<u>Case Study 2</u>

"Depreciation at Delta Air Lines and Singapore Air lines"

Harvard Business School

1 Annual Depreciation Expenses

Depreciation for each $100 gross value of aircraft

Annual Depreciation expenses =

(Initial value – End residual value)/ (number of years)

1.1 Delta airlines

Given Data:

	Before July 1st 1986	**From July 1st 1986 - March 31st 1993**	**From April 1st 1993 - today**
Residual (Percentage %)	10	10	5
Average Age of Aircraft (Years)	10	15	20
Depreciation expenses per annum (Dollars)	**9**	**6**	**4.75**

Depreciation expenses calculation for $100 worth of aircraft value.

1. Prior to July 1st 1986

   Depreciation expense = (100 – (0.1 * 100))/10

   = 90/10

   = $9

2. From July 1st 1986 to March 31st 1993

   Depreciation expense = (100 – (0.1 * 100))/15

   = 90/15

   = $6

3. From April 1st 1993 to today

   Depreciation expense = (100 – (0.05 * 100))/20

   = 95/20

   = $4.75

1.2 Singapore airlines

	Before April 1st 1989	From April 1st 1989 - 1993	From April 1st 1993 - today
Residual (Percentage %)	10	20	20
Average Age of Aircraft (Years)	8	10	10
Depreciation expenses per annum (Dollars)	**11.25**	**8**	**8**

Depreciation expenses calculation for $100 worth of aircraft value.

1. Prior to April 1st 1989

   Depreciation expense = (100 – (0.1 * 100))/8
   = 90/8
   = $11.25

2. From April 1st 1989 to end of FY-1993

   Depreciation expense = (100 – (0.2 * 100))/10
   = 80/10
   = $8

3. From end of FY-1993 to today

   Depreciation expense = (100 – (0.2 * 100))/10
   = 80/10
   = $8

2 Difference in accounting for depreciation expenses

There is a significant difference in the way Delta airlines and Singapore airlines are accounting for depreciation expenses.

For example, after April 1st 1993, the following table shows the depreciation expenses for Delta airlines and Singapore airlines for $100 Million worth of aircraft asset.

	Delta	**Singapore**
Residual (%)	5	20
Age (Years)	20	10
Depreciation Expense for $100 Million worth of aircraft in Million dollars	4.5	8
Final worth of the asset after aging period (Million Dollars)	5	20

According to the above calculations, Delta airlines will incur $5Million of depreciation expenses per annum and will left with $5M worth of assets at the end of the aging period. In contrast, Singapore airlines will incur $8M of depreciation expense per annum and will left with $20M worth of assets at the end of the aging period. Therefore, for the same value of aircraft owned, Delta airlines' depreciation expense will be only 56% of Singapore airlines'.

The major contributors for the difference are the aging period and the residual values.

2.1 Why companies differ in depreciation lives and salvages

1. Quality of aircraft equipment
2. Amount of Maintenance
3. Frequency of aircraft usage, wear and tear and capacity utilization
4. Operating gross profit margin
5. Management policies regarding renewing the aircraft
6. Application of accounting policies
7. Operation costs
8. Geography of operations and competition pressures.

2.2 Reasons for having different depreciable lives and salvage values

1. Aircraft equipment quality: The quality of the aircrafts possessed by Delta airlines may be better than that of Singapore airlines. This might lead to longer aircraft lives and less depreciation expenses for Delta airlines.
2. Aircraft maintenance: Delta may be spending a larger amount on their aircraft

maintenance than Singapore airlines and thereby achieving higher aircraft useful lives.

3. Frequency of usage (Number of miles flown per trip and Number of times flown per annum/month):

   Though the number of aircrafts owned by Delta airlines (564) is approximately 10 times more than that of Singapore airlines (57), the total revenue passenger mile for Delta airlines (82,406 M) is about 3.482 times that of Singapore airlines (23,663). Therefore, the lower usage rate of Delta airlines compared to Singapore airlines might have contributed to Delta airlines less depreciation expenses.

4. Different management intentions and policy:

   Singapore airlines are renowned for their superior customer service and aircraft facilities. This may be in line with their management's policies to renew their fleet more often than others and hence result in shorter operational lives.

5. Difference in capacity utilization:

   From the financial and operational data, it can be noted that the capacity utilization for Delta airlines and Singapore airlines are 62.3% and 71.2% respectively. Therefore, Delta airlines capacity utilization is 9% less than that of Singapore airlines. This may be a contributing factor for Delta airlines to have a longer useful life of their aircrafts than Singapore airlines.

