

**COMMERCIAL AIRFRAME PRODUCT-SPACE POSITIONING:
AN EMPIRICAL STUDY OF GLOBAL MULTIMARKET COMPETITION**

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Abstract

This paper reviews the trajectory of research in the areas of multimarket competition, oligopolistic reaction, and first mover advantage, and advances a model incorporating aspects of each for exploring competitive interactions in the International Commercial Airframe Industry. The nature of competitive interactions in product space provide the focus of attention, but the contributions of this study potentially extend to a deepened understanding of transitory competitive advantages stemming from superior management of competitive interactions, as well as providing insight into the nature of product specification in an oligopolistic competitive environment.

Introduction

This study examines the nature of product positioning in the International Commercial Airframe Industry. To this end, a theoretical framework utilising insights drawn from a diverse set of literatures formulated with respect to differing aspects of ongoing struggle for competitive advantage in the Commercial Airframe Industry.

The ventures of well-known commercial airframe producers, such as Boeing and Airbus, into 'product-space' with competing designs such as the Airbus A350 and Boeing 787 are a highly visible manifestation of an ongoing struggle for competitive dominance. What are less apparent, and insufficiently understood, are the roles and importance of relative product-space positioning among competing players in this oligopolistic industry.

The following quote provocatively expresses the difficulties imposed by the gaps in our understanding of the dynamic forces governing the International Commercial Airframe Industry:

'Suppliers of these large commercial aircraft (LCAs, as they are known in the trade) have goals that draw on spongy assumptions, political hubris, and industrial savoir faire. They mix great expectations with huge uncertainties. They grapple with uncertainty by dispensing smoke and mirrors. Every transaction becomes the most important until the next one... Reading the market is largely guesswork. An airline may plan to use a new airplane for twenty, possibly thirty years... the costs of any such venture can amount to betting the company, literally. A single deal with one airline can determine the fate of an airplane on which billions of dollars have been invested. And the returns, if any, lie far ahead. The break-even point of a new program is invariably a made up number, and is rarely, if ever, pinned down.' (Newhouse, 2007, p. 10).

Meanwhile, the regional segment of the international commercial airframe industry faces competitive pressures from two directions. Firstly, the smaller aerospace firms utilise the segment as they do not have the technological or financial resources to compete in higher segments, and secondly, the larger firms in the industry see the segment as a viable market for smaller versions of their narrow body airliners such as the Boeing 737 and Airbus's A320 derivative, the A318 (Ferreri, 2003).

Facing this situation, the challenges for the researcher are considerable. In order to shed some light on the complexities of product-space competition in this industry, insight drawn from theoretical literatures in the areas of oligopolistic reaction, multimarket competition, and first mover advantage will be applied to both longitudinal and cross-sectional data related to airframe specification and competitive interactions in the International Commercial Airframe Industry. This study seeks to test the explanatory power of these theoretical frameworks by utilising a triangulated methodology incorporating (1) quantitatively derived product space analysis, and (2) qualitative data drawn from a series of interviews.

The objective of this paper is to introduce the topic, outline the key research questions, and provide the reader with an overview of the study and to discuss its potential contributions.

Literature Review

In a broad sense, this study revolve around an understanding, application, and extension of dynamic strategy. Dynamic strategy describes the nature of interactions and strategic actions undertaken by firms as they vie for competitive superiority in the market place, in an active, purposeful, and dynamic way (Smith et al., 2002). The term stems from an orientation towards strategy in the tradition of Mintzberg (1994), who viewed strategy as a pattern in the stream of actions undertaken by a particular firm.

Dynamic strategy represents a distinct stream of literature within the international strategic management tradition (Smith et al., 2002). Of particular interest to scholars in the area is the nature of competitive interaction, with a particular focus on multimarket competitive interaction (considered in greater detail in the next sub-section). Of interest in this literature, also, is the contribution provided by game theory. Game theory contributes to our understanding of payoffs from particular competitive actions. These payoffs may change as the game goes through further iterations over time, as a firm's rivals choose to respond or not respond to competitive actions (Smith et al., 1992).

As Peng (2006) puts it, in business (unlike militaries undertaking strategies in war) it is possible to compete and win without resorting to killing the opposition. This live and let live approach underpins the emergence of mutual forbearance, cartels, and other forms of implicit and explicit collusion.

In this literature, the link to competitive advantage is considered to occur when a firm undertakes an action to which its competitor cannot effectively respond. First mover advantage accrues to the firm that acts first, and gains above average returns before the rival can effectively respond (Porter, 1980; Lieberman and Montgomery, 1988; Nelson and Winter, 1982). As Porter succinctly proposes:

Other things being equal, the firm wants to make the move that gives it the most time before its competitors can effectively retaliate... Finding strategic moves that will benefit from a lag in retaliation, or making moves so as to maximise the lag, are key principles of competitive interaction. (Porter, 1980; pp. 95, 98).

