Business Digital Transformation: A Study to Evaluate the Current Digital Operating Model in Saudi Airlines Company to Realize the Impact of Digital Transformation

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Abstract: Nowadays, digital transformation is a must for most organizations. It is a trend and interesting topic for companies across the world. During the past twenty years, technology has not only changed our personal lives but also changed the businesses around the world. Technology became the most important factor to the success and sustainability and the fast revolution of technology is changing the business industries environment and affecting the nature of competition and it is getting more aggressive. Digital transformation is one of the essential programs to achieve the vision of Saudi Arabia 2030. The kingdom has taken real steps towards implementing digital transformation. However, SAUDIA Airlines, the flag carrier and the biggest airline company at Saudi Arabia, has to be digitally transformed to be in-line with industry trends. The challenge is to transform SAUDIA's entire digital experience into seamless experience to keep up with the competition. MIT-Capgemini digital transformation framework was the base of this study. The framework contains ten factors for successful digital transformation journey. All these factors have been analyzed and discussed. Finally, Interpretive Structural Modeling (ISM) has been used to prioritize the factors of framework and to define factors' dependencies among each other.

Keywords: Digital Transformation, Digital Transformation Framework, Interpretive Structural Modeling (ISM)

I. INTRODUCTION

Digital transformation is not a new phenomenon, it is not something started in the last few years. Digital transformation has been affecting businesses for the last 50 years. Nowadays, digital transformation is a must for most organizations. The idea is to become significantly better with using new technologies [1]. It is a trend and interesting topic for companies across the world.

SAUDIA Airlines, the flag carrier, and the biggest airline company at Saudi Arabia, must be digitally transformed to be in-line with industry trends. The challenge is to transform SAUDIA's entire digital experience into seamless experience to keep up with the competition. Moreover, SAUDIA has a transformation plan called (SV2020) and digital transformation is one of the most important elements of this plan. Moreover, digital transformation is one of the essential programs to achieve the vision of Saudi Arabia 2030. The kingdom has taken real steps towards implementing digital transformation.

During the past twenty years, technology has not only changed our personal lives but also changed the businesses around the world. Technology became the most important factor to the success and sustainability and the fast revolution of technology is changing the business industries environment and affecting the nature of competition and it is getting more aggressive. Our minds are expecting that the evolution of technology is linear but in fact it is exponential. In another word, technology makes the difference. The impact of technology is not immediate because it takes time and because only small numbers of companies are adopting those new technologies in early stages. Adopting the right technology investment will generate higher revenues and increase the profitability.

Digital transformation is about using technology to enhance a process and performance to be more effective and efficient. Digital transformation means how organizations are integrating technologies to change the operating models to become more successful. McKinsey [2] stated that digital transformation is more difficult than other changes and technologies change industries shapes. Companies are making a large effort to take advantage of these trends to keep up with the competition. And according to a survey, 80% say their companies are trying to be digitally transformed in the past five years. Also, research showed that only 30% of organizations have succeeded on their digital transformation journey.

According to Earley [3], around 125,000 organizations are expecting revenue incremental from their digital activities by 2020 and digital transformation initiatives will increase by 55%. Digital transformation is about digitizing the operating model although many organizations are just introducing new products and services.

II. METHODOLOGY

A. MIT-Capgemini Digital Transformation Framework

The MIT-Capgemini framework for digital transformation is one of the most common frameworks. It has been conducted by the *MIT Center for Digital Transformation and Capgemini Consulting* [4]. It covers all areas in organizations to be evaluated, analyzed, and improved. It will be used in this research to study SAUDIA Airlines' current situation and in future planning as well.

