Role of the airplane in American business

Charles Hiram Davey

The University of Montana

Follow this and additional works at: https://scholarworks.umt.edu/etd

Let us know how access to this document benefits you.

Recommended Citation
Davey, Charles Hiram, "Role of the airplane in American business" (1967). Graduate Student Theses, Dissertations, & Professional Papers. 6129.
https://scholarworks.umt.edu/etd/6129
THE ROLE OF THE AIRPLANE IN AMERICAN BUSINESS

By

Charles H. Davey, Jr.

B.A. University of Montana, 1960

Presented in partial fulfillment of the requirements for the degree of

Master of Business Administration

UNIVERSITY OF MONTANA

1967

Approved by:

Glenn B. Barth
Chairman, Board of Examiners

Dean, Graduate School

AUG 16 1967
Date
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>I. BUSINESS FLYING</td>
<td>3</td>
</tr>
<tr>
<td>II. INDUSTRIAL GROWTH</td>
<td>12</td>
</tr>
<tr>
<td>III. ECONOMICS</td>
<td>19</td>
</tr>
<tr>
<td>IV. PEOPLE</td>
<td>40</td>
</tr>
<tr>
<td>V. CASE EXAMPLES OF PLANE UTILIZATION</td>
<td>51</td>
</tr>
<tr>
<td>Montana Aviation</td>
<td>58</td>
</tr>
<tr>
<td>VI. SUMMARY AND CONCLUSIONS</td>
<td>72</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>74</td>
</tr>
<tr>
<td>TABLE</td>
<td>PAGE</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>I. LIGHT SINGLE ENGINE CLASS</td>
<td>9</td>
</tr>
<tr>
<td>II. HIGH PERFORMANCE SINGLE ENGINE</td>
<td>9</td>
</tr>
<tr>
<td>III. LIGHT TWIN ENGINE CLASS</td>
<td>10</td>
</tr>
<tr>
<td>IV. HEAVY TWIN ENGINE CLASS</td>
<td>10</td>
</tr>
<tr>
<td>V. TURBO JET CLASS</td>
<td>11</td>
</tr>
<tr>
<td>VI. EMPLOYEES IN MANUFACTURING ESTABLISHMENTS</td>
<td>13</td>
</tr>
<tr>
<td>VII. COMPARATIVE LISTING OF EMPLOYEES IN WHOLESALE-RETAIL TRADE AND FINANCE-INSURANCE AND REAL ESTATE FOR 1955-1965 IN FOUR REPRESENTATIVE STATES</td>
<td>14</td>
</tr>
<tr>
<td>VIII. PER HOUR OPERATING COST</td>
<td>21</td>
</tr>
<tr>
<td>IX. EARNINGS PER YEAR AND VMH</td>
<td>22</td>
</tr>
<tr>
<td>X. FLIGHT TIME COMPARISON, KANSAS CITY TO CHICAGO</td>
<td>23</td>
</tr>
<tr>
<td>XI. FLIGHT TIME COMPARISON, KANSAS CITY TO CHICAGO</td>
<td>28</td>
</tr>
<tr>
<td>XII. FLIGHT TIME COMPARISON, WICHITA TO HUNTSVILLE</td>
<td>29</td>
</tr>
<tr>
<td>XIII. FLIGHT TIME COMPARISON, WICHITA TO HUNTSVILLE</td>
<td>31</td>
</tr>
<tr>
<td>XIV. CHICAGO TO SAN FRANCISCO</td>
<td>35</td>
</tr>
<tr>
<td>XV. LEG #2, SAN FRANCISCO TO BOISE</td>
<td>35</td>
</tr>
<tr>
<td>XVI. BOISE TO DENVER</td>
<td>36</td>
</tr>
<tr>
<td>XVII. FLIGHT TIME COMPARISON, BUTTE TO SAN FRANCISCO</td>
<td>64</td>
</tr>
<tr>
<td>XVIII. BUTTE TO GLASGOW TO BUTTE</td>
<td>67</td>
</tr>
</tbody>
</table>
### LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comparison of Standard Metropolitan Areas, 1949 and 1967</td>
<td>16</td>
</tr>
<tr>
<td>2. Cost Comparison, Kansas City to Chicago (A)</td>
<td>24</td>
</tr>
<tr>
<td>3. Cost Comparison, Kansas City to Chicago (B)</td>
<td>26</td>
</tr>
<tr>
<td>4. Cost Comparison, Kansas City to Chicago (C)</td>
<td>27</td>
</tr>
<tr>
<td>5. Cost Comparison, Wichita to Huntsville (A)</td>
<td>30</td>
</tr>
<tr>
<td>6. Cost Comparison, Wichita to Huntsville (B)</td>
<td>32</td>
</tr>
<tr>
<td>7. Cost Comparison, Wichita to Huntsville (C)</td>
<td>33</td>
</tr>
<tr>
<td>8. Cumulative Cost Comparison for Chicago-San Francisco-Denver-Chicago</td>
<td>38</td>
</tr>
<tr>
<td>9. Cost Comparison, Butte to San Francisco</td>
<td>66</td>
</tr>
<tr>
<td>10. Cost Comparison, Butte to Glasgow to Butte</td>
<td>68</td>
</tr>
<tr>
<td>11. Cost Comparison, Butte to Denver</td>
<td>70</td>
</tr>
</tbody>
</table>
INTRODUCTION

Business in the United States is a product of the environment and the people that live in it. It is a competitive system that requires a high level of economic excellence from the people that participate. The profit system and consumer acceptance of products are unexcelled economic judges of a business action in the market place. In a macro sense much of the story of the business world is contained in the Balance Sheet and Income Statements of all the firms in the country. The entries in these reports are a reflection of the men who make the decisions that determine what will take place in each of the millions of firms. When considered in the micro sense or that of the individual entrepreneur, business becomes a reflection of a way of life; a way of life whose movements are dictated by the combined actions of the individual men in search of self satisfaction in the business community. This drive for self satisfaction is instrumental in the business community, but it always operates in an environment whose parameters are set by the judges of profit and loss.

The economic picture of the United States is a mosaic that is continually changing to mirror the ebb and flow of activities and the movement of people as they respond to opportunities. Man, adapting to this ever-changing environment, has produced a machine for conveyance that is gaining acceptance in the business world, the airplane.

In describing the role the airplane plays in business, this paper will deal with five areas. Chapter I will be a description of
business flying and its magnitude. The airplane will be defined as part of a system. Technology in the light plane industry has played a role in the business community's decision to incorporate the airplane in its operation. The current status of this technology will be shown in a description of the 1967 models of the light airplanes and their performance. Chapter II describes the changing picture of industrial location in the United States, with text, figures and maps, that has taken place since the end of World War II. Chapter III is an economic analysis of the employment of business airplanes. It incorporates time comparison for airlines and business airplanes and a graphic cost comparison analysis for showing the equal cost points of using the airlines and the business airplane on a variety of different missions. The fourth chapter deals with the motivations of business men. It cites the reasons why business men do the things they do and what the implications of their actions are. As in Chapter III, theoretical analysis by qualified people in the field with a direct relation to flying is nonexistent, but an oblique relation can be established between what exists in the more popular journals and the original research in the scientific journals. Chapter V consists of illustrative cases from the literature and a review of Montana's aviation fleet, with a case analysis of a Montana firm and its use of the airplane. Chapter VI is a summary and conclusions.
CHAPTER I

BUSINESS FLYING

Business aviation as we shall use it here will be the travel situation where an airplane is employed and the firm or individual using it controls the schedule, the itinerary and the route that the vehicle follows. This definition excludes scheduled airlines, but does not imply ownership; thus, ownership, leasing, rentals or charters are a legitimate means of control by the user of the airplane. The important consideration is the role or contribution the airplane has in the corporation or individual enterprise. To limit further the considerations such special use airplanes as agricultural will be excluded even though they have a relevant business function. The analysis will be confined to the role played in the overall management or sales function of the firm. Much of what will be presented will be true for other forms of transportation. The great distinguishing feature of the airplane is speed. This is the factor which accounts for most of the increase in aviation in business.

The airplane is part of a system. This system has three principal components: the ground environment, the pilot or crew, and the airplane. Remove any one of these components and the system is non-functional and, conversely, strengthen or enlarge any of the components and the total capability of the system is enlarged. A brief description of the ground environment and the pilot are necessary for an understanding of the system.
The airplane's mission starts on the ground, ends on the ground, and while airborne its path of flight is determined by visual reference to terrain features or artificial navigational aids provided by radio and radar. An almost necessary feature of the ground environment is the airport. In 1966 in the United States there were 9,566\(^1\) airports listed with the Federal Aviation Agency (FAA). This is an increase of 3,817 airports since 1947.\(^2\) Of these airports 1,521\(^3\) have runway lights for night operations, and 1,357\(^4\) are paved. Of these airports, 1,235\(^5\) have runways of 5,000 feet or greater in length.\(^6\) In this airport system 364\(^7\) of them have either radio instrument landing systems or precision approach radar for all-weather operations. The principal radio navigation aid in the United States is the Visual Omni Range (VOR) which provides information on direction and distance to the station. There are 867\(^8\) of these stations located throughout the nation. Other significant features of the ground environment are the 28 airtraffic control centers, the 226 airport towers and the 331 flight service stations.\(^9\)

\(^2\)Ibid.
\(^3\)Ibid.
\(^4\)Ibid.
\(^5\)Ibid.
\(^6\)While runway length is not a critical factor in the operation of most light planes used by business, it does become important in the operation of the heavy twins and turbo jets, which have requirements of 2,500 feet for the heavy twins and 5,000 feet for the turbo jets.
\(^7\)FAA Statistical Handbook, op. cit., p. 32.
\(^8\)Ibid.
\(^9\)Ibid.
The airplane can only operate efficiently in conditions that correspond to the pilot's flying abilities. The capabilities of pilots vary from those who can operate only in day-visual conditions to crews that maintain airline proficiency and training standards. Unfortunately, the pilot is often the limiting factor in the capability of the system.

The third component of our system is the airplane. Any airplane that a businessman uses in the pursuit of his business can be classified as a business airplane. This takes in a wide variety of different makes and models, ranging from Piper Cubs to jets. The only real requirement is that the plane's predominant use be in the pursuit of business activities. This defines a business airplane as a factor of utilization, not of make and model.