Multimarket Competition

Multimarket or multiple point competition is defined as occurring in situations in which firms compete with each other simultaneously in several markets (Karnani and Wernerfelt, 1985). Where this occurs, one competitor may informally occupy a position of superiority in the market, with the expectation that its rival's superior position in another market is similarly respected (Edwards, 1955; Bernheim and Whinston, 1990). Theoretical development in this area originates in industrial

organisation economics (Edwards, 1955; Bernheim and Whinston, 1990), population ecology (Baum and Korn, 1996), and strategic management (Karnani and Wernerfelt, 1985; Chen, 1996; Gimeno and Woo, 1996; Jayachandran et al, 1999). From a strategic management perspective, firms occupy particular market domains, defined by Jayachandran et al (1999) as the totality of geographic-product markets in which the firm operates. If a firm's domain overlaps with that of another firm, multimarket competition ensues. Multimarket competition is, then, the total degree of contact among competing firms across all of their market domains (Gimeno and Woo, 1996; Jayachandran et al, 1999).

Traditionally, researchers have viewed competition as occurring among firms within the same industry (Porter, 1980). This view is challenged by proponents of a strategic group approach, which aggregate firms as competitors based on strategic attributes that are heterogeneous between groups (Chen, 1996). In terms of predicting rivalry, we can say that firms will tend to have less incentive to interact in competitive situations, if they have little in common with one another (Chen, 1996). Porac and Thomas (1990) suggest that each firm will have its own conceptualisation of its competitors. Firms will then self-select their rivals for the purposes of their internal competitor analysis. This self-selection raises the possibility of competitive asymmetry (a situation where one firm competes with a rival, but the reciprocal relationship does not occur), which may have important implications for any consideration of inter-firm rivalry (for example, Tversky, 1977). Chen (1996) goes on to warn that a failure to consider that competitor awareness, motivation, and capability are shared constructs between rivalrous firms may lead to a misunderstanding of the nature of competition within a market.

The implicit assumption underlying traditional literature in economics and associated fields (articulated by Gimeno, 1999) is that a given firm's decision to attack a rival is independent of the set of reactionary responses that the rival may put into place. Consequently, the sustainability or otherwise of a firm's degree of competitive advantage may be, in large part, a reflection of

competitor's motivation (or lack of) to change the competitive status quo. Repeating rounds of interaction between competing firms form the basis for mutual familiarity (Simmel, 1950 cited in Gimeno, 1999). As such, firms develop 'spheres of influence' in their chosen product/geographic markets which are sustained via implicit threats of reciprocal retaliation, and consequent mutual harm.

Competitive events result from the combination of a strategic action, and a strategic reaction. This standpoint argues that the extent of each rival's advantage and profitability within a competitive pairing is determined by the dynamic factors underlying these events (Smith et al., 1992). The intellectual pedigree of this perspective can be traced back to Schumpeter (1934), Nelson and Winter (1982) and Smith et al., (1992). These authors articulate a view that some firms may attempt to be industry leaders, while others are content to follow and imitate. Firms that take actions (viewed by Schumpeter as innovations) may successfully reap monopoly profits, while their competitors struggle to catch-up throughout a time period coined by Nelson and Winter (1982) as the 'imitator's lag,' but referred to in this study as a 'response lag' in line with Smith et al. (1992).

Multimarket competition is viewed as an important determinant of firm performance. Previous empirical research has tended to find a positive relationship between firm performance and the degree of multimarket competition. However, evidence is mixed regarding whether the positive association is due to the influence of mutual forbearance; Jayachandran et al (1999) cite a number of studies in support of the mutual forbearance hypothesis (Feinberg, 1985; Singal, 1993; Hughes and Oughton, 1993; Evans and Kessides, 1994; Jans and Rosenbaum, 1996) and others against it (Rhoades and Heggstad, 1985; Mester, 1987). While the causal linkage between multimarket competition and firm performance remains unclear, one explanation for the development of mutual forbearance is that competing firms develop spheres of influence in their geographic-product markets. This concept (originating in Edwards, 1955) is based on the territorial interests of competing firms (traditionally considered with respect to geographic markets). Repeating rounds of

interaction provide firms with opportunities to maintain a state of competitive advantage over their rivals (McGrath et al, 1998; Jayachandran et al, 1999). This is particularly applicable to the market leader, as its advantages, in terms of strategic deterrence and ability to retaliate in different markets, are expected to negatively influence rival firms' motivations to attack them (Chen, 1996; Gimeno, 1999).