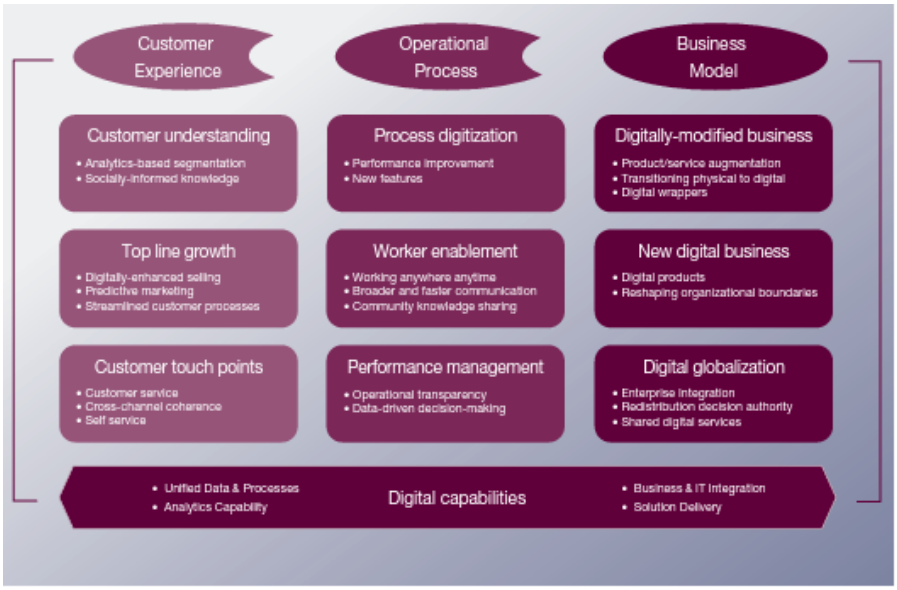

Figure 1. MIT-Capgemini digital transformation framework.

B. Interpretive Structural Modeling (ISM)

According to Alidrisi [5], Interpretive Structural Modeling (ISM) is a common method that simplifies a complex relationship between specific factors. This will help in decision making to understand the current situation in a different way. The author summarized the implementation steps as follows:

1. Listing down all related factors that will be considered in the study.
2. Defining a contextual relationship between previously listed factors.
3. Conducting a Structural Self-interaction Matrix (SSIM) and it will show the pairwise relation between the factors.
4. Constructing the reachability matrix based on the conducted SSIM.
5. Checking the reachability matrix for transitivity. If factor A leads to factor B, and factor B leads to factor C, so factor A necessarily leads to factor C.
6. The reachability matrix will be divided into different levels.
7. Developing a directed graph (diagraph) based on final reachability matrix.
8. Converting the diagraph into ISM model by putting the factors instead of symbols.

III. DATA ANALYSIS AND RESULTS DISCUSSION

A. Digital Transformation Framework

Based on the digital transformation framework, SAUDIA's situation will be analyzed and evaluated through ten essential elements to come up with helpful insights.

1) Transforming Customer Experience

a) Customer Understanding

SAUDIA Airlines has powerful analytical capabilities to gain a deep understanding of customers' needs and preferences based on geographies and market segments. These capabilities help in analyzing customers behavior and interaction with products and services. Moreover, customization should be taken in consideration to improve customer satisfaction. Also, SAUDIA is considering Net Promoter Score (NPS); one of the most important metrics to have an overview on how much customers are satisfied with their experience. SAUDIA is using its social media channels to measure customer sentiment periodically in order to have real reviews on the products and services.

b) Top Line Growth

In fact, this is the most important element SAUDIA needs to improve. SAUDIA does not have a customer profile at all. There is no personalized content for each customer, and this causes lack of interaction. Customer's purchasing history data should be utilized to provide customized offers, making customer experience easier, and faster. SAUDIA needs a full CRM strategy to make the digital transformation journey more successful.

c) Customer Touch Points

Nowadays, customers need prompt response to their inquiries and complaints. Customer service can be improved by introducing advanced technologies. As for SAUDIA, they mainly respond to their customers via social media official accounts such as Twitter and Facebook. With technology's continuous revolution, many companies are using chatbots to answer the most frequent questions. Chatbot which SAUDIA does not have, is a very important factor to build trust for customers. Prompt responding to customers is helping them to avoid going physically to airports and sales offices and to avoid waiting so long when calling call centers.

