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A Study of Information Technology in Airlines

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ABSTRACT

This is a study of information technology within a company and how it works and its structure. In this case, it's a airlines company called Air India and how IT helps in running the different flights around the world.

Keywords : IT, Company, Flights, Structure

I. INTRODUCTION

Company Profile

Air India(Airline Code: AI)is the flag carrier airline of India, a Public Sector Company fully owned by Government of India. The present entity is the merged Airline between erstwhile Air India and Indian Airlines. The Airline is headquartered at New Delhi and operates under Hub and Spoke Model. Over the period Air India has earned good reputation in both international and domestic markets. Its mascot Maharaja is a highly recognized brand. Being a public sector, it enjoys the financial backing of Government of India which helps in financing Aircraft acquisition. Air India has two major hubs at IGI Airport, New Delhi and CSI Airport, Mumbai. In 2007 Indian Airlines was merged with AI. AI (including Indian Airlines) was once the largest operator in the Indian subcontinent with a market share of over 60%.

It has two subsidiary Airlines: Air India Express (Airline Code: IX) is the LowCost Carrier (LCC) primarily focusing on Gulf and South East Operations and Air India Regional (Airline Code: 9I) is the India Regional Carrier with operations focused to connect small Airports with Metros in India.

Fierce competition at both international and domestic market with world leading airline and also small Low Cost carriers has led to lack of clarity and loss of focus on providing strategic direction thereby largely diluting its capabilities and brand confusion in the market. Bottlenecks in Merger, indifferent financial performance and service, labor trouble, low employee morale and issues in Aircraft acquisition pushed it to third place in terms of Domestic Market Share. In the recent times, government has also taken away many profitable routes of Air India and given the same to other airlines on bilateral leading to severe revenue loss. These types of intervention

coupled with the merger related issue has badly affected the performance of the company.

In the last three years, with financial restructuring and enforcement of strict rules and regulations, the airline has showed significant signs of turn around. In March 2013, the airlines posted its first positive EBITDA after almost 6 years. On 11 July 2014, the airline became the 27th member of Star Alliance.

Air India prides itself in the way it treats its customers during the flight like the Maharaja. It offers things such as food, drinks, entertainment, and of course a welcoming staff.

Industry

Airline sells Service. It is the space and experience provided by an Airline while transporting a person (the same may also include for cargo) from Origin A to Destination B. A and B can be directly connected in one hop or connected via some other points as multi hop. In the transportation more than one Airline or other surface transportation means may also be involved. The space provided is highly perishable item as once an Aircraft leaves with empty seats; Airline looses the corresponding revenue forever. From a Passenger perspective, she/he expects a Safe Flight from A to B with all her/his Baggage intact and also within the committed time.

Aviation industry in India was primarily viewed as Upper Class transport mode. Liberalization of Economy in 1991 and with lot of IT and Multinational companies growing up in last couple of decades and driven by modern facilities and infrastructure, Air passenger in India is increasing at a healthy rate. The number of tourists and investments from foreign countries are also increasing in steady pace. India is fast emerging as a destination for affordable world class medical treatment and attracting patients from Middle East/ Gulf in the form of Medical tourism.

With the public–private partnership (PPP)model four metros- Delhi, Mumbai, Hyderabad and Bangalore have swanky new Airports which can boast of being truly World Standard. The new airports at Kolkata and Chennai developed by Airports Authority of India are also similar in standard. Rapidly expanding air transport network and opening up of the airport infrastructure to private sector participation have fuelled the growth of the air traffic in the country. India is likely to be the fastest growing aviation market of the world in the next 20 years. Indian airport system is poised to handle 336 million domestic and 85 million international passengers by 2020, from the current level of 121 million domestic and 41 million international passengers, making India the third largest aviation market. According to International Air Transport Association's (IATA) Airline Industry Forecast 2012-2016, India's domestic air travel market would be among the top five globally, experiencing the second highest growth rate at CAGR of 13.1%. Air Transport in India today supports 56.6 million jobs and produces over US$ 2.2 trillion of the global gross domestic product (GDP).

Airline business requires huge investments and has high level of fixed and operating costs. But the revenues barely cover operation cost. Ever since the Air Corporations Act was repealed and Open Sky Policy was brought in mid Nineties, new Airlines barring only few, have gone bankrupt and shutdown with unrecovered dues to Airports, Fuel Companies, Government, Air India and Banks. Kingfisher Airline closed down in 2012 and Auditors of Spice Jet are skeptical of its performance. At present except Low cost Indigo, all Indian Airlines are bleeding. The huge losses are because of high taxes on fuel and rising operational costs. Taxes constitute 40% of an airline's total expenditure, far above the global average of 32%.

