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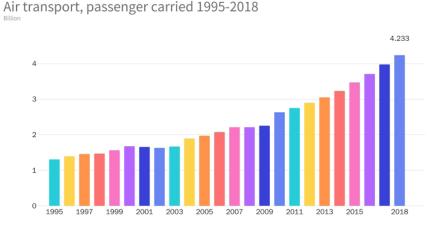
Impact of Digital Technologies on Airline Operations

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What to study - Background

- Digitalization causes changes for air travel system as entities to have to adapt and embrace digital (Parviainen et al. 2017).



Data sourced form World Bank 2020, Air transport, passenger carried, https://data.worldbank.org/indicator/IS.AIR.PSGR

Fig.1. Passenger carried by air transport, 1995-2018



Digital technologies make air travel convenient

- Digitalization results in a smooth air travel process.
- Digitalization can improve the airline industry's competitiveness.

Digital technologies in air travel

- Online ticketing
- Online check-in
- In-flight entertainment systems (IFE)
- etc.

Literature review



IFE (In-flight entertainment system) enhances customer loyalty

As a product that could differ the levels of airline services, IFE shows an important position in customers' preference lists (Alamdari 1999).



IFE (In-flight entertainment system) increase revenue of LLC

As the results showed in the survey conducted by Balcombe et al. In 2009, some passengers who flew with low-cost airlines were willing to pay extra fees for in-flight services such as IFE. Thus, a high-quality IFE could bring more revenue to low-cost airlines (Balcombe et al. 2009).



IFE (In-flight entertainment system) benefits passengers

IFE can ease passengers' stress. This significantly helps to improve the passenger flying experience and to simplify the cabin crew's working procedures (Liu et al. 2017).





How to study – Research questions

Main research question

- How passengers evaluate inflight entertainment system?

Sub-research questions

- What kind of passengers takes more value of IFE?
- Depends on different ages, how passengers evaluate IFE?
- Based on the frequency of taking flights, how passengers value the free in-flight WIFI connection?
- Would passengers like to watch movies in their mother languages in the flight?
- How passengers value the importance of getting news of their destinations in the flight.
- What kinds of IFE are people most likely to choose?
- What are the most popular IFE elements for passengers?
- Are people willing to pay for IFE products?
- What actions airlines could take to improve passengers' inflight experience?



Methodology

- Comparative analysis:

Comparing the current applications of IFE products in 5 fullservice and 5 low-cost airlines.

- Survey research:

A questioner survey was conducted to investigate the current application and customer satisfaction of IFE services.

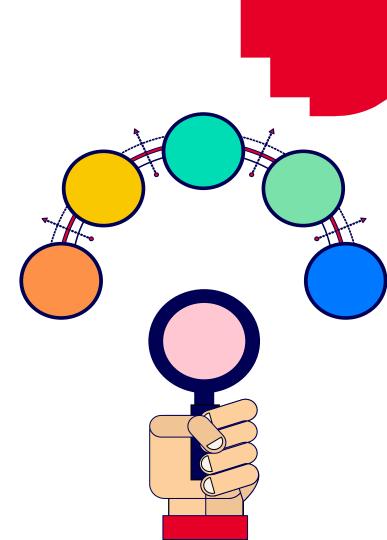
- Data analysis:

Frequency analysis and cross-table analysis.

- Data resource:

World bank (2020); Airlines' annual reports; Survey research.





Findings – Comparative results

Table 1- IFE in Full-service airlines

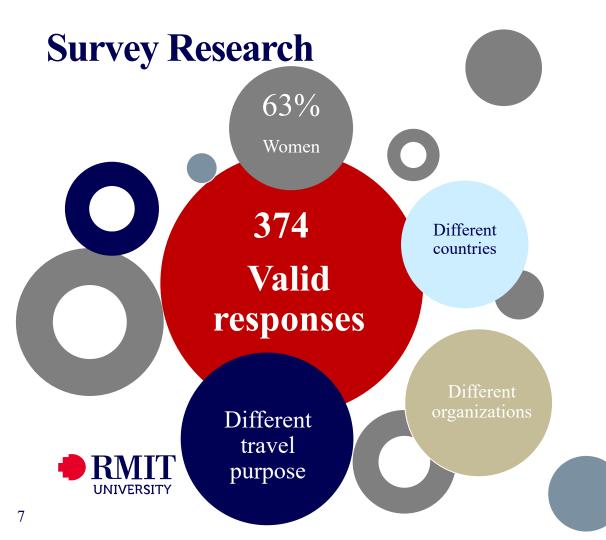
Airlines	Name of IFE system	Producer	Start year	App availabl e (Y/N)
Emirates		Panasonic Avionics&		
Airlines	Ice system	Rockwell Collins	2015	Y
Singapore	Kris World			
Airlines	system	Panasonic Avionics	2012	Y
Delta Air				
Lines	Delta Studio	Panasonic Avionics	2012	Y
	Qantas			
Qantas	Entertainment/i	Rockwell Collins/		
Airways	Q	Panasonic Avionics	2008	Y
Turkish	Planet IFE			
Airlines	system	Panasonic Avionics	2011	Y



