to manual pricing processes

0.5% incremental revenue opportunity

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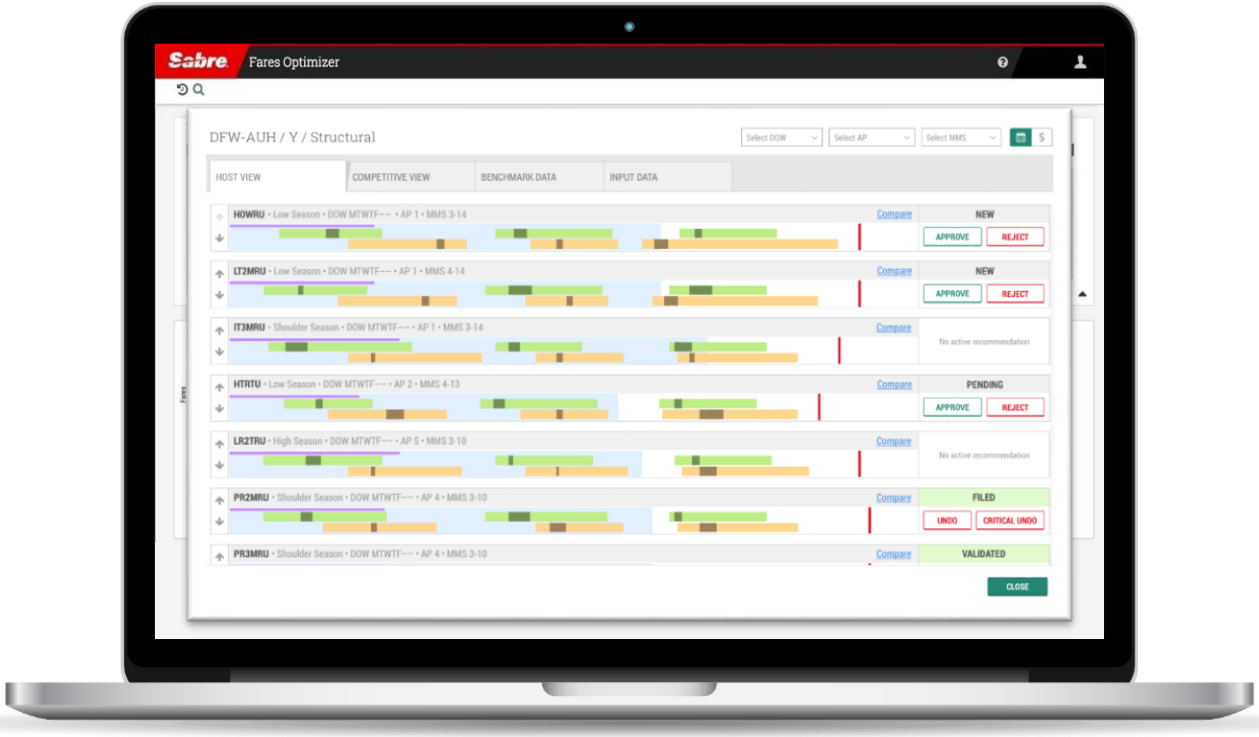
Fares Optimizer enables competitive advantage thru automated benchmarking & price positioning



- Provide pricing decision support
- Enhance strategic & tactical pricing based on market context
- Monitor host and competitive price and rule changes on an hourly basis
- Optimize fares - structural & tactical - considering host and competitor fares and fare rules
- Recommend new price levels based on competitor benchmarking & relevant price positioning
- Publish recommendations subject to an approval process

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Thank you!

Hunkar Toyoglu
Sr.Director
Advanced Analytics Services,
Hunkar.Toyoglu@sabre.com

Octavian Oancea
Pricing Solutions & Innovation
Revenue Management
OOancea@etihad.ae