At the same time Financial Turmoil around the world has also forced many companies to cut down Business Travel and resort to Cloud Technologies and Video/Audio Conferencing thus effecting Airline Business Class Revenues. There is fierce competition in the Indian Skies which has got amplified by Oil rich Gulf Airline Carriers which prevents Indian airlines from raising ticket prices. In fact at some of the competitive routes, the fare has come very near to Indian Railway fare. All Indian carriers are flying overseas taking competition outside India as well. However this has not deterred new carriers from joining the fray. Air Asia and Tata Singapore Airlines (Vistara)are the new entrants. This will certainly take the cut throat competition to still higher level and bring down the market share of each operator. Various Carriers are resorting to means to boost its bottom-line and image. Jet Airways entered into strategic alliance with Etihad Airways and Air India joined Star Alliance recently.

Airlines are wonderful generators of profit for all companies related to it except for them. No doubt over the period Airline Industry has never really made money. Both the buyers and suppliers associated with Airline Industry have high bargaining power. Whether it is the Aircraft manufacturers, Airports, Ground Handling Agency or Travel Agents everyone makes money out of the Airline. Almost all of them enjoy monopolistic setup. For example most of the Commercial Aircrafts are manufactured by either US based Boeing and Europe based Airbus. Governmental policies determine the Aircraft purchase and hence high dependency on the Suppliers. Similarly most Indian cities have single Airports. Hence, for example, if an Airline has to operate to New Delhi has to accept terms and conditions and financials led down by GMR Delhi International Airport Limited. With so many Airlines operating, the travelers are pampered with choices.

Competitor Analysis in Brief

Indigo (Airline Code: 6E) has been one of the successful Low cost airline. Presently it is the number one airline in India.

GoAir (Airline Code: G8) is also Low costairline launched in 2004. GoAir offers competitive prices and provides services to major destinations across India.

Spicejet (Airline Code: SG) is another Low cost airlines launched in 2005. Spicejet also offers competitive prices. At present financially it is not doing very well.

Etihad (Airline Code: EY) and Emirates (Airline Code: EK) are the Cash Rich Gulf Carriers, based in Abu Dhabi and Dubai respectively, together operating more flights than any other airlines from India.

II. IT IN AIRLINES

Background

Airlines are pioneers in Information Technology. SITA (*Société Internationale de TélécommunicationsAéronautiques*), was founded in 1949 by 11 airlines in order to bring about shared infrastructure cost efficiencies by combining their communications networks. The Airline Reservation System (also called Passenger Services System) was developed jointly by IBM and American Airlines in the early 1960. It was named SABRE (Semi-automated Business Research Environment). By late 1980s a large number of Airlines and Airports had joined SITA Network and was able to communicate Airline data across the world. SITA developed robust telecommunication protocols (way before TCP/IP) for transferring both Host to Host and Teletype data. With the advent of IP based

Networking, the same was moved on to MATIP (Mapping of Airline Traffic to IP). The Teletype SITA Type B can in true sense be called as a precursor to Email system within the Aviation fraternity with a guaranteed delivery.

IT has always been the backbone of Airline. Before the IT and Computational Boom occurred, Airlines primarily had Mainframe based centralised setup. Primarily IT applications used to be Passenger and Cargo Booking System, Departure Control System, Aircraft Spares Inventory and couple of small applications like MIS, Fuel and Cargo Billing, Frequent Flyer Database, Employee payroll and Personal Record. The Central Mainframe was also connected to other GDS mainframe systems for Inter Airline and Travel Agent Bookings. The downlink connections were through 9.6 Kbps or 14.4 Kbps link (which is unthinkable in today's world!). The user nodes were predominantly Dumb Cathode Ray Terminals (we are talking of Pre PC Era). When Personal Computers became cheaper, Emulation Software were developed which mimicked the Dumb Terminals. With the advancement in Networking Technologies, IP based LAN/WAN Networking developed.