Business aviation is in its infancy compared to other forms of transportation. These business aircraft are largely a post World War II phenomenon. From a small fleet of 400 in 1940, the number had grown to 10,000 in 1953. In 1946 businessmen flew 1,068,000 hours. By 1965 this figure had increased to 5,857,000 hours and comprised 35 percent of the flying that was done during that year. FAA forecasts indicate a 15 percent increase in the number of hours flown by businessmen and a 10 percent increase in the number of airplanes used in business by

---

12 Ibid.
14 Ibid., p. 20.
1969. Business aviation has been and is forecast to continue to be the largest sector of general aviation.\(^\text{15}\)

In 1966 the Federal Aviation Agency listed 95,442 active general aviation airplanes.\(^\text{16}\) This is an increase of 57,653 over the 37,789\(^\text{17}\) general aviation airplanes listed in 1966. Of these 95,442 airplanes, 21,127 are registered in the names of businesses and are treated in aviation statistics as "the business fleet." This number is deceptive in that limiting business airplanes only to those registered to businesses excludes a large number that are registered to individuals who use them for business purposes and to companies that specialize in lease, charters and rentals to individuals for business purposes. Estimates of the total business fleet usually place the number at 40,000 for 1966.\(^\text{19}\) An estimated 50 percent of the remaining 55,000 are used to some extent in business activities. It is estimated that these business airplanes were flown 5,857,000 hours\(^\text{20}\) for a total of 1,204,321,000 miles\(^\text{21}\) in 1966.

Safety is an important consideration in the analysis of a mode of transportation. In 1965 there were 5,250 accidents\(^\text{22}\) in general aviation.

\(^{15}\)Ibid., p. 1.

\(^{16}\)FAA Statistical Handbook, op. cit., p. 95.

\(^{17}\)General aviation airplanes are distinguished from those owned by certified air carriers.


\(^{21}\)Ibid.

aviation airplanes; \(^{23}\) of these involved fatalities with 1,018 deaths resulting. This is .20 fatal accidents for every 100 million plane miles flown and .40 fatalities for every 100 million plane miles flown. During the same time period the air carriers had 82 accidents, of which nine involved 261 fatalities.\(^{24}\) The automobile fatality rate was 5.6 persons per 100 million vehicle miles in 1965.\(^{25}\)

The business fleet has had three eras as far as development of equipment is concerned. From the end of World War II until the early 1950's the fleet was comprised largely of surplus military airplanes. These planes, purchased from the government, were converted to civilian transports and placed on the market by a large number of firms. These early aircraft, the DC-3, B-23, Lockheed Lodestar, Twin Beechcraft, saw and still see extensive service in corporate fleets. In the early 1950's there appeared on the market the first of what was destined to be a long expanding line of aircraft designed specifically for the business fleet. These early entries were Beechcraft's Twin Bonanza and Aero Commander's model 520. These were quickly followed by Cessna's model 310 and Piper's Apache. In 1958, another new era in business flying began with the delivery of the first corporate jet. The Lockheed Jet Star and North American Saberliner were the first to appear in the business fleet. These have been joined by three more domestic and three foreign entries. These planes, costing from $650,000 to more

\(^{23}\text{Ibid.}\) \(^{24}\text{Ibid.}\) \(^{25}\text{Statistical Abstract of the U.S., 1966, op. cit., p. 576. Fatalties per 100 million vehicle miles traveled are comparable in the light plane and the automobile because of their similar carrying capacity.}\)
than $2 million represent the ultimate of the current business fleet.

While the business airplane can be any airplane used in the pursuit of a business, in practicality they tend to be the larger and faster models of the general aviation fleet. The business fleet is made up of 574 jets, 9,795 multi-engine, approximately 16,000 single engine with four seats and over 200 hp., 12,000 single engine with four seats and less than 200 hp., and 1,000 single engine with 60 to 150 hp. and one to three seats.

The currently manufactured aircraft that contribute to the business fleet can be divided into five principal divisions: light single engine, high performance single engine, light twin engine, heavy twin engine and turbo props, and the fifth class, the new jets. The classes are divided on the basis of their physical features and their performance. The light single engine class is predominantly four place, has a non-retractable landing gear and has a cruising speed of 130 to 160 miles per hour. The high performance single engine planes are four to six place, have a retractable landing gear and cruise between 180 and 220 mph. The light twin engine class is generally four to six place. The heavy twins and turbo prop class are eight to twenty place aircraft. The jets are four to twelve place. The characteristics, performance and price are contained in Tables I through V.26

To the prices in the tables, except where footnoted differently, the price of instrumentation and radios must be added. Some typical examples for the single engine categories are: $1800 for instrumentation

---

### TABLE I
LIGHT SINGLE ENGINE CLASS

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number of Seats</th>
<th>Cruising Speed</th>
<th>Range (in miles)</th>
<th>Base Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero Commander</td>
<td>100</td>
<td>4</td>
<td>130</td>
<td>650</td>
<td>$8,500</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>Musketeer</td>
<td>4</td>
<td>138</td>
<td>906</td>
<td>15,250</td>
</tr>
<tr>
<td>Cessna</td>
<td>172</td>
<td>4</td>
<td>130</td>
<td>600</td>
<td>12,450</td>
</tr>
<tr>
<td>Cessna</td>
<td>182</td>
<td>4</td>
<td>162</td>
<td>650</td>
<td>17,995</td>
</tr>
<tr>
<td>Cessna</td>
<td>Super Skyline 6</td>
<td>4</td>
<td>174</td>
<td>810</td>
<td>23,995</td>
</tr>
<tr>
<td>Piper</td>
<td>Cherokee</td>
<td>2-6</td>
<td>143</td>
<td>725</td>
<td>12,900</td>
</tr>
</tbody>
</table>

1"General Aviation Aircraft--1967," op. cit. This list excludes all aircraft with less than four seats because of the minor contribution they make to the business fleet.

2Does not include radios or other electronic equipment.

3The basic model has three variations dependent on horsepower.

4The basic model has seven variations dependent primarily on HP.

### TABLE II
HIGH PERFORMANCE SINGLE ENGINE

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number of Seats</th>
<th>Cruising Speed</th>
<th>Range (in miles)</th>
<th>Base Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero Commander</td>
<td>200</td>
<td>4</td>
<td>214</td>
<td>1,230</td>
<td>$29,500</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>Bonanza</td>
<td>4</td>
<td>203</td>
<td>539</td>
<td>32,500</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>Debonair</td>
<td>4</td>
<td>185</td>
<td>535</td>
<td>27,450</td>
</tr>
<tr>
<td>Bellanca</td>
<td>260C</td>
<td>4</td>
<td>196</td>
<td>800</td>
<td>22,950</td>
</tr>
<tr>
<td>Cessna</td>
<td>210</td>
<td>4-6</td>
<td>192</td>
<td>1,090</td>
<td>27,975</td>
</tr>
<tr>
<td>Mooney</td>
<td>Model 21</td>
<td>4</td>
<td>180</td>
<td>929</td>
<td>18,250</td>
</tr>
<tr>
<td>Piper</td>
<td>Commanche</td>
<td>4</td>
<td>182</td>
<td>1,108</td>
<td>24,990</td>
</tr>
<tr>
<td>Waco</td>
<td>S220</td>
<td>4</td>
<td>175</td>
<td>700</td>
<td>19,850</td>
</tr>
</tbody>
</table>

1"General Aviation Aircraft--1967," op. cit.

2Does not include radios or other electronic equipment.
### TABLE III

**LIGHT TWIN ENGINE CLASS**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number of Seats</th>
<th>Cruising Speed</th>
<th>Range (in miles)</th>
<th>Basic Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero Commander</td>
<td>500d</td>
<td>4-8</td>
<td>218</td>
<td>900</td>
<td>$94,500</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>D95A</td>
<td>4-5</td>
<td>200</td>
<td>1035</td>
<td>52,000</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>B55</td>
<td>4-6</td>
<td>225</td>
<td>780</td>
<td>63,950</td>
</tr>
<tr>
<td>Cessna</td>
<td>Super Skymaster</td>
<td>4</td>
<td>192</td>
<td>765</td>
<td>42,500</td>
</tr>
<tr>
<td>Cessna</td>
<td>310</td>
<td>4-6</td>
<td>222</td>
<td>799</td>
<td>61,950</td>
</tr>
<tr>
<td>Cessna</td>
<td>320</td>
<td>4-6</td>
<td>260</td>
<td>845</td>
<td>82,500</td>
</tr>
<tr>
<td>Cessna</td>
<td>406</td>
<td>6-8</td>
<td>240</td>
<td>694</td>
<td>96,500</td>
</tr>
<tr>
<td>Piper</td>
<td>Twin Comanche</td>
<td>4-6</td>
<td>223</td>
<td>1425</td>
<td>45,680</td>
</tr>
<tr>
<td>Piper</td>
<td>Aztec</td>
<td>6</td>
<td>206</td>
<td>1055</td>
<td>55,990</td>
</tr>
</tbody>
</table>

1"General Aviation Aircraft—1967," op. cit.
2Basic price does not include radios or other electronic equipment.

### TABLE IV

**HEAVY TWIN ENGINE CLASS**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number of Seats</th>
<th>Cruising Speed</th>
<th>Range (in miles)</th>
<th>Basic Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero Commander</td>
<td>Grand Commander</td>
<td>5-11</td>
<td>224</td>
<td>950</td>
<td>$146,900</td>
</tr>
<tr>
<td>Aero Commander</td>
<td>Turbo Commander</td>
<td>5-13</td>
<td>285</td>
<td>1100</td>
<td>299,950</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>A90</td>
<td>6-9</td>
<td>224</td>
<td>1100</td>
<td>407,500</td>
</tr>
<tr>
<td>Beechcraft</td>
<td>A65-88 &amp; B80</td>
<td>6-9</td>
<td>210</td>
<td>1250</td>
<td>176,000</td>
</tr>
<tr>
<td>Cessna</td>
<td>411</td>
<td>6-8</td>
<td>246</td>
<td>1190</td>
<td>108,950</td>
</tr>
<tr>
<td>Piper</td>
<td>PA-31</td>
<td>6-8</td>
<td>210</td>
<td>1240</td>
<td>89,500</td>
</tr>
</tbody>
</table>

1"General Aviation Aircraft—1967," op. cit.
2Basic price does not include radios or other electronic equipment.
TABLE V
TURBO JET CLASS

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number of Seats</th>
<th>Cruising Speed</th>
<th>Range (in miles)</th>
<th>Base Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aero Commander</td>
<td>1121</td>
<td>6-9</td>
<td>503</td>
<td>1593</td>
<td>$595,000</td>
</tr>
<tr>
<td>Lear</td>
<td>24</td>
<td>8</td>
<td>526</td>
<td>1920</td>
<td>649,000</td>
</tr>
<tr>
<td>Lockheed</td>
<td>Jet Star</td>
<td>10-12</td>
<td>500</td>
<td>2400</td>
<td>1,700,000</td>
</tr>
<tr>
<td>North American</td>
<td>Saberliner</td>
<td>4</td>
<td>532</td>
<td>1890</td>
<td>795,000</td>
</tr>
</tbody>
</table>

1"General Aviation Aircraft--1967," op. cit.
2 Only the Lear jet model 24 price includes radios and electronics.

and $1380 for radios in the light single engine group, 27 and in the high performance single engine $2600 for instrumentation and $3800 for radios. 28 In the twin engine categories the equipment becomes more sophisticated, and thus more expensive. The light twin engine group usually includes instrumentation in the basic price and $19,000 for radios. 29 An electronic installation on a heavy twin or turbo prop will be approximately $60,000 30 including weather radar and a transponder. No published prices are available for pure jet electronics installations.