Airlines	Name of IFE system	Producer	Start year	availabl e (Y/N)
AirAsia Airlines	Xcite (Only for AirAsia X) Huawei		2017	N
Ryan Air	D	oes not have any IFE	system	
Norwegian Air Shuttle	Set-back dev selected long	Y		
JetBlue Airways	AVANT& ViaSat-2	Thales	2000	Y
Southwest Airlines	D	oes not have any IFE	system	

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Table 2- IFE in Low-cost airlines



A customer satisfied survey

- Investigate how passengers evaluated the IFE system when they traveling by air ;
- Participants have evaluated the full-service and low-cost airlines' IFE systems together.
- For some questions, participants may choose more than one answers.

 Table 3. Cross-table result of travel purpose with important level of IFE

Is in-flight entertainment important for you when booking flight ticket?										
Travel purpose (More than one answer may be chosen)	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Total				
For business reasons	28	32	32	100	28	220				
For holiday	18	27	19	95	19	178				
To visit family and friends	9	12	14	32	8	75				
For educational purpose	4	9	9	17	2	41				
Other reasons	4	8	1	11	4	28				

Is in-flight entertainment important for you when booking flight ticket?										
Age	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Total				
Under 22 years	1	0	1	3	0	5				
22-35 years	23	23	23	85	13	167				
36-55 years	11	31	21	86	23	172				
56-66 years	1	3	5	12	7	28				
Over 66 years	0	0	0	0	2	2				



 Table 4. Cross-table result for age with important level of IFE

Is free WIFI connection important for you when booking flight ticket?						Tabl	e 6. Cross-table	result for ag	e with important	level of wate	ching movies fi	rom	
Traveli ng	Extremel y importan	Very importan	Moderately	Slightly	Not at all		passengers' mother languages Is it important to watch movies in your mother languag					her languages	2
times	t	t	important	important	important	Total			Very		in your mou	ier languages	
Never	6	2	3	4	3	18	Age	Extremely important	importan t	Moderately important	Slightly important	Not at all important	Total
1-2 times	20	10	8	68	20	126	Under 22						
3-5							years	1	2	2	0	0	5
times	7	13	16	55	20	111	22-35						
6-10 times	7	6	9	19	8	49	years	42	41	43	35	7	168
Over 10							36-55 years	38	38	41	47	7	171
times	15	14	8	24	9	70	56-66						
Table 5. Cross-table result for frequency of taking flights with important level of free in-flight WIFI connection						years Over 66 years	4	10 0	7	7	0	28	

9

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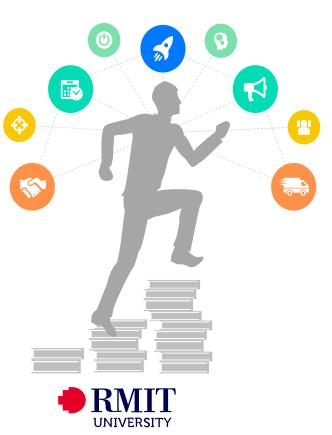
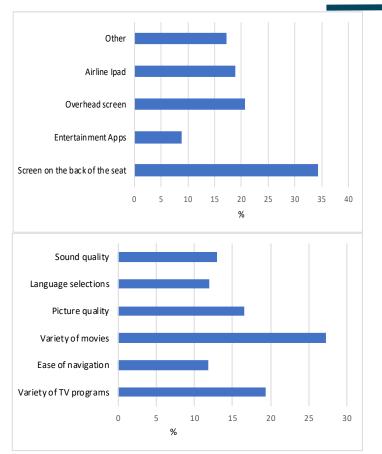


 Table 7. Cross-table result for frequency of taking flights with important level of knowing news from destination

	Is it importa	nt to know the	e news of your o	lestination duri	ng flight?	
Traveling times	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Total
Never	5	5	5	2	2	19
1-2 times	36	36	42	12	0	126
3-5 times	21	33	36	19	2	111
6-10 times	12	9	20	6	1	48
Over 10 times	13	25	15	14	3	70

