STRATEGIC IDENTIFICATION OF DOMESTIC AIR EXPRESS MARKETS: ASSESSING ALABAMA'S MARKET POTENTIAL

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August 1, 1983

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Running Head: Air Express

Submitted to: University Aviation Association
Aviation Management Track
August 5, 1983

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Abstract

The air express submarket of the air cargo industry plays a vital role in the movement of "time sensitive," high value, small-sized parcels. Air express is growing at a fast pace as shippers become more aware of the value of time utility. To meet the ever increasing demand for air express services many companies are being formed and the critical examination of markets is essential in planning for business growth.

This paper describes a methodology by which the demand for air express services can be estimated. The air express demand model uses published secondary data which allows simple applications to estimate order of magnitude market potentials on a city, county, or state basis. The model is used to evaluate the air express market potential for the state of Alabama, segmented on a 2-digit SIC code market basis.

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Introduction

The air cargo industry is segregated into three major product/service submarkets, freight, mail, and express or priority traffic. Although air cargo historically has played a minor role (significantly less than 1.0% by tonnage and ton-miles) in the movement of our nation's domestic intercity freight, the air mode plays a vital role in the movement of "time sensitive" high value to weight commodities where another transportation mode will just not suffice. Cummings (1978) highlighted a recent Air Transport Association study which projected total domestic air cargo to grow over three-fold from 1975 to approximately 10.2 million enplaned tons by the year 2000. Manufacturers, distributors, service firms, agricultural concerns, and even the individual nonbusiness shipper are consciously becoming aware of the value of time associated with their shipments and the tradeoffs offered by the air transport mode versus a competitive surface mode. Shippers are now more than ever evaluating freight decisions based on the total cost approach as described by Davis (1982). Thomas R. Oliver, Senior Vice President - Marketing and Customer Service, for the Federal Express Corporation labels the movement of air cargo as "high priority logistics." The anticipated growth in air cargo reflects the latent value now being recognized by shippers.

In recent years there has been a great deal of activity in the air express submarket. Although the express concept began in 1927, the industry has now experienced a rebirth. Feldman (1983) concludes that the poor and declining reputation of the U.S. Postal Service was one of the reasons for the increased activity. Cummings (1979) sees the increased activity as a result of the collapse of REA Express in the early 1970s breaking a forty-year monopoly on the movement of express freight. Following REA's demise the CAB ordered the airlines to establish priority freight service; quickly following was the formation of

all freight airlines, such as the Federal Express Corporation. Since the mid to late 1970s, the domestic air express submarket has again exploded with activity in the wake of airline and air cargo deregulation.

The average weight of a typical air express package is approximately 12 pounds (50-70 pounds is usual industry maximum limit) with an average replacement value of approximately $22.00 as reported by J. Golden (personal communication, April 20, 1979). Donoghue (1983) finds that on average, general air freight generates revenues at about $0.50 per pound while express contributes about $3.50 per pound. Lyon (1983) found express revenues at about $4.00 per pound. Express traffic therefore tends to be small package, high value to weight air freight. Express freight can be found moving in all levels of air service between all service points, from major hubs to the typical county airport. Express traffic, although still in the process of establishing itself in a growth phase of its lifecycle, is expected to keep pace with the overall growth of domestic air freight. Cummings (1978) reports a four-fold increase since 1975, projecting nearly 121.6 million route ton-miles (102,000 tons) by the year 2000, an average annual growth rate of 5.9% (enplaned express tonnage growing at a 5.6% annual rate). However, a more recent industry survey conducted by Henderson (1983) reports a large 20%-30% increase in small package air freight from 1982 to 1983. The total domestic market is estimated at $2 billion, Feldman (1983).

The vast majority of the major target markets for air express (major metropolitan areas) are presently being serviced by one or more of the priority freight air carriers: courier service, air forwarders, scheduled airlines, belly freight, or all cargo airlines. The market potential in these major hub areas is high and will sustain the operation of several competing express carriers.

There is a point at which markets become marginal in generating enough demand for air express services that a critical market potential analysis becomes necessary

to justify the initiation, continuation or removal of service to a particular market. In addition, in following the concept of the hub-spoke market configuration as described by Hagedoorn and Crittenden (1979), Kjelgaard (1982), and Speas (1979). certain pockets of demand can be identified and evaluated in and around a major hub. If the potential is large enough an air express feeder network could be profitably established via commuter airline service agreements to feed the central hub, such as described by Cummings (1979).

The purpose of this paper is to describe a rudimentary methodology for evaluating the domestic air express market potential for specific target markets. The methodology is then used to evaluate the potential for the state of Alabama and its smaller submarkets. Specific attention was given to segmenting the demand for air express services into distinct target markets by industrial classifications. The results of the analysis are presented in terms of an expected number of express parcels per day. A post-analysis survey was initiated to verify and substantiate the research.