With the Airline Deregulation in various countries in last couple of decades, Airline competition increased. Airlines looked towards IT to distinguish themselves from Competitors. Together with the advancement in IT and computational methods, IT Software and applications have been developed in the fields of Airline E-Commerce, Airline Passenger and Cargo Booking Engine, Inventory Management and Forecasting, Aircraft Spares Inventory, Maintenance Repair and Overhaul (MRO), Scheduling, Fleeting, Operations Management, Flight Navigations, Aircraft Communication, Crew Scheduling and Operations Recovery Solution. Most of the products currently are tapping Operations Research using Integer Programming to come up with Optimum Solution to Real Time Problems in real time. Airlines all over the world now use E-Tickets and there is already successful implementation of Mobile Boarding. RFIDs are being used in Check-in Baggage for easy tracking.

Airline Alliances like Star Alliance, One World are increasingly tapping IT to seamlessly integrate the information flow between the member Airlines on real time basis to project the Alliance as One Airline.

IT Setup at Air India

Department of Information Technology (DIT) of Air India (as well as in erstwhile Indian Airline) is a full-fledged Department headed by Executive Director who reports directly to Chairman and Managing Director. ED (IT) heads able bunch of IT Professionals who have tried to keep abreast with ever changing IT Technologies. Based on requirements various in house software have been developed. However given the complexity of Airline System, it is next to impossible to develop and manage all software/application in house. Also customised software is already available presently in the Market.

Air India has its own Data Centre at New Delhi and Mumbai where the Servers and Mainframes are located. The whole setup is protected by Firewall. There are redundancies built up with Load Balancer and proper DR site. The Data backup is taken periodically and stored at a location far away from the Main setup.

Having invested largely in latest Technology, the full benefits of IT can be reaped only when all the Systems interface seamlessly. Since multiple IT Product vendors and software platforms are involved, interfacing is real challenge. Interfacing between some of the Systems is already functional. For some it is still ongoing at various stages.

Computer Based Information Systems at Air India

Computer Based Information Systems (CBIS) used in Air India can be primarily classified into following three heads:

Cloud Based or Hosted Solution

The various CBIS in this category are:

i. SITA Passenger Service System (includes Reservation, Departure Control System and associated services).
ii. LMS Cargo System.
iii. Sabre® Air Centre® modules:
   - Schedule Manager
   - Slot Manager
   - Code Share Manager
   - Refleeting Manager
   - Fleet Manager
   - Profit Manager
   - Movement Manager
   - Movement Manager Web
   - Crew Management System (kept in abeyance)
iv. Crew Management System.
v. AI Website at NIC and E-Commerce Portal.
vi. Kale MIS
vii. Mobile Phone Booking Facility using NgPay.

Proprietary Software/Applications with In house setup

The various CBIS in this category are:

i. SAP ERP System :
It is the company wide (including subsidiaries) ERP implementation. Most of the modules are functional. The Business Intelligence module is to be implemented.

ii. Lotus Email System :
It provides the Air India Corporate Email (@airindia.in)

iii. RAMCO MRO Engineering System :
It is the Engineering MRO and Aircraft Spares Management Solution.

iv. IBM Document Management System.

v. SITA Data mart.

vi. Boeing E-enabling Ground System for 787 (Dream liner).

In house developed Application

Bilingual Intranet Website (Click).
Web based E-Log Portal.
Web based Applications for Medical Services Department.
Web based Customer Feedback and Monitoring Application.
Flight Safety Portal.
In house MIS generation.

III. RESULTS AND DISCUSSION

Table 2.1 – Cloud Based or Hosted Solution

S. No.	*Name of IT Application*	*Functional Area Covered*	*IT System Architecture*	*Details of Software*			*Details of Hardware*
				Operating System(s)	*Application System(s)*	*Networking Software*	*Hardware inclg.Terminals required*
	1	2	3	4(i)	4(ii)	4(iii)	5
1	SITA – Passenger Service System	Reservation, Ticketing, DCS, BRS, etc.	File Server System, Client Server System, Web-Based	Unisys OS	SITA-PSS Hosted Solution	Liaison	Hosted at SITA Atlanta, USA
2	LMS Cargo System	Cargo Sales, Warehousing, Tracking etc.,	Web-Based	Unisys OS	Cargo Application	Nil	Hosted at UNISYS
3	Sabre AirCentre® Modules	Various Operational Unit		Linux		Nil	Hosted at Sabre Tulsa, USA
4	Crew Management System	Crew Scheduling		Windows			
5	Corporate Website & E-Commerce	Web Booking & Static Information	Web-Based	Windows	.Net	Nil	Hosted at NIC, Delhi
6	Kale MIS			Windows			
7	Mobile Phone Booking Facility using NgPay						