---

27 Prices from Standard Packages for Piper Aircraft.
28 Prices from Standard Packages for Piper Aircraft.
29 Prices from Standard Packages for Cessna 310L. This includes two very high frequency transmitters and receivers, distance measuring equipment, automatic direction finder and a glide slope receiver.
30 Price from Standard Package for Cessna 411A.
CHAPTER II

INDUSTRIAL GROWTH

Since the end of World War II there has been a profound change in the distribution and magnitude of American industry. World War II provided an early impetus to migration, as the Army and Navy encouraged the location of as many plants as possible away from the Atlantic Coast. This migration initially benefited such areas as Dallas, Wichita, Des Moines, Atlanta, Kansas City, Los Angeles and others in the West and South. In 1948 over one-half of the new plant construction was in the West and South.

The size of city needed for a new location was largely determined by the nature of the industry. The movement to small cities has been strong in some lines, particularly those such as the electrical equipment industry and others that do not require large investments. Many locations are made in smaller cities because of lack of space in larger cities.

This migration has had a way of feeding itself. New auto assembly plants, for example, may be located in Atlanta or Los Angeles because of the trained labor force and the parts suppliers that have grown up in the area. Once plants are established they attract new manufacturers, which provide new markets for steel, building materials and machine tools. The circle expands again when new workmen are attracted and population increases, demanding more goods and services. One careful distinction to make is that this migration is one of growth and not a
wholesale abandonment of existing facilities. Some notable exceptions are the decline in textiles in the north and a shift in lumbering to the West and pulp and paper to the South.

The primary geographical trend has been the rapid growth of manufacturing in the West and South and comparative loss in manufacturing in the northeast.\(^1\) There are several indicators that demonstrate this change in the levels of manufacturing in the particular areas. By using the number of employees in manufacturing as an index of the level of activity, Table VI shows the relative changes in employees in the four primary statistical areas of the United States.

**TABLE VI**

**EMPLOYEES IN MANUFACTURING ESTABLISHMENTS\(^1\)**

<table>
<thead>
<tr>
<th>Area</th>
<th>1948 (in thousands)</th>
<th>1955</th>
<th>1965</th>
<th>Percent Change 1948-1965</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>5,713.9</td>
<td>5,620</td>
<td>5,617</td>
<td>-1.8%</td>
</tr>
<tr>
<td>North Central</td>
<td>5,364.3</td>
<td>5,798.7</td>
<td>5,930</td>
<td>+11.3%</td>
</tr>
<tr>
<td>South</td>
<td>3,022.0</td>
<td>3,404.8</td>
<td>4,416</td>
<td>+31.6%</td>
</tr>
<tr>
<td>West</td>
<td>1,205.9</td>
<td>1,647.2</td>
<td>2,075</td>
<td>+41.4%</td>
</tr>
</tbody>
</table>


The West had the most rapid growth with a 41.4 percent increase in the number of manufacturing employees, while the northeast showed a decrease of 1.8 percent. It has been demonstrated by Fuches\(^2\) that using

\(^1\) This is a comparative loss in that the rate of increase has dropped below that which is average for the U.S.

value added by manufacturing provides the same picture of dispersal of growth as that demonstrated by manufacturing employees.

All parts of the country have shown marked increases in the areas of finance, insurance and real estate, and wholesale and retail trade, but the rate of increase is largest in those areas with the largest increases in manufacturing employees. Some representative examples of these increases are shown in Table VII. Here again the West and South have the highest rate of growth. Another indicator of the changing economic picture in the United States is the decrease in the number of people employed in agriculture. In 1947 there were 8,266,000 agricultural employees. By 1965 this number had decreased to 5,128,000.

**TABLE VII**

**COMPARATIVE LISTING OF EMPLOYEES IN WHOLESALE-RETAIL TRADE AND FINANCE-INSURANCE AND REAL ESTATE FOR 1955-1965 IN FOUR REPRESENTATIVE STATES**

(In Thousands)

<table>
<thead>
<tr>
<th>State</th>
<th>Wholesale-Retail Trade</th>
<th>Finance-Insurance-Real Estate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Employees</td>
<td>% Change</td>
</tr>
<tr>
<td></td>
<td>1955</td>
<td>1965</td>
</tr>
<tr>
<td>California</td>
<td>908.3 1,271</td>
<td>+28.7</td>
</tr>
<tr>
<td>Kansas</td>
<td>132.2 140</td>
<td>+5.1</td>
</tr>
<tr>
<td>New York</td>
<td>1,293.0 1,337</td>
<td>+3.3</td>
</tr>
<tr>
<td>North Carolina</td>
<td>207.0 259</td>
<td>+25.1</td>
</tr>
</tbody>
</table>


4Ibid., 1966, p. 221.
Fuches lists some of the important factors influencing these changes in location as being climate, labor, and the availability of raw material. Other considerations in the geographical expansion are markets, transportation, transportation costs, governmental expenditures and a supporting role of availability of power. Each of these either singularly or in combinations have been instrumental in the changing geographic pattern of industry.

Figure 1 is a comparison of populations for a 10-year period and will show the increases in the standard metropolitan areas between 1949 and 1965. The market increases in the West Coast and Southern states are readily apparent. There are also significant increases in the Central plains and Western states. These new population centers are indicative of new industrial and commercial activities in these areas and will account for much of the new locations in the United States' industrial decentralization. The redistribution of industrial growth has created a picture of our country that shows a filling in of the mid-sections with industrial and commercial growth and a rapid growth of the same activities on the West Coast and in Southern states.

The change in the industrial scene creates a new type of control problem for the firm. As its activities expand and as frequently happens, it changes from a local to regional or national firm, the methods of organization have to change. There are several ways for them to organize, depending on the nature of the business, and much of the control

---


Figure 1. Comparison of Standard Metropolitan Areas, 1949 and 1967.

From County and City Data Book, 1949, p. vii; County and City Data Book, 1967, p. xiii.
of these outlying divisions can be maintained by financial reporting procedures. Smith⁷ in his investigations of the management of geographically decentralized companies found no company where the chief executive relied solely on financial reports to check on the local organizations. Always, reports were supplemented by visits and meetings, formal and informal, regular and occasional, held at headquarters and in the field. These chief executives often express the view that frequent personal conversations between them and their field officers are highly desirable. Without them it is difficult for the head of the firm to know his men, to sense their feelings or to impress his views and attitudes on them. These visits help to solve one of the biggest problems in geographically decentralized companies, that of poor communications. These visits help to insure a two-way flow of communication and not the one-way flow that can result from the use of financial reports as the only means of communicating.

These visits from the central office can be manifested in many ways: visits from the chief executive, lesser managers and staff people. These visits can be routine or the result of a request for assistance by the outlying facility, or a premonition of a problem by the central office.

There are, of course, several ways a manager can get to these decentralized facilities. Among these would be the commercial airlines and the business airplane. In 1962, 575⁸ U. S. cities were serviced by


the scheduled airlines. Only 23 of these are major hub airports with a convenient and frequent schedule of flights. A considerable number of the rest of the communities are limited to two or three flights a day. With the geographic expansion that has taken place and the limited commercial air transportation available, the businessman has adapted all means of transportation to help him control his enterprise. No matter what the nature of the trip, the possibility that a business airplane can be employed is apparent. The economics of the airplane's employment will be analyzed and in many cases these trips can be profitably made in a business airplane.
CHAPTER III

ECONOMICS

The principal interest in an economic analysis of the business airplane is a study of the economics of time and money. The analysis will be confined to a comparison of the business airplane versus the airlines. It is implicit in this discussion that the businessman has decided to fly. Economic comparison, then, will be between only the business airplane and airlines. Research into the travel requirements of companies has been conducted and the general mission can be defined. To support the analysis the costs of the business airplane will be defined on a per hour basis. The individuals being carried in the transports can be assigned a value and a formula to determine the value of a man-hour to the firm will be shown. The format in each of the several cases to be presented will be a comparison of the time involved, a comparison of direct operating costs and, finally, a comparison of operating costs with the value of a man-hour added.

The light plane industry has a research program to define the travel needs of U. S. companies to assist the aircraft manufacturers in designing their products. The market research division of Beech Aircraft Company supplied figures\(^1\) from surveys they made of several groups

\(^1\)Unpublished cumulative data from the Beech Aircraft Company Market Research Department. Only summary information was supplied. The companies involved or their numbers were not given. They did indicate that these requirements were used in the design requirements of the current product.

19
of companies in determining their travel needs. In this study it was found that of the eastern public utilities management group’s travel patterns 91.6 percent of the trips were in a radius of 600 miles of their office. A representative group of light manufacturers were questioned and it was determined that 89 percent of their travel was in an 800-mile radius of the home office. Several fully integrated metal producers were investigated and, again, 70.2 percent of their travel requirements was in an 800-mile radius of their headquarters. Generally, then, the mission assigned to the business airplane will be 800 miles or less.

Business airplanes can be analyzed for cost purposes along the same lines used to divide them in the equipment section. These classes were: the light single engine, the heavy single engine, the light twin engine, the heavy twin engine and turbo props, and the jets. Only generalities can be discussed in any analysis of operating costs. As Cessna Aircraft Company² pointed out, there is so much variation in such things as insurance, storage fees, airport use fees, that published data using nation-wide averages can provide only broad guide lines for analysis. In each group the operating figures for the individual models are generally the same (Table VIII).

The National Association of Accountants computed the value of a business employee at two and one-half times his annual salary divided by 2,000 working hours,³ or value per man hour (V.M.) = \( \frac{2.5 \times \text{yearly earnings}}{2,000 \text{hours}} \).

²Personal letter from T. S. Dean, Marketing Research Division, Cessna Aircraft Co.