2) Operational Process

a) Process Digitization

SAUDIA has good process digitization concepts. They have one of the most ERP systems which has allowed the company to gain efficiency and quality in main transactions. Also, most services can be done via self-services portal. Automation lets employees refocus on their tasks and company's strategy rather than focusing on other tasks.

b) Work Enablement

Work enablement is about enhancing customers satisfaction by using innovative technologies. The objective of work enablement is to increase staff satisfaction because it will definitely lead to customer satisfaction and eventually making more revenues. To accomplish this, employees need to stay connected to their work, colleagues, and customers. For example, Nowadays, many companies are operating remotely using technology. they made conferences, meetings, and accomplished daily tasks from home. SAUDIA has all capabilities to react to their customers needs promptly and also has all necessary tools to keep their staff connected.

c) Performance Managaement

Data is the key factor for digital transformation journey. It helps executives to make decisions based on real fact instead of assumptions and predictions. These decisions mainly depend on the level of available data. SAUDIA has advanced tools and portals to provide management and employees with whatever they need to make decisions and set strategies.

3) Business Model

a) Digitally-Modified Business

It can be said that all companies must change the way they run their businesses or they are going to die. SAUDIA has made real steps to change its approach. It has a good e-commerce strategy which helps it to generate more revenues and to attract more customers. SAUDIA has remarkable presence in digital world in many places such as:

- Google Display Network
- Meta-searches
- Email marketing
- Search engine optimization (SEO)
- Search engine marketing (SEM)

b) New Digital Business

Competition in the airline industry is very aggressive. Companies are fastly introducing new features and services to gain customers satisfaction and to increase passengers market share. For example, according to Dubos [6], AirAsia has advanced check-in technology using facial recognition at airports. Emirates offers meal ordering devices for business class travelers using smartphones. Lufthansa has another example; they use virtual reality (VR) to promote higher classes.

Talking about SAUDIA, it has the most essential products and services such as:

- Manage Bookings

Manage bookings allows customers to reschedule their flights, online check-in, add extra baggage, select seats, purchase Wi-Fi vouchers, and use the bidding system to upgrade flight class.

- Refund

Refund transactions can be performed automatically through SAUDIA website. This service will save time for SAUDIA's guests instead of going physically to sales offices.

- Virtual Reality (VR)

SAUDIA has a VR portal called *SAUDIA 360 VR*. It allows customers to have an amazing experience on the airplanes to discover first class cabins. It encourages customers who don't have experience on the first class to upgrade their tickets to have real experience.

To sum up, SAUDIA only has basic features and functions; need to introduce new features and technologies and be successful in the digital transformation journey and to stay competitive as airlines market's competition is very aggressive.

c) Digital Globalization

Digital globalization has entered a new era. The new technologies and platforms help companies to reach new markets and segments. Companies are transforming from being multinational to taking real global positions using digital technology. As SAUDIA is a flag carrier it is already reaching a cross-board segment and markets. SAUDIA has several portals on its website with many countries, languages, and currencies. Also, they are already releasing targeting campaigns to attract new customers outside Saudi Arabia.

4) Digital Capabilities

Digital capabilities are the base of all digital transformation building blocks. They should be considered before all digital transformation projects. Below are the key elements of digital capabilities:

- Unified processes and data
- Analytical capabilities
- Business & IT integration
- Solution delivery

B. Interpretive Structural Modeling (ISM)

The below Tables show Interpretive Structural Modeling (ISM) steps:

1. The below table shows the digital transformation factors DTFs

Table 1. digital transformation factors

Digital Transformation Factors (DTFs)	***Acronym***
Customer Understanding	DTF1
Top Line Growth	DTF2
Customer Touch Points	DTF3
Process Digitization	DTF4
Work Enablement	DTF5
Performance Management	DTF6
Digitally Modified Business	DTF7
New Digital Business	DTF8
Digital Globalization	DTF9
Digital Capabilities	DTF10

2. The structural self-interaction matrix (SSIM)

Below for symbols will be used to initiate the SSIM:

- V: if DTF i leads to successful implementation of DTF j
- A: if DTF j leads to successful implementation of DTF i
- X: if both DTF i and DTF j lead to successful of implementation if each other
- O: if both DTF i and DTF j doesn't lead to successful of implementation if each other

3. Initial reachability matrix

The Initial reachability matrix will be conducted based on below rules:

- if the (i,j) input in SSIM is V, then the (i,j) input in the reachability matrix will be 1 and (j,i) input will be 0.
- if the (i,j) input in SSIM is A, then the (i,j) input in the reachability matrix will be 0 and (j,i) input will be A.
- if the (i,j) input in SSIM is X, then the (i,j) input in the reachability matrix will be 1 and (j,i) input will be 1.