Table 2.2 – Proprietary Software/Applications with In-House Setup

S.No.	*Name of IT Application*	*Functional Area Covered*	*IT System Architecture*	*Details of Software*			*Details of Hardware*
				Operating System(s)	*Application System(s)*	*Networking Software*	*Hardware inclg.Terminals required*
	1	2	3	4(i)	4(ii)	4(iii)	5
1	SAP –ERP System	Finance Module, HR Module & MM	SAP-ERP	AIX-zOS, Windows	ERP	SAP Client	Hardware installed at DIT-Hqrs, Delhi
2	Corporate Email (Lotus Email System)	Mailing System	Client Server System, Web-Based	Suci Linux	Lotus Domino Server	Lotus Client	Hardware installed at DIT-Hqrs, Delhi
3	RAMCO-MRO Engineering System	Engineering & Material Management	File Server System	Windows	RAMCO MRO Module	Nil	Hardware installed at DIT-Hqrs, Delhi
4	IBM Document Management System	Quality Management	Client Server System, Web-Based			Nil	Hardware installed at DIT, Mumbai
5	SITA Datamart	Various Operational Units	Client Server System, Web-Based		Oracle Business Intelligence	Nil	Hardware installed at DIT, Mumbai

Table 2.3 – In-House Developed Applications

S. No.	*Name of IT Application*	*Functional Area Covered*	*IT System Architecture*	*Details of Software*			*Details of Hardware*
				Operating System(s)	*Application System(s)*	*Networking Software*	*Hardware inclg.Terminals required*
	1	2	3	4(i)	4(ii)	4(iii)	5
1	Bilingual Intranet Website CLICK Portal	Employee Information	Web-Based	Windows	.Net	NIL	Hardware installed at DIT, Mumbai
2	E-Log Portal	Various Operational Units	Web-Based	Windows	.Net		Hardware installed at DIT-Hqrs, Delhi
3	Application for Medical Services Department	Medical Services	Web-Based	Windows	.Net		Hardware installed at DIT-Hqrs, Delhi
4	Customer Feedback & Monitoring Application	Customer Services	Web-Based	Windows	.Net		Hardware installed at DIT-Hqrs, Delhi
5	Flight Safety Portal	Flight Safety	Web-Based	Windows	.Net		Hardware installed at DIT-Hqrs, Delhi
6	In-House MIS Generation	IOCC	PC based	Windows	.Net	NIL	Hardware installed at DIT-Hqrs, Delhi
7							

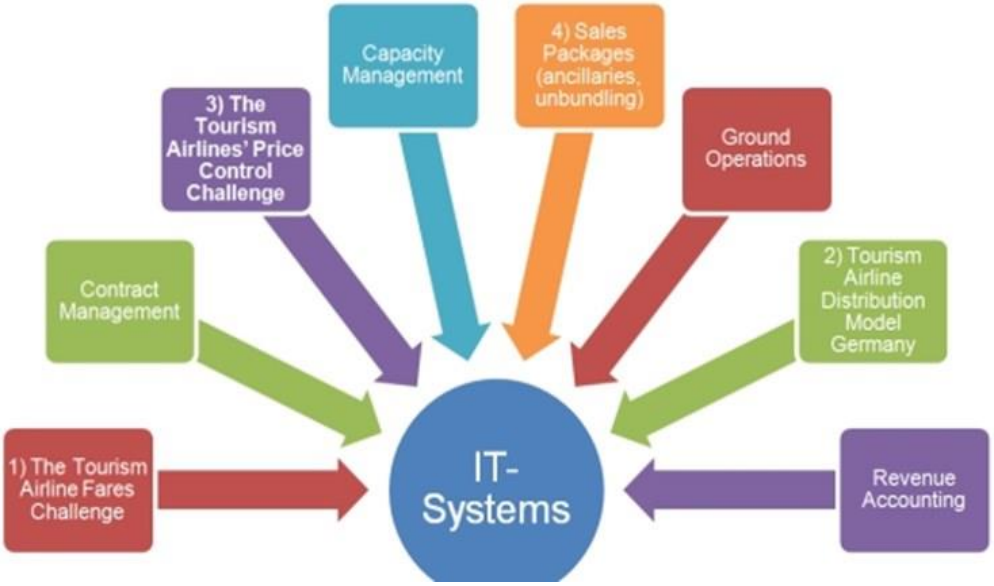

Figure 1. Airline Distribution

IV. CONCLUSIOLN

Airline companies in the world reinforce their marketing ability by employing e-business using IT infrastructures in all areas to have a competitive advantage against their competitors. Airlines also aim to provide better service for passengers and lower costs for air transport industry.

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