³This formula and its attribution to the nAA is contained in a reprint of an article, "How to Assess Your Need for a Company Airplane,"
### Table VIII

**PER HOUR OPERATING COST**

<table>
<thead>
<tr>
<th>Class</th>
<th>Per Hour operating Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light single engine</td>
<td>$14.53 (^1)</td>
</tr>
<tr>
<td>Heavy single engine</td>
<td>22.32 (^2)</td>
</tr>
<tr>
<td>Light twin engines</td>
<td>39.06 (^3)</td>
</tr>
<tr>
<td>Heavy twin engines and turbo prop</td>
<td>184.82 (^4)</td>
</tr>
<tr>
<td>Turbo jet</td>
<td>260.00 (^5)</td>
</tr>
</tbody>
</table>

\(^1\) All figures (1-5) include a depreciation figure based on a residual value of the airplane of 50 percent after 5 years. Straight line depreciation is used. Piper Aircraft Cherokees 180 for 400 hrs/year supplied by Piper Aircraft Company.

\(^2\) Piper Aircraft Comanche 2603 for 400 hrs/year supplied by Piper Aircraft Company.

\(^3\) Piper Aircraft Aztec for 400 hrs/year. Supplied by Piper Aircraft Company.

\(^4\) Beechcraft King Air A90 for 400 hrs/year, supplied by Beech Aircraft Company.

\(^5\) Lear Jet Model 24, for 400 hrs/year supplied by Lear Jet Industries.

Some representative computations that will be used in the analysis are shown in Table IX. These V/H values will be used in the final cost comparison of the airlines versus business airplanes.

---

in a 1964 issue of Business Management, supplied by Cessna Aircraft Co. A search of the MAA Journals failed to produce a paper where this formula was derived or discussed. The same approach is used by H. W. Ryan in "Economics of Business Aircraft" (unpublished). I feel that this figure does not represent the employee's productivity but more likely his cost to the firm in salary, benefits and materials utilized.
For comparative case analysis of the operation of a business airplane and the airlines, a route from Kansas City to Chicago will be used. This route was selected because of the heavy traffic between them. Also, because the distance between them is approximately the same as that between: New York and Cleveland; Atlanta and New Orleans; Dallas and Memphis; San Francisco and San Diego.

These parameters are established in making the time comparison:
1. Best carrier schedules as defined by the Official Airline Guide.
2. A single engine 200 mph general aviation airplane is used. The block speed\(^1\) for the trip is 180 mph. The direct operating cost is $25/hour.
3. The business airplane lands at Meigs Field on the Lake Front rather than at O'Hare.

---
\(^{1}\)Block speed is the average speed that is attained from take-off to landing.
The time comparison for the two flights is shown in Table X.

### TABLE X

**FLIGHT TIME COMPARISON, KANSAS CITY TO CHICAGO**

<table>
<thead>
<tr>
<th></th>
<th>Airline</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>office to Airport</td>
<td>:15</td>
<td>:15</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Enroute time</td>
<td>1:10</td>
<td>2:00</td>
</tr>
<tr>
<td>Deplaning time</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Airport to office</td>
<td>:30</td>
<td>:15</td>
</tr>
<tr>
<td></td>
<td>2:55</td>
<td>2:50</td>
</tr>
</tbody>
</table>

As the time comparison in Table X indicates, there is only a 5-minute differential between the business airplane and the airlines. This is not enough of a time advantage to warrant the use of the business airplane.

For the examination of costs comparison analysis can be used. As shown in Figure 2, it is more economical for one person to make the trip by airlines. The figure also introduces a new concept of load factor. The operating costs are fixed for one passenger or up to the capacity of the airplane, thus the intersection of the ticket cost line and the operating cost line is the point where the airline expense is equal to that of the operating cost of the business airplane. This intersection will be referred to as the equal cost point. While additional passengers are carried by the business airplane at no additional "out of pocket" costs, travel costs by the airlines increases
Figure 2. Cost Comparison, Kansas City to Chicago (A)
arithmetically with the load factor. This is an illustration of the savings that can be made with a business airplane. A load factor in excess of 1.5 (2.0)\(^5\) makes the use of a business airplane of this type feasible on a trip of this length.

A new dimension is introduced by the addition of \(\text{V}\text{H}\) (value of a man-hour) as previously discussed. A \(\text{V}\text{H}\) figure of $12.50 an hour will be used (the \(\text{V}\text{H}\) of $10,000/year). When the \(\text{V}\text{H}\) figure is incorporated in the cost comparison, the slope of the curve becomes steeper and the breakeven point moves to the left, reducing the load factor (see Figure 3).

For demonstration purposes a slower airplane with a lower operating cost will be used to demonstrate the changes that take place. The new airplane will have an operating cost of $10/hour and a block speed of 125 mph. This corresponds to the operating cost and speed of the light single engine group. The time comparison, as shown in Table XI, shows 1 hour, 10 minutes, more for the trip when a business airplane of this class is used.

Figure 4 shows that on a direct cost comparison the business airplane is cheaper than the airline ticket for such a trip. Without considering the value of the time of the people riding in the airplane, the business airplane is less expensive, but Figure 4 also shows that, when \(\text{V}\text{H}\) is added, the slower operating speed of the business airplane then requires a load factor of 1.5 (2.0) or greater to be economically feasible.

\(^5\)A fraction of a passenger cannot be carried. In this and further references to load factors, the equal cost point will be given as a decimal with the rounded number in parentheses following it. Rounding will always be to the next higher number.
Figure 3. Cost Comparison, Kansas City to Chicago (B)
Figure 4. Cost Comparison, Kansas City to Chicago (C)
### TABLE XI

**FLIGHT TIME COMPARISON, KANSAS CITY TO CHICAGO**

<table>
<thead>
<tr>
<th></th>
<th>Airline</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office to Airport</td>
<td>:15</td>
<td>:15</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Enroute time</td>
<td>1:10</td>
<td>3:15</td>
</tr>
<tr>
<td>Deplaning time</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Airport to office</td>
<td>:30</td>
<td>:15</td>
</tr>
<tr>
<td></td>
<td>2:55</td>
<td>4:05</td>
</tr>
</tbody>
</table>

1 Flight times are from *Official Airline Guide* for the airlines and computed direct route distance at 150 mph., for the business airplane. All other times are estimates.

This series has shown the effects of time, load factor, ViH and speed on the economic comparison of the business airplane and the airlines. This comparison is over a route that provides a considerable number of nonstop jet flights daily and is comparable to a number of routes in both length and airline coverage that businessmen would frequently take in this country.

Stage length, or the total distance involved in the flight, is a factor which must be considered in determining the economic feasibility of a business airplane. As the stage length changes, the economics of time and money change, even though the equipment and load factors remain the same.

An example of a longer stage length would be Wichita to Huntsville, Alabama, which is about 630 miles. The airplane will be the same
29

200 mph. single engine airplane at $25/hour used in the previous example. The time comparison of Table XII shows a 1 hour, 39 minute, advantage using the business airplane.

**TABLE XII**

**FLIGHT TIME COMPARISON, WICHITA TO HUNTSVILLE**

<table>
<thead>
<tr>
<th>Flight Route</th>
<th>Airlines</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office to Airport</td>
<td>:15</td>
<td>:10</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Enroute time</td>
<td>7:09</td>
<td>3:15</td>
</tr>
<tr>
<td>Deplaning time</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Airport to office</td>
<td>:15</td>
<td>:15</td>
</tr>
<tr>
<td></td>
<td>8:39</td>
<td>4:00</td>
</tr>
</tbody>
</table>

1 All airline routings necessitate a minimum of three flights. Flight time for the airlines is from the Official Airline Guide. The direct route distance at 180 mph. is used for the business airplane.

A new and important factor is introduced here, the difficulty of getting to off-line destinations. The continuing decentralization described in Chapter II increases the importance of this as a measurable factor.

Figure 5 shows the direct cost comparison equal cost point to be a load factor of about 1.4 (2.0). When V/H is incorporated the trip is economical in the business airplane regardless of the load factor.

When the slower $10/hour 125 mph. airplane is substituted there is still economic justification when only direct operating costs are compared. When V/H is added the slower plane still is more economical,
Figure 5. Cost Comparison, Wichita to Huntsville (A)
but the trip has taken 2 hours longer than in the 200 mph airplane.
This 2-hour factor is cancelled out costwise by the lower operating
costs of the slower airplane. Table AIII and figure 6 show the analy-
sis of this case.

TABLE AIII
FLIGHT TIME COMPARISON, WICHITA TO KNOXVILLE

<table>
<thead>
<tr>
<th></th>
<th>Airline</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office to Airport</td>
<td>1:15</td>
<td>1:10</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>2:30</td>
<td>2:10</td>
</tr>
<tr>
<td>Inroute time</td>
<td>7:09</td>
<td>5:15</td>
</tr>
<tr>
<td>Deplaning time</td>
<td>3:30</td>
<td>3:10</td>
</tr>
<tr>
<td>Airport to office</td>
<td>3:15</td>
<td>3:15</td>
</tr>
<tr>
<td></td>
<td>5:39</td>
<td>5:00</td>
</tr>
</tbody>
</table>

Flight times are from the Official Airline Guide for the airlines,
and direct route distance at 125 mph. for the business airplane. All
other times are estimates.

In recognition of the importance of the time factor and the in-
creased utility of all-weather capability, an evaluation of the economic
feasibility of using a faster twin-engine airplane for the mission can
be made. Here the operating costs have been increased to $30/hour and
the speed to 217 mph. The immediate results are that the breakeven
point generated by direct operating expenditures has increased to a
load factor of three (Figure 7). Then V.A. is incorporated the break-
even load factor is reduced to slightly under two. This demonstrates
the economic justification for using a heavy twin-engine plane if the
load factor is two or more.
Figure 6. Cost Comparison, Wichita to Huntsville (B)
Figure 7. Cost Comparison, Wichita to Huntsville (C)
A summary case using the factors in the economics of business airplane operation that have been demonstrated will be a trip across the United States and back to its point of origin with several intermediate stops. On this trip the business airplane used will be a jet. A time comparison will be made on each leg of the trip, but only one graphic cost analysis will be made for the entire trip at the end of the case. The trip will be from corporate headquarters in Chicago to the western division office in San Francisco. The company is a paper producer. Its personnel will stop at Boise, Idaho, for a conference with a supplier of kraft pulp, at Denver, Colorado, for a meeting with regional sales personnel and then return to Chicago.