Figure 2 & 3 - The IFE types that respondents used most frequently





Nearly 35% of passengers used the screen on the back of the seat to enjoy the IFE activities



Only 8.9% of participants chose using entertainment Apps which is the lowest

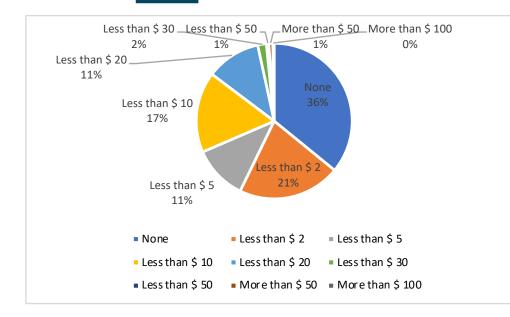


More than 46% of passengers cared about the variety of movies and TV programs.



The numbers of passengers who cared about sound quality, language selections, and ease of navigation were at the similar level

Fig. 4. Passengers Willingness of Paying for IFE.







Discussion & recommendation

Discussion

- Business purposed passengers took more value of IFE than education purposed passengers;
- > There was a little difference in demand for IFE by age;
- Frequency of taking flights did not have an obvious impact on the importance of free WIFI connection from a passengers' perspective;
- System language was an important factor for passengers using IFE;
- > Destination news are important to passengers;
- > The screen on the back of the seat was the most popular IFE type that passengers chose to use;
- Types of movies, the variety of TV programs, and picture quality were the three main elements that passengers cared about IFE systems;
- > About 60% of the passengers were willing to pay for using IFE on board.

Recommendations

- > Full-service airlines & airlines already installed IFE:
- Increase the types of movies and TV programs;
- Provide earphones, WIFI connection and other facilities to passengers.
- ➢ Low- cost airlines:

- Appropriates charge for IFE could both benefit airline revenue and enhance passenger in-flight experience.





02

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Limitation & future work





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Limitation

- Academic publication limitation;
- ➤ Time limitation;
- Limited participants in survey research;
- > Open resource limitation

04

In future

- More data should be collected and more analysis should be done;
- > Safety issues related to passengers should be improved.



Alamdari, F., 1999. Airline in-flight entertainment: the passengers' perspective. Journal of Air Transport Management 5.4, 203-209. AirAsia Airlines, 2019. Annual report. Balcombe, K., Fraser, I., Harris, L., 2009. Consumer willingness to pay for in-flight service and comfort levels: A choice experiment. Journal of Air Transport Management 15.5, 221-226. Delta Air Lines., 2019. Annual report. Emirates airlines., 2019. Annual report. Fourie, C., Lubbe, B., 2006. Determinants of selection of full-service airlines and low-cost carriers—A note on business travellers in South Africa. Journal of air transport management 12.2, 98-102. Groves, R. M., Fowler Jr, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., Tourangeau, R., 2011. Survey methodology. John Wiley & Sons 561. IATA., 2019. IATA Global Passenger Survey. JetBlue Airways., 2019. Annual report. Liu, H., Rauterberg, M., 2007. Context-aware in-flight entertainment system. Proceedings of Posters at HCI International: Part X, 1249-1254. Mordor Intelligence, 2019. Inflight Entertainment and Connectivity Market - Growth, Trends, and Forecast (2020 – 2025). Last accessed on 30th Jan 2020 < https://www.mordorintelligence.com/industry-reports/in-flight-entertainment-and-connectivity-market>. Norwegian Air Shuttle., 2019. Annual report. Qantas Airways., 2019. Annual report. Ryan Air., 2019. Annual report. Rihoux, B., 2006. Qualitative comparative analysis (QCA) and related systematic comparative methods: Recent advances and remaining challenges for social science research. International Sociology 21.5, 679-706. Sumeet P., 2017. In-Flight Entertainment and Connectivity Market By Type (Hardware, Service, Connectivity Service& Entertainment Service), Connectivity Technology (Satellite Connectivity & Air-To-Go Connectivity) - Global Opportunity and Forecasts, 2017-2023. Allied Market Research. Singapore Airlines., 2019. Annual report. Southwest Airlines., 2019. Annual report. Turkish Airlines., 2019. Annual report. World Bank., 2020. https://data.worldbank.org. Reviewed on 2020/01/11. Zhou, J., 2013. Digitalization and intelligentization of manufacturing industry. Advances in Manufacturing 1.1, 1-7. UNIVERSITY

Thank you!