- if the (i,j) input in SSIM is O, then the (i,j) input in the reachability matrix will be 0 and (j,i) input will be 0.

Table 2. The structural self-interaction matrix (SSIM)

DTFs	***DTF10***	***DTF9***	***DTF8***	***DTF7***	***DTF6***	***DTF5***	***DTF4***	***DTF3***	***DTF2***	***DTF1***
DTF1	A	V	V	O	V	O	A	X	V	
DTF2	A	V	A	A	O	O	O	O		
DTF3	A	O	O	O	O	A	O			
DTF4	A	O	V	A	O	X				
DTF5	A	O	O	O	V					
DTF6	A	O	V	O						
DTF7	A	V	V							
DTF8	A	V								
DTF9	A									
DTF10										

Table 3. The initial reachability matrix

	DTF1	***DTF2***	***DTF3***	***DTF4***	***DTF5***	***DTF6***	***DTF7***	***DTF8***	***DTF9***	***DTF10***
DTF1	1	1	1	0	0	1	0	1	1	0
DTF2	0	1	0	0	0	0	0	0	1	0
DTF3	1	0	1	0	0	0	0	0	0	0
DTF4	1	0	0	1	1	0	0	1	0	0
DTF5	0	0	1	1	1	1	0	0	0	0
DTF6	0	0	0	0	0	1	0	1	0	0
DTF7	0	1	0	1	0	0	1	1	1	0
DTF8	0	1	0	0	0	0	0	1	1	0
DTF9	0	0	0	0	0	0	0	0	1	0
DTF10	1	1	1	1	1	1	1	1	1	1

4. Final reachability matrix

Now the transitivity checking process will be done. If DTF1 leads to successful implementation of DTF2 and DTF2 leads to successful implementation of DTF3, then DTF1 necessarily leads to successful implementation of DTF3. Accordingly, some inputs in the initial reachability matrix will be converted from 0 to 1* in the final reachability matrix.

Table 4. The final reachability matrix

	DTF1	***DTF2***	***DTF3***	***DTF4***	***DTF5***	***DTF6***	***DTF7***	***DTF8***	***DTF9***	***DTF10***	***Driving Power***
DTF1	1	1	1	0	0	1	0	1	1	0	6
DTF2	0	1	0	0	0	0	0	0	1	0	2
DTF3	1	1*	1	0	0	1*	0	1*	1*	0	6
DTF4	1	1*	1*	1	1	1*	0	1	1*	0	8
DTF5	1*	0	1	1	1	1	0	1*	0	0	6
DTF6	0	1*	0	0	0	1	0	1	1*	0	4
DTF7	1*	1	0	1	1*	0	1	1	1	0	7
DTF8	0	1	0	0	0	0	0	1	1	0	3
DTF9	0	0	0	0	0	0	0	0	1	0	1
DTF10	1	1	1	1	1	1	1	1	1	1	10
Dependence power	6	8	5	4	4	6	2	8	9	1	

5. Levels of DTFs (1st iteration)

In this step, DTFs will be classified into different levels based on the iterations. The Reachability set represents DTF i itself and all other DTFs that DTF i influence. Antecedent set represent the DTFs that influence DTF i including DTF itself. When reachability set becomes equal to the intersection, this DTF will be removed, highlighted, and classified as level 1 if it occurs in 1st iteration and level 2 if it occurs in the 2nd iteration and so on.