Methodology

The primary demand for air express can be estimated from a simple functional relationship between number of employees in a given industry classification and a usage rate per employee. The generic demand model that has been used is:

$$AE_t = \sum_{k=1}^{n} N_{kt} R_{kt}$$

AE = Demand for air express

N = Number of Employees

R = Usage rate per employee

k = number of market segments

t = time period

The demand analysis is refined through the process of market segmentation that identifies target industries and their different usage factors for air express services. Over 99% of the existing air express volume is generated from the

business sector. It will be upon this general sector and especially the specific industry classifications identified as leading air express users, that the demand analysis for air express was focused.

The physical boundaries defining the market area proposed for analysis are then specified. Using data from such publications as the Bureau of the Census' County Business Patterns businesses can be identified by industry classification along with employment levels. These data are then used to drive the generic demand model, summing the demand for air express on an industry by industry basis.

Profile of Air Express Commodities

Commodities that are shipped by air generally have common characteristics which can be segregated and arranged to form a typical air cargo profile. Using a rudimentary form of market segmentation with attributes as the discriminator products with the greatest potential for small parcel air express shipment are identified by use of the Standard Industrial Classification, SIC Codes. Certain products are more adaptive to distribution by air than are others and historically, certain types of products are more often shipped via the air cargo mode than are others. Products have to be analyzed in relation to the systems concept of marketing and production. Therefore, this analysis encompasses not only the characteristics of the physical product, but also relationships to the producer's environment and the consumption market environment.

Jackson and Brackenridge (1971) conclude that companies with typically wider product ranges and greater proportions of slower moving inventories are potentially good candidates for air shipment. Inventory levels of slow moving product items which require a high overhead safety stock can be reduced by using distribution. However, in general the use of air distribution can reduce levels of transit stock as well as levels of static stock while manintaining or improving the same degree of customer service.

The level of customer service that an individual company provides is a key management decision. The use of air distribution and/or specifically, air express, can greatly improve the speed of product delivery, however, the increased customer service level must be balanced against the increased transportation costs.

As a rule, products with a higher value per unit weight have a greater economic potential for air shipment. Transportation charges are typically based upon weight and not the value of the shipment. Therefore, as value per unit weight increases the proportion of associated transportation costs to total costs (value of item plus shipping charges) become less significant.

The evaluation of a product strictly on the basis of replacement value and weight, however, will produce misleading results. The best perspective is gained by viewing the total products' value in relation to its replacement cost in dollars and the utility gained by having the parcel at its intended destination. The utility concept is the underlying principle which makes air express desirable. To illustrate this point, suppose that a major assembly line in an Atlanta manufacturing plant was idle due to a broken part valued at $13.47. The down-time was costing the plant $500.00 an hour in lost revenue and idle manpower. It is easy to see that if by shipping a replacement part by air express saves even a days time that the added expense for air shipment is totally justified with an approximate savings in excess of $12,000.00 using the average 12 pounds per parcel, (Value per unit weight goes from $1.12/pound to $1000.00/pound).

The utility concept brings forth the second common characteristic and that is a degree of urgency. Most descriptions about air shipments have coined this characteristic as emergency or nature of cargo, however, emergency describes only one class of cargo. Most air shipments have a relatively high degree of urgency associated with the product movement.

Urgency could be measured in dollars lost or opportunity loss in relation to the cost and time differential of using the next fastest mode of transportation.

Perishability, economic deterioration, or obsolescense are common characteristics of most air cargo shipments. The key is to have products reach the markets when they have maximum potential commercial value. This encompasses not only food items but also fad items, dated materials, printed matter, and so on.

The nature of the cargo has an important bearing on the decision to ship by air. Cargo of a high technological basis and a high value added component are good candidates for air cargo. Products of a delicate nature are common to air transportation.

Market characteristics of air cargo shipments include areas of high demand, high number and varied location of sales outlets, and an urgency of demand. Air shipment is also used to penetrate new markets and where a high level of customer service is required.

From the generalized characteristics of air cargo select attributes evolve which describe products which have a high probability of being shipped via air express. The air express attributes described by Jackson and Brackenridge and others are listed in Table 1.

A survey was initiated to question the major United States air express companies on the types of cargo carried and their marketing techniques. From the responses it was determined that the largest single user of air express services was the classification of business services. This accounted for approximately 13% of the package movements by volume. The business

Table 1

Air Express Product/Market Attributes

High value to weight ratio
High mark-up
High overheads
Unpredictably fluctuating demand/emergency needs
High degree of obsolescence/perishable
Light weight - low bulk
Require air transportation environment
New product
New market
High substitutability
Requirement of good customers service
Time - limited market
Many sales outlets
Slow moving stock
Poor-quality alternate transportation choice

services group includes such items as, advertising services; credit reporting and collection services; mailing reproduction, and stenographic services; personnel services; computer and data processing services; research and laboratory testing; etc. The other leading air express commodity groups and approximate volume breakout are shown in Table 2. The leading air express

user classifications that were developed from the survey were used in the determination of air express Standard Industrial Classification (SIC) Codes. For this study the two digit SIC Code provided a broad identification of high usage industries.