6. The available passenger miles for Delta airlines are very high compared to Singapore's.

7. Application of Accounting policies:

   Singapore airlines may be more conservative in their estimation of residual values and asset lives than Delta airlines. Singapore airlines appear to be basing their estimates on worse case scenarios, where as Delta airlines are taking a more optimistic approach.

8. Most of Singapore airlines revenue is coming from their international operations (56%). Therefore, Singapore aircrafts may be flying longer distances and more frequently than Delta aircrafts. This could result in more wear and tear of Singapore aircrafts and may be contributing to their higher depreciation expense.

9. Delta airlines operate mainly in the United States. Therefore, most of their income is from domestic service. In addition, most of the time, the average length of the domestic trip will be less than international trip. Long haul flights tend to operate at higher altitudes where planes can reach greater speeds due to thinner air. At such heights, a plane will endure more extreme temperatures and atmospheric conditions than flights at lower altitudes. Therefore, the less wear and tear of Delta aircrafts compared to Singapore aircrafts could prolong the Delta airlines equipment useful life.

10. Domestically, Delta airlines compete heavily with other low-cost and no frills airlines for most of their revenue. This makes their gross profit margin less than that of Singapore airlines, which compete mainly with other international carriers. Therefore, Delta airlines may use low depreciation expenses in order

to compete and display better performance than their main competitors.

11. The operational costs in Asia, where Singapore Airlines operates, are known to be less compared to those in US. This could be another reason for Singapore airlines to have a better gross profit margin than Delta airlines. In addition, Singapore airlines may haven chosen to use aggressive accounting techniques (writing-off most of their expenses at the earliest possible time) for expenses to manage investor's future expectations.

2.3 Is different treatment correct?

Based on the evidence above, it could be argued that Delta and Singapore are accurate in treating their depreciation expenses differently. These treatments vary due to numerous factors such as geography of operations, frequency of usage, wear and tear, maintenance costs and management policies.

3 Difference in Depreciation expenses

3.1 With and without policy change

The total depreciation expenses on flight equipment owned from July 1st 1992 to June 30th 1993 was

= 3559 – 3213

= $346 Million

This would have been calculated on a net flight equipment owned of $X using the following equation.

Total depreciation expenses =

Depreciation expenses from July 1st 1992 to March 30th 1993 using old policy

+

Depreciation expenses from April 1st 1993 to June 30th 1993 using old policy

Depreciation expenses from July 1st 1992 to March 30th 1993 using old policy

= ((Av. assessed Flight equipment owned value - residual value) / aging period)

* Part of the year the old policy was used

= ((X – 0.1X)/15) * (9/12)

= 8.1X/180

= 0.045

Similarly

Depreciation expenses from April 1st 1993 to March 30th 1993 using old policy

= ((Av. assessed Flight equipment owned - residual value) / aging period)

* Part of the year the new policy was used.

= ((X – 0.5X)/20) * 3/12

= 2.85X/240

= 0.011875X

Total Depreciation expense = 0.045X + 0.011875X

346 = .056875X

X = 346/17.8

= 6083.51

The resultant average assessed flight equipment owned value used from period July 1st 1992 to June 30th 1993 was $6083.51 Million.

If Delta had not adopted the new policy in April 1st 1993, the depreciation expenses for period July 1st 1992 to June 30th 1993 using old policy would have been

(6083.51 * .9) /15 = $365.01 Million.

By adopting the new policy that was effective from April 1st 1993, Delta saved 365.01 – 346 = $19.01Million for year 1993.

3.2 Delta's depreciation expenses with Singapore airline's depreciation policy

Singapore uses the following depreciation expense policy in 1993.

Residual value = 20% of original

Aging period = 10 years

If Delta airlines use this policy for the period July 1st 1992 to June 1st 1993 for its average assessed flight owned equipment value of $6083.51M , its depreciation expenses would be

= (6083.51 * .8)/10

= $486.68Million.

Therefore, if Delta airlines use Singapore airlines depreciation policy then Delta airlines depreciation expenses would have been $486.68M, which is $140.68M more if Delta airlines uses their own policy.

4 Impact of Singapore Airline's Depreciation Assumptions

Although Singapore Airline's depreciation expense results in reduced Net Income, it is able to accomplish several goals. As the aircraft are only around 5 years old, Singapore can sell the "pre-owned" aircraft at a higher price than an older craft. Selling off the

aircrafts at such a young age allows Singapore to recoup a significant portion of its initial purchase expense.