The business airplane departs Chicago's Meigs field at 5:30 AM on Monday morning. The first airline flight to the West Coast does not leave Chicago until 8:45 AM. Those business men traveling in the business airplane arrive in downtown San Francisco at 8:30 AM, Pacific time and at 12:00 from the airline flight. Table XIV shows a comparison between the two methods for this leg of the trip.

By arriving in San Francisco early Monday morning those men traveling in the business airplane have the morning for meetings. Those men traveling by airlines spent the morning enroute and any meetings will be in the afternoon on Monday. After a 3-hour conference the businessmen traveling in the business airplane are ready to depart on the next leg of the trip. Leaving downtown San Francisco at 11:30 AM they will arrive in downtown Boise at 3:00 PM. The businessmen traveling by airlines can get a flight to Boise at 6:45 PM and arrive at Boise at 9:03 PM. Table XV is a comparison of flight time to Boise.

^This is the only PM flight to Boise.
After a meeting with the supplier in Boise the businessmen traveling in the business airplane are able to make a night flight to Denver. The businessmen traveling by airlines must wait until Tuesday morning for meetings with suppliers in Boise. They will be able to leave Boise at 1:25 PM for Denver on Tuesday, arriving in Denver at 5:10 PM. By the time they have deplaned and arrived downtown it will be after 6:00 PM.

**TABLE XVI**

<table>
<thead>
<tr>
<th>Route</th>
<th>Airlines</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office to Airport</td>
<td>1:30</td>
<td>1:30</td>
</tr>
<tr>
<td>Terminal boarding time</td>
<td>1:30</td>
<td>1:10</td>
</tr>
<tr>
<td>Enroute</td>
<td>4:00</td>
<td>1:15</td>
</tr>
<tr>
<td>Deplaning</td>
<td>1:30</td>
<td>1:10</td>
</tr>
<tr>
<td>Airport to town</td>
<td>5:20</td>
<td>2:35</td>
</tr>
</tbody>
</table>

1Flight times for the airlines are from the *Official Airlines Guide*. The business airplane uses operating information for the Lear Jet Model 24 supplied by Lear Jet Industries. Other times are estimates.

By noon on Tuesday the businessmen in the business airplane have completed their business in Denver and are enroute to Chicago. If they leave downtown Denver at 12:00, they will be in downtown Chicago at 5:00 PM Tuesday. The team traveling by airlines will not have arrived in Denver yet. Their meetings in Denver will have to be on Wednesday. Flights from Denver to Chicago leave approximately every hour. If they depart Denver at 12:20 Wednesday they will arrive in downtown Chicago.
at 4:20 P.M., virtually one full day behind those men traveling by business airplane.

With both teams back in Chicago, a comparison of the two trips can be made. The most apparent difference is that those traveling in the business airplane saved one full day. The total time enroute between offices was 19 hours, 20 minutes, for the airlines and 13 hours, 10 minutes, for the business airplane. This is a saving of 6 hours, 10 minutes, for the business airplane. The round trip fare on the airlines is $287.12\textsuperscript{7} tax included per individual. The trip in the business airplane involves 7 hours, 50 minutes of flying time at $260\textsuperscript{8} per hour for a total cost of $1,296.55 for the use of the airplane. On basis of cost only Figure 8 shows the breakeven point to be 6.4 (7.0) passengers.

When the value of a man-hour is added for just the difference in travel time, the breakeven point is five passengers. The significant factor becomes apparent when an additional 3 hours of \( \frac{1}{2} \text{H} \) are added for the day that is gained by those flying the business airplane. The breakeven point is then a load factor of 4.2 (5.0). A quasi-economic point, but one that belongs in this comparison, is that of what can be done during the flying time. The business airplane provides a confidential conference room where information from the meetings just attended can be discussed or the upcoming meetings can be prepared for. This opportunity does not really exist in the airliner.

\textsuperscript{7} Coach rates were used when available, otherwise first class fares were used, as given in the official airline guide.

\textsuperscript{8} Per hour cost of Lear Jet Model 24, supplied by the Lear Jet Industries.
Figure 8. Cumulative Cost Comparison for Chicago–San Francisco–Denver –Chicago.
In this section a method for the comparison of airlines and business airplane trips has been shown. These comparisons started with a time comparison, the operating costs were added, and then a value of the man-hour factor was included. The effects of each of these factors was demonstrated by a graphic cost comparison analysis. These cases showed the effects of different stage length trips, different airplanes and factors such as destinations that are off direct routes and having limited numbers of scheduled departures and arrivals.

The analysis in this chapter shows that those flights by business airplanes which are over routes well covered by commercial carriers are not operating at or above the equal cost point. Based on my personal observations a large number of flights are made in single engine airplanes with only one passenger. This load factor of one in the single engine airplane will be only slightly below the equal cost point. I doubt if the business jets operate with the load factor of 1 that is indicated as the equal cost point in the last example. The Rexall Drug Company found that after a year's operation they had an average load factor of 3.2 in their Lear Jets. Those airplanes with a lower operating cost are capable of contributing a profit with any load factor in reaching off-line destinations such as the Wichita to Huntsville example. Considering the large number of light single engine and high performance single engine airplanes and their lower operating costs compared with the higher operating costs and limited number of the twin engines and jets, the business airplane as a whole probably operates at or slightly below the equal cost point.

---

CHAPTER IV

PEOPLE

Not all aspects of the airplane's role in business can be explained by the changing picture of industrial location or an economic analysis and measurement of profit and loss in each case. To understand the role of the airplane some understanding of the business society and the individuals that comprise it is necessary. In this chapter a profile of the executive or potential executive and the individual entrepreneur will be drawn and their motivations described. In closing, their goals will be defined and how the airplane can assist their fulfillment will be shown.

There is a growing acceptance of flying by our society. Most people no longer regard it as a pastime for fools and dare devils. Technology has provided a system with a high level of reliability even in the most adverse weather conditions. The high mobility provided by the automobile and the airplane has virtually destroyed the railroad passenger business. With society becoming more accustomed to flying and the system becoming safer and more reliable, the businessman has adapted flying to support his enterprise. In many cases his initial introduction to flying is in the airlines. A growing percentage of these businessmen who fly on commercial carriers are adapting general aviation equipment and techniques to their business.

In the business enterprise two large categories of individuals may be defined: those who make the decisions that determine the goals
of the firm and the direction it is to move in, and those that follow these decisions. For the analysis and profiles of the individuals in business those who make the decisions will be the ones singled out. As the ownership of corporations becomes more diluted by the increasing number of investors, the gap between owner and the professional manager widens. It is these managers or decision makers who, in maintaining a balance between the demands of the stockholders and a desire to satisfy their own drives and motivations create a non-economic area in which some airplane ownership and flying decisions are made. Although the psychological literature on motivation does not contain direct reference to businessmen flying, an oblique inference can be drawn from the general characteristics that psychologists have found in people who are successful in business.

In our culture, social and economic status depend more on occupation than on any other factor. Maslow\(^1\) lists an arrangement of eight basic needs. They are:

1. The physiological needs
2. The safety needs
3. The needs for belongingness and love
4. The need for importance, respect, self esteem and independence
5. The need for information
6. The need for understanding
7. The need for beauty
8. The need for self actualization.

The occupation is potentially capable of giving some satisfaction to most of these basic needs. Since the predominant amount of the entrepreneur's or corporate manager's time is spent in his occupation, it is plausible that he will strive to meet the largest amount of each need through his occupation.

There are generally two classes of business leaders: the executives of large corporations and the entrepreneurs that own and manage their own enterprises. Overall their goals and desires are much the same. The major difference is the subjugation of the self for the organization and the team effort in the case of the executive in the large company.

To measure the level of motivation of these leaders, McClelland describes a quantity he calls national achievement or "n" achievement. This is a measurable factor derived from the cumulative group response to tests involving the interpretation of a picture with individuals engaged in some activity in it. The greater the competitive implications in the interpretation, the greater the achievement motive of the group. From his tests McClelland has drawn a number of postulates about businessmen and the levels of success that they reach. The individual's need for achievement must run relatively high for him to be successful. There is a definite correlation between the individual's need for achievement and economic progress of a country. American businessmen often find this lack of desire for achievement in the businessmen of other countries, particularly the poorer ones.

---

From stated sources, these researchers have found that a person with a high need for achievement has certain characteristics. He has more self confidence than the individual with low achievement needs. He enjoys carefully calculated risks and reacts to his environment actively. He is extremely interested in concrete measures or feedback of how he is doing. This is especially evident in salesmen and the need for the feedback that is indicated by a sale. Situations are needed where he can take personal responsibility for finding solutions to problems. He wants to accomplish things by personal effort and not leave things to chance. He believes in his ability to get a solution. Generally, the individual will set moderate achievement goals. If his goals are too low he does not get any satisfaction from his efforts. If the goals are too high the risk of failure negates much of the possible satisfaction from the project. He will attempt to maximize his interests somewhere in between. It is not profit per se that these businessmen strive for, but the need for the concrete feedback and a strong desire for achievement for doing a good job. Profit is simply one measure among several of how well the job has been done, but not necessarily the goal itself. Some other general characteristics that McClelland describes are the willingness to give up a sure thing for higher stakes with some risk of total failure, preference for experts to friends for working partners, and a desire to travel. For the businessman, probable motives for action are achievement, affiliation and power.

---

3Ibid., p. 102.

Roe, in her studies of the psychology of occupations and motivations, has through her own works and a compilation of the works of others developed comparative profiles of executives and their different levels of achievement. In the category of executives she limited the boundaries by using only those individuals who had no supervision and had high demands upon them in terms of intellectual and personality qualities. These individuals were compared with individuals of lower rank. Generally, she found that in the executive group:

1. Three times as many executives had gone to college as those in the lower groups.
2. Three times as many executives made school records in the upper two-thirds of their class.
3. Four times as many executives pursued studies after the normal school years.
4. Three times as many executives found ways to do their jobs better.
5. Two and one-half times as many executives had records of working hard and long hours.
6. Three times as many executives had a definite aim in life.
7. Six times as many executives had sought and were willing to assume increased responsibility.

Other considerations listed were a high level of intelligence, both abstract and concrete, the emotional control displayed even in the face of trying situations, the human relations and leadership displayed in

---

5 Roe, op. cit. 6 Ibid., p. 164.
face-to-face situations, insight into human behavior and an overall ability to organize and direct.