Industry Usage Rates

The demand for air express is analyzed on a market by market basis and segregated by user classification. The results will lend themselves to the specific identification and location of businesses that are the most probable potential users of air express services. The air express usage rates were calculated from survey data obtained from air express carriers. The usage rates for the different industry classifications are also shown in Table 2. These rates correspond to the potential one-way movement of air express packages developed from national averages. The results indicate the largest consumption rate of air express services per employee is the Instruments and Related Products classification averaging one daily parcel per every 16 employees in that industry.

A detailed study was undertaken by Sletmo (1972) which analyzed the demand for air cargo. The air express segment was studied in relation to a static demand model using Civil Aeronautics Board data from 1947 through 1968. Some important results were presented that have implications on this study. Air

Table 2

Air Express Industry Usage Rates[1]

SIC Code	Market Share (%)	Classification	Estimated Daily Usage Rate Parcel: #Employees	Parcels/Employee
38	6	Instruments & Related Products	1:16	.0636
36	12	Electric & Electronic Equipment	1:35	.0283
35	10	Machinery, Except Equipment	1:38	.0266
27	7	Printing and Publishing	1:43	.0232
89	5	Miscellaneous Services	1:58	.0172
73	13	Business Services	1:62	.0160
28	5	Chemicals and Allied Products	1:63	.0160
37	4	Transportation Equipment	1:149	.0067
50	8	Wholesale Trade-Durable Goods	1:170	.0059
34	3	Fabricated Metal Products	1:263	.0038
--	27	Miscellaneous Users[2]	1:907	.0011
	100%			

[1]Usage rates represent average daily one-way package movements our of state.

[2]No one user having greater than 2% of remaining volume; with non-business volume less than 1%.

express and air freight, although having similar commodity characteristics, have vastly different economic characteristics. Air express was determined to have a price elasticity which is not significantly different than zero.

The conclusions indicate that the demand for air express is highly inelastic in relation to price. This conclusion is supported by the air express urgency characteristic which was described previously, where the price of the service loses its significance in relation to the concept of place utility.

Sletmo's study also estimated the income elasticity for air express to be positive and highly significant. Therefore as the general level of production increases so also does the quantity demanded of air express services.

Cross-price elasticities for air express were calculated using both truck and air freight as competing modes of transportation. Sletmo states, "the signs suggest that air express may be complementary to truck and air freight services", rather than competitive over the same short-haul routes.

Alabama's Air Express Market Potential

The generic demand model described earlier was applied using industry data from the state of Alabama. It was determined that there was a potential for approximately 3,680 one-way daily small package parcel movements from the state. The results are shown in a summary form in Table 3. This type of information enables the strategic identification of target markets to focus company resources in a more efficient manner.

It should be noted that although the other industries category generates the most parcels per day (990) there are some 58,000 firms generating demand. Based

Table 3

Alabama

Employment and Consumption, Air Express Services for Selected Industries

SIC Code Number	SIC Code Name	[1] Number of Production Employees	Number of Firms	Average Number of Daily Parcels Per Employee	Industry Total Parcels Per Day	Parcels Per Firm Per Day
73	Business Services	26,181	1,572	.0160	419	0.3
36	Electric and Electronic Equipment	18,798	110	.0283	532	4.8
35	Machinery, Except Electric	16,732	442	.0266	445	1.0
50	Wholesale Trade-Durable Goods	44,164	3,608	.0059	261	0.1
27	Printing and Publishing	9,492	438	.0232	220	0.5
38	Instruments and Related Projects	3,386	47	.0636	215	4.6
28	Chemicals and Allied Products	13,262	137	.0160	212	1.5
89	Miscellaneous Services	8,760	1,116	.0172	151	0.1
37	Transportation Equipment	19,606	146	.0067	131	0.9
34	Fabricated Metal Products	27,461	402	.0038	104	0.3
--	Other Industries	900,370	58,319	.0011	990	0.0
	Totals	1,088,212	66,337	---	3,680	0.1

[1] In those cases where specific employment size was not provided, the mid-point of the employment range was used. Production employees were estimated using either the Alabama or national ratio of total employees to production employees, for that industry.

[2] NA - Consumption data not available.

Source: United States Department of Commerce, Bureau of the Census. Alabama County Business Patterns 1979. CBP-79-2. Washington, D.C.: Government Printing Office, 1981.

upon an average number of parcels per firm per day, the other industries classification is the worst prospect giving way to the electric and electronic equipment (4.8 parcels/firm/day) and instruments and related projects (4.6 parcels/firm/day) classifications.

County Business Pattern data and state manufacturing directories provide more detailed data on a county and city basis. For example, from further analysis it was determined that approximately 50% state's potential electric and electronic equipment air express shipments are generated from the Huntsville area alone, while only 6% from the Birmingham area.

Conclusion

Many of the decisions to be made when developing a market strategy are based upon an understanding of the characteristics of the market, such as generic demand. This paper has outlined a simple methodology by which air express firms can evaluate markets. Critical decisions regarding the initiation, sustenation, or eradication of service can be aided when following the proposed methodology. A true marketing approach to business is a prerequisite to long-run profitability; the air cargo industry is no exception.

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