Table 5. Levels of DTFs (1st iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,2,3,6,8,9	1,2,3,4,5,7,10	1,2,3	
DTF2	2,9	1,2,3,4,6,7,8,10	2	
DTF3	1,2,3,6,8,9	1,3,4,5,10	1,3	
DTF4	1,2,3,4,5,6,8,9	4,5,7,10	4,5	
DTF5	1,3,4,5,6,8	4,5,7,10	4,5	
DTF6	2,6,8,9	1,3,4,5,6,10	6	
DTF7	1,2,4,5,7,8,9	7,10	7	
DTF8	2,8,9	1,3,4,5,6,7,8,10	8	
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	1,2,3,4,5,6,7,8,9,10	10	10	

6. Levels of DTFs (2nd iteration)

Table 6. Levels of DTFs (2nd iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,2,3,6,8	1,2,3,4,5,7,10	1,2,3	
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,2,3,6,8	1,3,4,5,10	1,3	
DTF4	1,2,3,4,5,6,8	4,5,7,10	4,5	
DTF5	1,3,4,5,6,8	4,5,7,10	4,5	
DTF6	2,6,8	1,3,4,5,6,10	6	
DTF7	1,2,4,5,7,8	7,10	7	
DTF8	2,8	1,3,4,5,6,7,8,10	8	
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	1,2,3,4,5,6,7,8,10	10	10	

7. Levels of DTFs (3rd iteration)

Table 7. Levels of DTFs (3rd iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3,6,8	1,3,4,5,7,10	1,3	
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3,6,8	1,3,4,5,10	1,3	
DTF4	1,3,4,5,6,8	4,5,7,10	4,5	
DTF5	1,3,4,5,6,8	4,5,7,10	4,5	
DTF6	6,8	1,3,4,5,6,10	6	
DTF7	1,4,5,7,8	7,10	7	
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	1,3,4,5,6,7,8,10	10	10	

8. Levels of DTFs (4th iteration)

9. Table 8. Levels of DTFs (4th iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3,6	1,3,4,5,7,10	1,3	
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3,6	1,3,4,5,10	1,3	
DTF4	1,3,4,5,6	4,5,7,10	4,5	
DTF5	1,3,4,5,6	4,5,7,10	4,5	
DTF6	6	1,3,4,5,6,10	6	IV
DTF7	1,4,5,7	7,10	7	
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	1,3,4,5,6,7,10	10	10	

10. Levels of DTFs (5th iteration)

Table 9. Levels of DTFs (5th iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3	1,3,4,5,7,10	1,3	V
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3	1,3,4,5,10	1,3	V
DTF4	1,3,4,5	4,5,7,10	4,5	
DTF5	1,3,4,5	4,5,7,10	4,5	
DTF6	6	1,3,4,5,6,10	6	IV
DTF7	1,4,5,7	7,10	7	
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	1,3,4,5,7,10	10	10	

11. Levels of DTFs (6th iteration)

Table 10. Levels of DTFs (6th iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3	1,3,4,5,7,10	1,3	V
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3	1,3,4,5,10	1,3	V
DTF4	4,5	4,5,7,10	4,5	VI
DTF5	4,5	4,5,7,10	4,5	VI
DTF6	6	1,3,4,5,6,10	6	IV
DTF7	4,5,7	7,10	7	
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	4,5,7,10	10	10	

12. Levels of DTFs (7th iteration)

13. Table 11. Levels of DTFs (7th iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3	1,3,4,5,7,10	1,3	V
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3	1,3,4,5,10	1,3	V
DTF4	4,5	4,5,7,10	4,5	VI
DTF5	4,5	4,5,7,10	4,5	VI
DTF6	6	1,3,4,5,6,10	6	IV
DTF7	7	7,10	7	VII
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	7,10	10	10	

14. Levels of DTFs (8th iteration)

15. Table 12. Levels of DTFs (8th iteration)

	Reachability set	***Antecedent set***	***Intersection***	***Level***
DTF1	1,3	1,3,4,5,7,10	1,3	V
DTF2	2	1,2,3,4,6,7,8,10	2	II
DTF3	1,3	1,3,4,5,10	1,3	V
DTF4	4,5	4,5,7,10	4,5	VI
DTF5	4,5	4,5,7,10	4,5	VI
DTF6	6	1,3,4,5,6,10	6	IV
DTF7	7	7,10	7	VII
DTF8	8	1,3,4,5,6,7,8,10	8	III
DTF9	9	1,2,3,4,6,7,8,9,10	9	I
DTF10	10	10	10	VIII