In her description of executives, Roe has drawn from many studies. The successful executives were men who have high drive and achievement desire. They are men who have to accomplish things to be happy. Many have a need for continuous upward mobility, but for others the important things are increased social prestige and status in the organization and the community. They know what they are, what they want, and the techniques to get it. They also harbor a rather pervasive feeling that they may not succeed and be able to do the things they want to do. Uncertainty is a continual activity with them. They have a continual fear of losing ground. They lack the ability to be introspectively leisurely. They have an ever-present fear of failure and are faced with artificial limitations put on their emotional interpersonal relations. These are some of the costs of the role.

There is some sense in businessmen saying the dominant goal is success. To this there appears to be two main aspects, a satisfactory medium of attainment of the technical goals of their respective activities, such as on the one hand increasing the size and improving the business portion of the firm for which the individual is in whole or in part responsible. The other aspect is the attainment of high standing in one's occupation group. In business this will involve official position in the firm, income and that rather intangible but none the

---

7Ibid., p. 185.

less important thing "reputation," as well as perhaps particular honors such as election to clubs and the like. The essential goals are object achievement and recognition.

Stryker\(^9\) portrays the business executive as one who has a keen sense of self, a desire to control one's environment rather than be controlled by it. He usually works four evenings a week, largely because he is away from the office and is able to engage in some individual effort. This is much the same rationale he uses for weekend work. Work is a way of self-expression or a way of using the energy within. To the executive there is between work and other aspects of life a unity he can never fully explain. As one executive answered a question on overworking, "How can you over work if your work is your life? Over work is simply work that you don't like to do."\(^10\) The business executive is by profession a decision maker. Uncertainty is his opponent and he is assigned the task of overcoming it. Decision making demands the finding of the problems and alternative solutions. Then he must make the decision as to the best alternative.

Guzzardi\(^11\) has attempted to document some of the characteristics of young men that mark them for the top positions in the large companies. He found that business and business matters not only occupy them but totally preoccupy most of their efforts. They are constantly striving

---


\(^10\)Ibid., p. 69.

to learn from each experience. These individuals need facts, lots of facts, and the very best facts they can get. This need for facts explains many of the techniques that they employ, such as the computer and the desire to work with experts. Largely because of the techniques he employs he has confidence in his decision making powers. He is accustomed to winning and is fiercely competitive in all aspects of life, be it on the golf course or the job. They are constantly trying to improve their own performance and that of the people around them. As one individual summarized it, their business function is "to create a thought, to think up a plan, to think out the ramifications and then to bring it into being, to sit back and say, it's working." ¹²

For a number of years, corporate directors have concentrated on relieving the tax pressures on company officers and key men.¹³ The combined pretax income from salaries and bonuses of such executives has risen steadily since the mid-thirties. Cash incomes often have been sharply increased. There has also been an increase in deferred pay and stock options and an extraordinary collection of tax-free fringe benefits including the company airplane. The compensation an executive gets is a tangible message from the company to him that indicates what they think of the job he is doing. This is most obvious in the salary paid, but all other benefits contribute to this message.

The preceding discussion has been directed towards the individual in the large company, but what of the individual entrepreneur— is he the same type of individual? In many respects, he is. He is generally an

¹²Ibid., p. 39.
ambitious and decisive man who has a natural gift of leadership. The small company man is an egoist and shows it while the large company man is also an egoist, but must sublimate his interests to the team. The young entrepreneur usually works long hard hours when establishing his business, but after the business is running smoothly he spends somewhat less time than the large company executive. Murch lists some of the qualities that individual entrepreneurs usually exhibit:

1. The common touch—understanding and recognizing the traits that are common to the greatest number of people.

2. Self-confidence—will have a thorough knowledge of the merits and demerits of his proposals.

3. Mechanical bent—ability to contrive and visualize mechanical aspects.

4. Optimistic visualization—blend of imagination and resourcefulness as a faith in a nation's future combined with a capacity to see a commercial venture in things imperfect.

5. A talent for risk—the true entrepreneur takes risk but does not merely gamble. They assess the risks before they take them.

Klaw found that living standards of the young president are somewhat more lavish than that of the typical $35,000 to $40,000 a year executive of a big corporation. In the way of travel, entertainment, private planes and the like, hefty amounts can be legitimately charged

---


to the company or at least claimed as an income tax deduction. He found that many small company presidents are out to "beat Pop". Many have started in businesses that were originated by their fathers or father's fathers and continued to build them. Generally, they seem to have the desire to build an empire.

Of all the non-economic factors that have contributed to business flying the elevation of flying as a bonafide means of transportation and its removal from the realm of a stunt has had the greatest effect. This has resulted in large part from the technological improvement of the airplane and its ground support system. As the design of modern light airplanes has improved, the utility that can be gained from them has increased. As designs continue to improve and as the public becomes more accustomed to flying, the number of light airplanes used with continue to increase.

These individuals are functioning in a social system where the role of the occupation is extremely important. In our work or production oriented society they are at the high extreme in the amount of satisfaction of the basic needs they seek in their occupations. As described, they are self confident individuals who want to take personal responsibility for the solution of problems and not leave the outcome to chance. They are willing to take risks, but like experts for working companions to help insure the outcome of a project. They desire to control their environment and not to be controlled by it. They spend a great amount of their time interacting with other people rather than working alone.16 The package they are offered in remuneration

has changed from pure cash rewards to a salary plus non-taxable fringe benefits. These satisfy many demands for social status and prestige in the firm. Encompassing much of his reaction is the fear that he will fail to attain his goals. This in a sense will make him run all the harder.

The individuals that we have described are in the forefront of the business wave. They tend to be early adopters of techniques and tools that they can use in running their enterprises. The airplane can assist in filling many of the needs these individuals have. The airplane can assist in his taking personal responsibility for things by increasing the number of places he can be in a given length of time. This increases his ability to collect information or facts and decreases the time span needed to get feedback on how his projects are going. These individuals with high achievement motives are highly competitive and like to travel. The airplane as a means of transportation can help fulfill the desire for travel and can provide an edge on competition by the speed it provides. If the individual flies his own plane it is satisfying to him in that the personal accomplishment enhances his reputation and he receives recognition for his accomplishment. Ownership of the airplane can provide reinforcement of his prestige and social status in the group.

The area of personal satisfaction is difficult to measure, but the contribution the airplane makes in this area appears to be a real and valid one.

CHAPTER V

CASE EXAMPLES OF PLANE UTILIZATION

In this chapter the information developed on the growth and decentralization of businesses and the satisfaction that businessmen seek in the pursuit of their activities will be used in analysis of cases in the use of business airplanes. Several short examples from business periodicals will be cited. The final portion of the chapter will be a discussion of aviation in Montana and an analysis of the role the airplane plays in a Montana company.

For the credit managers of an expanding western steel fabricator flying is the ability to assess the credit of a distant and somewhat doubtful client when the possibility of a sale hinges on an immediate yes or no on the extension of credit to him. ¹ The credit manager of this firm has found that what ostensibly appears to be an unreasonable credit risk will be found to be a reasonable risk after discussing the situation with the client and observing his operation. As the size of the firm and the area it covered increased, it was impossible in many cases to maintain this service without flying. The credit manager felt that by being on the spot, a sale that might well have gone to someone else because of faulty interpretation of the financial data available on the client, could be saved for the firm. The firm believes that the

customers appreciate the rapid and personal service they can expect from them. Another factor that contributes to the firm is the shrinking of the time element between client and home office in the matter of accounts receivable. The credit manager feels that a customer who is a day or more away from the office and personal visits on the matter of payment of bills, feels more secure in ignoring phone calls and mailed entreaties to pay than if he knows he is only an hour or two away by air.

With each additional geographic area added by the firm and the additional administrative details assigned the credit manager, the more difficult it becomes for him to maintain the personal touch with the firm's customers. The credit manager feels that the airplane has been a great value in assisting him in meeting these increased demands. It is no answer for the problems created by granting unwise credit, but it has aided him in getting a more objective picture of the customer's financial status.

In this case the problems created by geographic expansion are demonstrated. It appears that the size of the firm has not reached the proportions to justify a system of branch offices and staffs. The financial manager is attempting to maintain a certain level of bad debt losses and still not pass up sales that would be profitable to the company because of insufficient credit information on the customer. If the firm flies its light single engine plane 500 hours a year at $14 per hour, the $7,000 operating expense will probably be recovered from profits of increased sales and is considerably less expensive than the addition of another man. A non-economic aspect not to be ignored is the satisfaction the financial manager can obtain from an increased contribution to the firm. He increases his control of his sphere of
operation by providing himself with on the spot information. He avoids the uncertainty of being office bound and wondering if the credit was really good or if an error was made in declining a credit clearance for a sale.

A case in general management utilization of a company airplane is the Central Iowa Telephone Company of Cedar Rapids, Iowa.² Sixteen years ago the company was contained in six counties around Cedar Rapids and intertwined between regional and national utility exchanges and fellow independents. To manage this small enterprise, Vice-president and General Manager J. J. McIntosh was driving an automobile 60 to 70 thousand miles a year. As McIntosh puts it, not the least of his discomforts was the necessity of spending a great deal of time away from home.

It was then that he began to consider flying. His job was a natural for air travel. Most Iowa towns, even the small ones, have serviceable airstrips. Then, too, there are a large number of farmers who maintain strips across the state. McIntosh felt he could count on contacts in any town to provide ground transportation once he arrived. Most important, what had been a week's work dwindled to a day or two.

After learning to fly and starting with a two-place airplane, McIntosh started to expand Central Iowa Telephone by the acquisition of other independent telephone exchanges. He feels that he gained a competitive edge on other small exchanges with expansion notions by the

²This case was extracted from an original study supplied by the Marketing Research Division of the Beech Aircraft Company as part of the information supplied on utilization and operating costs.
mobility the plane gave him. His exchange now covers 35 counties in two states. It has grown until it is the largest independent company in Iowa, and still has plans for expansion.

Here is an example of an entrepreneur with empire building interests. Faced with a long work week and a large amount of traveling to maintain a status quo, he used the airplane to assist him in expanding the scope of his firm. While the number of nights he spent at home during a week probably increased, I doubt if the length of his work week decreased any. As pointed out by Klav in the discussion of the individual entrepreneur, they are normally faced with a long work week and a great desire for their organization and plans to succeed.

An example of a large corporation and its aviation department is The Rexall Drug and Chemical Company, a diversified international manufacturer of pharmaceuticals and housewares. The speed and flexibility of its first Lear Jet Model 23 has revived the lagging interest of company executives in their aviation fleet for trips between their nationwide facilities. The older, piston-engined fleet was unable to compete with the jets of the commercial carriers for speed and comfort. The first Lear Jet was acquired in the fall of 1964 and largely because of the satisfactory response of the central management group to the first plane, two more Lear jets were purchased in mid-1965. Rexall's aviation fleet now stands at three Lear jets and one piston-engine Aero Commander.