Although not identical in process, leasing these aircraft could have a similar financial effect. Instead of incurring the full cost of the airliner, Singapore's revenue from selling the aircraft in such good condition helps defray the initial cost. This sale revenue helps off-set the cost of the new aircraft coming into the fleet. By being able to purchase new aircraft on a more frequent basis, Singapore Airlines can offer its passengers newer, more high-tech aircraft. Consumers are willing to pay more for better, faster planes, especially business travelers who depend on the speed and comfort of the aircraft to endure the long hours of travel. This is evidenced in Singapore Airline's 2003 Annual report.[1] Over the course of 12 months (April 2003 to March 2004) Singapore Airlines received over 100 service awards including Fortune Magazine's World's Most Admired Companies 2004 All Star list (ranked 2 of 32), and Reader's Best Brands Awards 2003 *Best Foreign Airline* for the 10th consecutive year.

In 2003 and 2004, Singapore Airlines has sold or disposed of 15 airliners and purchased 14. These sales and disposals resulted in $1.5 Billion (USD). Purchases of new airliners resulted in $2.2 Billion (USD). The difference of only $700 Million (USD) was the only real cost incurred by these purchases. Some of the crafts sold were bought by leasing firms who leased-back the younger aircraft to the airline company. Singapore also phased out their Airbus 340's, after seven years of service.

Singapore Airline's overall strategy is to maintain a high standard of service, both in its employees as well as in aircraft and equipment. By maintaining such a short life span for its aircraft, Singapore can offer its passengers some of the most high-tech conveniences of air travel. Many airlines that use older aircraft do not have the latest and greatest in passenger technologies, such as new larger television screens, more ergonomic seating and more leg room. Singapore may also be able to avoid some of the more expensive maintenance procedures that may plague airlines who keep older aircraft. It also does not have to worry as much about safety compliance as the aircraft rarely have a chance to fall into that level of disrepair.

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[1] www.SingaporeAir.com Annual Report 2003

5 Impact on the amount of depreciation expense

Let us consider that both Delta airlines and Singapore airlines own $100 Million worth of aircrafts.

1. First, we will consider a common residual values along with the respective aging policies for Delta airlines and Singapore airlines

   Aircraft asset : $100M

   Residual Value: 10% of initial value

   Aging Years :

Delta	- 20 years
Singapore	- 10 years

   Depreciation expense per annum for Delta =

   100* 0.9/20 = $4.5m

   Depreciation expense per annum for Singapore =

   100* 0.9/10 = $9.0m

   In this case the depreciation expense per annum of the Singapore airlines will be 2 times that of Delta airline

2. Second let us assume that both Delta and Singapore are using their respective polices for both aging years and residual values of the aircraft for $100M worth of aircraft each.

   Aircraft asset : $100M

   Residual Value:

Delta	- 5% of initial value
Delta	- 20% of initial value

   Aging Years :

Delta	- 20 years
Singapore	- 10 years

   Depreciation expense per annum for Delta =

   100* 0.95/20 = $4.75M

   Depreciation expense per annum for Singapore =

   100* 0.8/10 = $8.0M

   In this case the depreciation expense per annum of the Singapore airlines will be about 1.6842 times that of Delta airline

Due to rapid shorter aging period, Singapore airlines have to renew their fleet at a rapid interval compare to Delta airlines. In addition, over the time, Delta airlines had accumulated flight equipment that is older than that of Singapore airlines. The assets are accounted based of their cost of acquisition, which will presumable be less than their present valuation and cost of new equipment. Therefore, the depreciation expenses (computed as a percentage of asset whose value is assessed using its acquisition cost) for Delta airlines will be very less than that of Singapore airlines(which contain newer flight equipment whose cost of acquisition will be relatively high).

My Notes

Delta:

- Largest in terms of the number of airline departures and the number of passengers carried
- Deregulations of 1978
- Non-synchronization of inflation and airline fares increase
- Internal competition from low-cost, no-frills airlines like southwest and people's express
- Only 21% of revenue from international flights
- Acquired Trans Atlantic to expand international operations in 1991
- Need to reduce marketing programs and staff downsizing because of heavy recession in 1990-93 and 12.8B loss to airline industry
- Average age of Delta's aircraft was 8.8 years, which was very less compared to industry standard. (American 8.9, United 10.8 and Continental 15.3)
- Revenue passenger mile 82,406
- Number of revenue passengers carried 85M
- Average Passenger trip length: 969
- Available passenger mile 132,282
- Capacity utilization, 62.3%
- Total number of flights, owned and lease, 564

Singapore

- Transit point for a good deal of travel in Asia
- Operations revenue composition
    - 44% to Asia
    - 23% to Europe
    - 22% to north and south America
    - 11% to southwest pacific
- High level of customer service
- Youngest aging policy in the world
- Revenue passenger mile 23,663
- Number of revenue passengers carried 8.7M
- Average Passenger trip length 2,720
- Available passenger mile 33,174
- Capacity utilization, 71.3%
- Total number of flights, owned and lease, 57