16. The final interpretive structural model

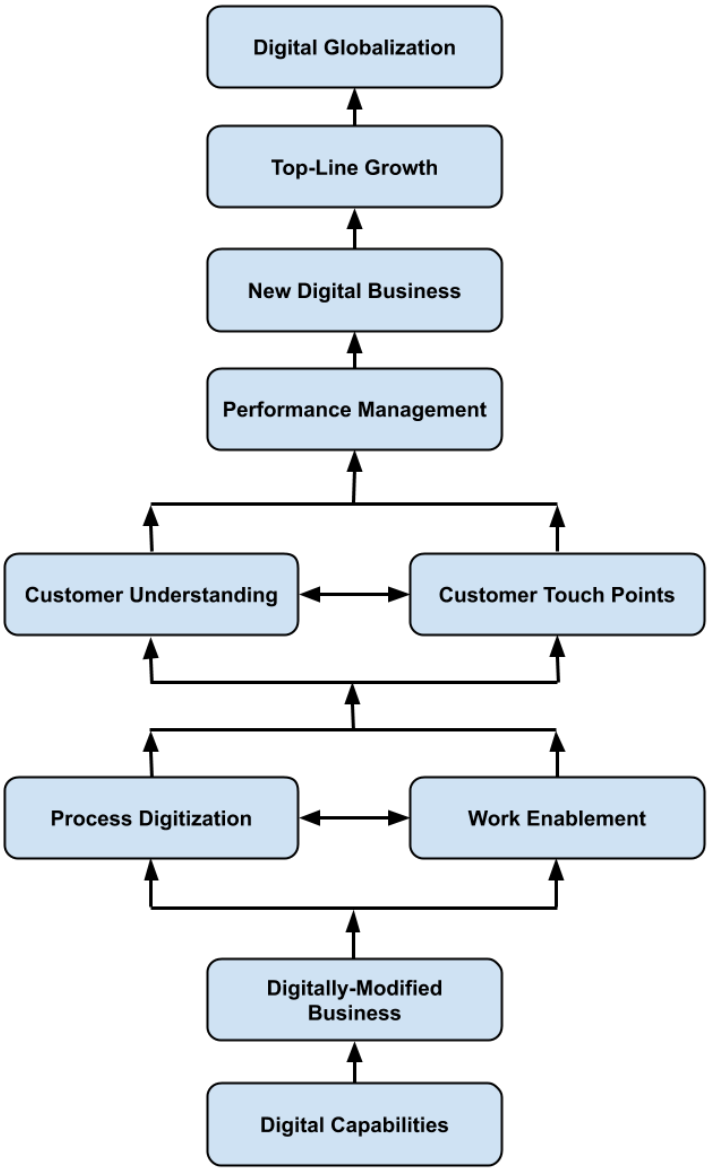

Figure 2. The final interpretive structural model

IV. CONCLUSION AND RECOMMENDATIONS

Digital transformation is one of the essential programs to achieve the vision of Saudi Arabia 2030. Digital transformation is about using technology to enhance a process and performance to be more effective and efficient. It means how organizations are integrating technologies to change the operating models to become more successful. In airlines industry, competition is very aggressive, and companies keep transforming their operating models to introduce new features and services to maximize revenues and meet customer satisfaction. This research discussed SAUDIA Airlines current position regarding digital transformation and what are the potential opportunities to be considered. Data was collected by direct interview with expert inside the company and by observations. Also, market research was used to collect additional information about airlines industry and future trends. MIT-Capgemini digital transformation framework was the base of the study. All factors have been discussed and analyzed to come with insights. Interpretive Structural Modeling (ISM) has been used

to prioritize and study the dependency of these factors among each other to design a roadmap of digital transformation journey. Based on study, it recommended that SAUDIA focus on digital capabilities which is the most important factor and the digital transformation process start with it. Also, SAUDIA must modify its business model to be in-line with industry trends. All other factors affect SAUDIA's position and future as well. Finally, digital transformation is not easy to be implemented and all factors are related to each other, so they need tremendous efforts and time to be accomplished.

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