"There's much more demand for use of our corporate aircraft now, with the jets," says Dale Reis, assistant to the president of Rexall.

The appeal of the six passenger Lear jet is based on the time saving and convenience features of an airplane that nearly matches the speed of commercial jets, and offers short field capabilities to meet requirements of company operations into many small communities. Thomas Dartner, manager and chief pilot of Rexall's Aviation Department, states that to date they have had no difficulties scheduling Lear jet business trips because of runway requirements.

"The basic philosophy behind Rexall's corporate aircraft operation and formal aviation department is to provide expeditious transportation to supplement airline service to localities where commercial service is non-existent or inconvenient," says Reis. "We don't fly people to Chicago, New York, or San Francisco where the airlines have flights scheduled from Los Angeles every hour." (The Aviation Department is a staff function that reports through Reis to the president.)

There are many factors contributing to the new success of the aviation department. Not having to restrict travel to airline schedule time tables provides flexibility in planning for the people involved. With some executive salaries in excess of $50 to $60 an hour, the firm cannot afford to have them wasting their time sitting in airline terminals. Another factor is the corporate bookkeeping policy not to charge the department that uses the company airplane; instead the aviation department and its operating expense is a corporate expense. The ability to schedule any number of stops enroute and a friendly and informal atmosphere are other attractions. Reis feels that the multi-stop capability means that Rexall executives can hold three meetings a day and complete a series of sales meetings within a week that might
take them as long as a month if they had to travel on commercial airlines.

Rexall's evolving service pattern has resulted in a Lear Jet being based in the northeast, southeast, and southwest corners of the country, where they are available to the personnel concentrated in those areas. Lear Jet #1 and the Aero Commander are based at Van Nuys Municipal Airport, convenient to corporate headquarters at Los Angeles. Lear Jet #2 is at Herndon Airport, Orlando, Florida, where it is used almost exclusively by the Rexall Tupperware housewares operation based at Orlando. Lear Jet #3 is based at Teterboro, N. J.

The crew and plane at Orlando operates almost autonomously in setting its own schedules. The Teterboro plane is coordinated by the Los Angeles office.

Both telephone calls and formal trip request forms are used by the executives seeking aviation department service, although as operations of the department become more firmly established, the formal trip request forms will become mandatory. Flight schedules are coordinated with the company traffic department which makes commercial arrangements for business travel. If seats are available on a company aircraft to a destination for which a Rexall employee has earlier requested an airlines ticket, the employee will be asked to fly in the company plane.

The average load on the Lear Jet trips has been running 3.2 passengers per trip at an average operating cost of $260 per hour. The types of trips for which the Rexall aircraft are being used include transportation of directors to board meetings or committee meetings, real estate site selection surveys, trouble shooting flights of company
engineers to manufacturing facilities, inspection of new facilities construction, transportation of new or potential customers to Rexall offices to show them new products and sales trips.

In the following case we see a large corporation (number 160 in *Fortune's 500*) that has formalized its aviation department and manages it like a small airline. Its costs are a corporate expense and will come under the direct scrutiny of the budget and finance department. It reports as a staff function directly to the president. Purchase of equipment, both past and future, is instigated by the president.

The primary function the airplane serves is an aid to management control and the general functioning of the business. This is indicated by the general lists of missions assigned to the airplane. Personal satisfaction is indicated by Reis' statements about the personnel appreciating the friendly and informal atmosphere while flying in the company plane. The president, Justin Dart, is a veteran pilot and sometimes flies on the trips.

The contribution the airplane makes is the flexibility that it gives personnel in planning their schedules. It increases the number of meetings that can be held by allowing the personnel as many stops as they desire, made when and where they want them. At a cost of $260 per hour and a cruising speed of 550 mph, the cost per mile is 47.3 cents. With an average load factor of 3.2 people per trip, the average cost per seat mile is 14.6 cents. This is considerably more expensive than the average airline tariff of 6.1 cents per mile in 1966. It is

---

impossible to tell from the information provided in the case whether or not the firm is at the equal cost point when compared with airline transportation.

Montana Aviation

The state of Montana is an active aviation state. It is number two in the nation for airplanes per capita, and number three per capita for the number of airplanes in business use.\(^7\) of the 1,705 airplanes in Montana an estimated one-third of these are engaged in business activities.\(^3\) The state has 110 publicly-owned airports, of which 49 are paved and 34 are lighted.\(^3\) Fifteen\(^10\) of these airports have scheduled air carrier service. For a more detailed look at the role of the business airplane, a Montana company and the use of their two planes will be analyzed.

The Montana Power Company\(^11\) is a publicly-owned utility engaged in the sale and transmission of electricity and natural gas. In conducting its business it serves 171 cities, towns and communities. The Montana Power Company system contains 4,378 miles of electric transmission lines and 9,559 miles of gas transmission line. The area encompassed in its transmission facilities is in excess of 100,000 square miles.

\(^7\)Personal communication by Charles Lynch, director, Montana State Aeronautics Commission, July 23, 1967.

\(^8\)Ibid.


\(^10\)Ibid.

\(^11\)This case was prepared from material gathered in a personal interview with Mr. O’Conner, president, and Mr. Thurmond, chief pilot.
The company, with 1956 sales of $67,113,000, has its corporate headquarters in Butte, Montana. At the headquarters in Butte are the offices of the chief executive officer, the president and the vice presidents and their staffs. The company has division offices in Billings, Bozeman, Butte, Great Falls and Helena. The company has wholly owned Canadian subsidiaries for exploration, management and development of oil and gas resources. These are headquartered in Calgary, Alberta. A subsidiary for the development of coal resources is headquartered in Butte.

The aviation department is an informal staff function reporting to Mr. O'Conner, the president. The department utilizes two pilots, two airplanes and a hangar they share with another firm. The chief pilot is responsible for the maintenance of the two airplanes, the scheduling of trips and decisions as to which plane will be used. A receptionist in the executive offices acts as a coordinator for transportation of company personnel. She assists in the scheduling of people in the company airplanes, along with other duties such as making airline reservations.

The aviation department as it stands now is the culmination of ten years of development. In 1957 the firm leased its first airplane, a Beechcraft Twin Bonanza, on an experimental basis. There were two vice presidents who did not like to fly, but utilization was still great enough to deem the experiment a success. In 1958 the executive department was expanded. Several of these new executives liked to fly. The load factor increased to the point that in late 1958 the firm felt justified in purchasing a Twin Bonanza. The utilization continued to increase. In 1960 the firm traded the Twin Bonanza for a larger plane,
a model G-18 Twin Beechcraft. This plane was kept extremely busy, so
in 1964 a smaller Beechcraft Baron was purchased to supplement the Twin
Beech. Partially because of use and partially because of increased
technology in the light plane field, the Twin Beech was traded for a
turbo prop Beechcraft King Air in 1965, and the Baron for a Cessna
model 320 in 1966. These are the aircraft currently in service.

The Beechcraft King Air carries five passengers with its present
seating configuration. The two front seats face the rear and the back
two seats. There are tables that fold into the wall between them. A
fifth jump seat is at the far rear of the plane. The plane cruises at
250 miles per hour at 16 to 20 thousand feet. It is equipped with com­
plete instrumentation, radio, radar and de-icing equipment for all-
weather operation. The Cessna 320 seats six or four people and their
baggage. It cruises at 205 miles per hour. Generally, the King Air
is assigned the longer trips or those where icing or turbulence are
expected. The 320 flights are usually those which are less than 2 hours
in length.

The trips that Montana Power Company planes fly are generally of
three types: administrative trips in the state, administrative trips out
of the state, and trips in or out of the state to meet terminal points
for major trunk airlines. The in-state flights can go to any point in
the state in support of business activities. The out-of-state adminis­
trative flights are usually to meetings with other utilities. Frequent
trips are to Spokane, Seattle, Portland, Boise, San Francisco, Los Ange­
les, Salt Lake City and Denver. To avoid overnight layovers for person­
nel coming in from transcontinental flights they will meet these flights
and bring the personnel back to Butte. The usual points that these
pickups are made are at Denver, Salt Lake City and Billings.

The company airplanes flew a total of 1,032 hours in 1966. Of these hours 663 were in the Cessna 320 and the Beechcraft Baron that preceded it and 469 hours in the Beechcraft King Air. Eighty-six of these hours were instrument or weather operations. They carried 891 passengers for a total of 500,000 seat miles. They made 65 trips out of the state of Montana. As of June 30, 1967, they have made 46 trips out of the state. During 1966 the average load factor of the King Air was three people, and four people in the Cessna 320.

General company policy is that any employee having a need to travel on the company airplane is eligible to use it. Department heads are the approving authority for the people in their department to request an airplane. The departments are charged for the use of the airplane at the rate of $30/hour for the Cessna 320 and $190/hour for the Beechcraft King Air. The company does not allow the chief executive officer, the president, or the vice president of gas and oil to fly together on the same plane. Another restriction is that department heads and the individual directly under them will not fly together.

The geographic expansion of Montana Power Company has stabilized and the flying the firm does is not an attempt to expand its boundaries, but to manage the facilities it has and aid in the construction of new facilities in its franchised area. This area includes about 80 percent of the state of Montana. Some road miles to the extremities are 433 to Glasgow, 221 miles to Billings, and 197 miles to Kerr Dam at Polson. The corresponding air miles to these areas are 324 miles to Glasgow, 200 to Billings and 155 to Polson.
The planes make flights to all points in the company system. Flights to such points as Kalispell and Glasgow allow administrators to travel to, complete their work, and return to Butte in the same day. Large construction projects such as the steam generator in Billings require the attention of administrators and about two days per week support from the engineering staff in Butte. The airplane is used extensively in support of projects such as these. The management of the company requires the officers to participate in a considerable number of meetings throughout the West. The firm has a consulting agreement with the Stanford Research Institute and in support of their efforts to integrate data processing into their system has frequent meetings in San Francisco. These trips are made almost exclusively in the company airplanes.

One of the functions of a manager is to unite his personnel and motivate them to direct their activities in a direction that is towards a common goal and beneficial to the firm. Even the lowest ranking member of the firm wants to feel as though he is part of the firm and is making a contribution to the organization. A portion of the philosophy of the use of the airplane by the Montana Power Company is designed to achieve these goals. The president feels that by providing his people with good equipment they will be motivated to respond with more and better work.

A feature that is predominant in the management philosophy of the firm is a workload for the personnel that is compatible with a satisfactory home life. It is top management's expressed belief that by considering the home life of the employee, whether he be an executive, engineer, or other, productivity will be higher, the quality of the work will be better and turnover will be lower. It is this area of a human
interest in employees that prompted many flights. Many of the personnel make trips in the company plane in one day that would require two or three days by driving.

The executives and employees of the firm are proud of their modern, well equipped airplanes. These airplanes play a role in supporting the ego and maintaining the status of the executives and employees among their counterparts in other firms. The president feels no corporate officer can help but feel proud that his company thinks enough of him to provide him with a first-rate airplane. He feels that it helps in establishing his position among other executives and that he can complete his travel rested and able to make better decisions. Engineers, staff employees and others obtain a feeling of being a part of the company by using the airplanes. This reinforces their status with the company and people of like professional status with other firms.

The airplane acts partially in the role of deferred compensation for employees. In a company of this nature, it is not a deferred compensation in the sense that it is available for fishing trips or vacations, but it eases the work load. Particularly in the executive group where stockholders and society in general can be influential in setting the upper limit of the salary, there is a tendency to offer other than monetary rewards for the executive's services. There are distinct psychological advantages to providing the executives with a good airplane and allowing them to set their own travel schedules. Mr. O'Conner feels the privacy of their own plane allows them to consider and discuss company matters. They frequently prepare for meetings or discuss meetings they have just come from. Time that would otherwise be wasted can be productively used in the airplane.
For an economic comparison of airline transportation and the use of their airplanes, a trip from each of the general classes of trip that they take will be analyzed. For administrative flights within the state a flight to Glasgow will be used. Administrative flights out of the state will be represented by a flight to San Francisco. A flight to pick up a passenger will be demonstrated by a flight to Denver.

For the flight to San Francisco the airlines depart Butte at 11:05 AM and arrive in San Francisco at 1:25 PM. The firm’s Beechcraft King Air can depart whenever they desire. For the time comparison analysis the same format will be used as developed earlier. Table XVII shows the comparison.

**TABLE XVII**

**FLIGHT TIME COMPARISON, BUTTE TO SAN FRANCISCO**

<table>
<thead>
<tr>
<th>Time Description</th>
<th>Airline</th>
<th>Business Airplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office to Airport</td>
<td>:15</td>
<td>:15</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Enroute time</td>
<td>3:30</td>
<td>3:10</td>
</tr>
<tr>
<td>Deplaning time</td>
<td>:30</td>
<td>:10</td>
</tr>
<tr>
<td>Airport to office</td>
<td>:45</td>
<td>:45</td>
</tr>
<tr>
<td></td>
<td>5:00</td>
<td>4:30</td>
</tr>
</tbody>
</table>

1Flight times for the airlines are from the Official Airlines Guide. The business airplane uses operating information for the Beechcraft King Air supplied by the Beech Aircraft Co. Other times are estimates.
There is no significant difference in the time involved. The only real time advantage is that the King Air can pick its own departure time. If it departs Butte at 7:00 AM the men will be downtown by 11:00 AM in San Francisco. If they are on the airlines they will not arrive until 3:00 PM. By arriving in the middle of the afternoon they have made it difficult to conduct meaningful business during that day. If they are going to leave the next day on the airlines they can depart at 7:30 AM or 1:10 PM. In essence they have about 7 hours to conduct their business if they are to leave the next day. If 7 hours is sufficient to conduct their business then by using their own plane and arriving downtown at 11:30, they will have completed their business by 6:30 PM and can depart for Butte, arriving there at 12:00 PM. On the airlines they will arrive at 7:00 the next evening.

By direct cost comparison the trip is unrealistic in the King Air. There are 4:20 of flying time for the King Air at $1.15/hour for a total expense of $1,110 and one round trip on the airline is $1,850.00. There is a total of 9 hours travel involved in the King Air and 10 hours on the airline. An additional 3 hours of V.H must be added to the airline time for the second day that is needed to make the trip. If the personnel are in the $15,000 a year bracket, they have a V.H of $18.75. Figure 9 shows the comparison of the two for direct-cost and V.H added. The equal cost point for the direct-cost comparison is seven passengers, two greater than the plane is capable of carrying. The equal cost point with V.H added for a trip to San Francisco under the conditions given is a load factor of 3.25 (4.0).

For a flight to Glasgow only one connection per day is available on the airlines. It departs Butte at 1:35 AM and arrives at Glasgow at
Figure 9. Cost Comparison Butte to San Francisco.
67

4:45. To return they must depart Glasgow at 10:58 A.M. and arrive in Butte at 4:01 P.M. Connections such as this are only slightly better than driving. For this comparison we will assume that the business they came to conduct can be completed by departure time the next morning. The company plane used will be the Cessna 320. Table XVIII shows the time comparisons.

**TABLE XVIII**

<table>
<thead>
<tr>
<th></th>
<th>To Glasgow</th>
<th>To Butte</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airline</strong></td>
<td><strong>Business Plane</strong></td>
<td><strong>Airline</strong></td>
</tr>
<tr>
<td>Office to Airport</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Terminal boarding</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Enroute time</td>
<td>3:10</td>
<td>5:00</td>
</tr>
<tr>
<td>Depplaning time</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Airport to office</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>4:45</td>
<td>6:30</td>
</tr>
</tbody>
</table>

1 Flight times for the airlines are from the Official Airlines Guide. The business airplane uses operating information for the Cessna 320 supplied by the company. Other times are estimates.

In this case there is a significant time difference. In the case of the business airplane the round trip office-to-office travel time is 5:00 hours and for the airlines it is 11 hours, 15 minutes. The Cessna 320 can easily make this round trip in one day where it is a day and a half trip away from home by airlines because of schedules. Figure 10 shows a cost comparison for the trip. An extra 4 hours of VNH are added for the additional one-half day required for the airlines. The Cessna
Figure 10. Cost Comparison, Butte to Glasgow to Butte.
320 cost is computed at \$80/hour and the airline fare is $70 round trip. The personnel making this trip are assigned a salary of \$10,000/year for a VMH of \$12.50. Figure 10 shows that based on only comparative operating costs the equal cost point is a load factor of 3.35. When VMH is included the equal cost point decreases to a load factor of 1.25 (2.0).

The third type of flight is that which meets an airline that has come from the east coast with company officers that have been working in the eastern cities or officials of other companies that have come to Montana to inspect their facilities or on other business. It is difficult to leave the eastern cities and make adequate connections into Montana. These transcontinental flights are usually met in Denver or Salt Lake City. For the analysis we will use Denver and the Cessna 320 which is frequently used on these flights. The situation that usually exists is that the personnel arrive in Denver about 5:00 PM and are unable to get a flight to Butte until 7:40 the next morning, arriving in Butte at 1:30 AM. If they are met by the company plane they will arrive in Butte about 9:00 PM. This will save the firm approximately 5 hours of working time. Figure 11 shows a cost comparison of these two methods. The Cessna utilizes 6 hours of flying time at $80/hour and the one way airline fare is $50.00. The VMH in this case is $25, the amount for $20,000 a year. The direct operating cost comparison equal cost point is well in excess of the carrying capacity of the plane. With a VMH value added, the equal cost point is a load factor of 3.3 (4).

With the inputs being time, cost and VMH, the firm can hardly show a contribution to profits from the use of their airplanes. This ignores the contribution that higher productivity, better decisions and
Figure 11. Cost Comparison, Butte to Denver.
lower turnover rates can make. These can be significant contributions, but virtually unmeasurable in total. The Cessna 320 with its average load factor of four and relatively low operating cost makes a significant contribution. As shown in the example for the trip to Glasgow, the break even point was a load factor of 1.25 (2). The analysis of a number of instate trips would show similar results. The King Air has the same carrying capacity, is only 45 mph faster, more than double the operating cost and has an average load factor lower than that of the 320.

The general discussions with management indicated that a number of long King Air trips are made with one and two passengers. These would definitely be uneconomical.

The president felt that the company could not operate without its airplanes unless it had a major reorganization and added at least two executives. One of these would be added to the Calgary office and one would travel to cover many of the meetings. If his assumptions are correct and these men were added at $20,000 a year and their value is assessed at 2.5 times their earnings this additional $100,000 would be a determining factor for the economic justification of the airplane.

Montana Power Company covers a large territory and of necessity managers and staff personnel will have to cover a large amount of country to control the enterprise. It is the president's stated desire that personnel not be away from home any more than is reasonably necessary in the pursuit of their assigned tasks. It is this desire that dictates much of the role of the airplanes. A total analysis of its aviation activities may show that all factors considered, the operation is at or above the breakeven point, but the overriding role the airplane plays in this firm is in the humanistic areas of motivation, status and personnel satisfactions.
CHAPTER VI

SUMMARY AND CONCLUSIONS

The dominant role of the airplane is a rapid means of transportation. In 1962, 576 U.S. cities were serviced by the scheduled airlines. Only 23 of these are major hub airports with a convenient and frequent schedule of flights. A considerable number of the rest of the communities are limited to two or three flights a day by one carrier. It is to fill this gap in the air transportation system that a number of firms have adopted the company airplane.

Business aviation is in its infancy compared to other forms of transportation. In 1946 businessmen flew 1,068,000 hours. By 1965 this figure had increased to 5,857,000 hours and comprised 35 percent of all flying that was done during that year. FAA forecasts indicate a 15 percent increase in the number of hours flown by businessmen and 10 percent increase in the numbers of airplanes used in business by 1969. Business aviation has been and is forecast to continue to be the largest sector of general aviation. General aviation has started to expand twice and twice it has almost died on the vine. It appears that this third attempt may be the most successful in view of the continued growth and favorable overall economic conditions.

The role the airplane plays in American business has been defined in three areas: the transportation of managers and company personnel in their efforts to control geographically decentralized companies, as a competitive form of transportation with airlines and a vehicle for
transporting the individual entrepreneur, the corporate manager and company personnel in their efforts to fulfill their satisfactions in the business community. In any given case one of these areas may be more important than the other two. To say which should be most important is a value judgment that is best left to the individual who is using the plane.

For the airplane to be a legitimate asset to the business, some emphasis should be placed in each of the three areas. The best overall results will be attained if the individual has a need to travel, he should like to fly, and while it does not have to be economically at the equal cost point with other forms of transportation, it should not create a burden economically on the firm. There is considerable latitude in the amounts that each of these segments can vary within, but in their total, they should make a contribution to the firm.
BIBLIOGRAPHY
BIBLIOGRAPHY


"Jets Move Into the Company Hanger," Business Week, August 9, 1958, pp. 100-106.


Other Sources