Oligopolistic Reaction

In this study, the definition of oligopolistic reaction is adapted from Head, Mayer, and Ries, (2002), as being the situation in which a firm's decision to enter a given market segment increases its competitors' incentives to invest in the same segment. In its original conceptualisation (as per Knickerbocker, 1973), oligopolistic reaction was seen as a possible third motive for foreign direct investment (FDI). This motive was seen as acting in addition to the two extant views that FDI would be undertaken in a particular geographic location in order to (a) gain access to lower transaction costs, or to avoid trade barriers, or (b) to exploit abundant factors of production in the target destination (Head, Mayer, and Ries, 2002; Knickerbocker, 1973). In essence, Knickerbocker considered that, in oligopolistic industries, firms would follow their rivals' location choices.

Knickerbocker (1973) illustrated this view with a hypothetical example of two firms matching one another move for move in their international expansion activities:

'[Firm] B, uncertain of product economies, if any, that [firm] A might gain by manufacturing locally, faces the possibility that it could be under priced by A in the market place. By establishing its own manufacturing subsidiary, B can match the production costs of A and thereby preserve its market share should A resort to price competition.' (Knickerbocker, 1973, p. 26; as quoted in Leahy and Pavelin, 2003).

The ultimate result would be that neither firm would be better or worse off in the long run, as the gains or losses due to foreign market success or failure would be always within the range of the firm's key rival.

The overall trajectory of the oligopolistic reaction literature has been largely in terms of firms investing in location-space (e.g. Flowers, 1976; Yu and Ito, 1988; Hennart and Park, 1994; Ito and Rose, 2002; and Head, Mayer, and Ries, 2002; Lehy and Pavelin, 2003). However, a number of authors in contemporary articles begin to explore the notion that the concept of oligopolistic reaction type behaviour may have explanatory value in areas beyond the traditional FDI/location decision issues. In fact, Lehy and Pavelin (2003, p. 441) state:

‘One may wish to characterise other investment (say in capital, research and development, or in a distributed network) in the same way. If so, the follow-my-leader behaviour... will be applicable to a wider range of firm behaviour than simply FDI.’

Working with the antecedent conditions of oligopoly, uncertainty, and risk aversion then it follows that an oligopolistic rival firm is likely to follow the first mover’s investment. The impact of oligopolistic reaction is the development of clusters of foreign direct investment events, as oligopolistic rivals follow the pioneer firm; Flowers (1976) noted that such activity leads to increased concentration in the foreign market. Empirical evidence of oligopolistic reaction suggests that firms recognise their state of mutual interdependence, assessing the actions of their competitors when planning their investment decisions (Knickerbocker, 1973; Yu and Ito, 1988; Ito and Rose, 2002).

Literature in this area also contributes to our understanding of how the role of industry structure in terms of competitive interaction. Yu and Ito (1988) note that the mutual interdependence of oligopolistic rivals mean that behaviours will tend toward an action-reaction and move-countermove structure (in line with Knickerbocker, 1973). However, both Knickerbocker (1973) and Yu and Ito (1988) agree that imitative behaviour is likely to vary according to industry concentration. Knickerbocker’s (1973) contention was that oligopolistic reaction cannot be observed in industries with too few or too many players. Yu and Ito (1988) expand this view in noting that, in a situation of two leading firms, mutual cooperation is likely to ensure as both seek to maximise industry-level profitability. Where more firms are competing, then it is unlikely that mutual cooperation, or

complete independence is possible, and oligopolistic reaction-type behaviour is likely to emerge. In the situation where there is a high number of competing firms, then they are more likely to behave independently.

On the question of whether oligopolistic reaction can explain the sequence of entry into product-market segments, the literature would appear to offer some limited insights. Head, Mayer, and Ries (2002) note that the scope of the oligopolistic reaction hypothesis extends beyond the immediate scope of the international business literature to economics, in its identification of sources of strategic complementarity. Possible areas of generalisation include the type of follow-the-leader activities, or the nature of motivations such as the role of uncertainty in generating imitative behaviour. Furthermore, imitation may occur in both location and product space domains, as the success or otherwise of a pioneer firm projects a signal to competitors about the attractiveness of a particular investment choice. Overall, assuming comparable processes of risk aversion, uncertainty avoidance, and a lack of perfect information regarding market entry costs then it follows that the oligopolistic reaction hypothesis has relevance for understanding product-space investment activities.

First Mover Advantage

First mover advantage is defined by Lieberman and Montgomery (1988, p. 41) as '*...the ability of pioneering firms to earn positive economic profits (i.e. profits in excess of the cost of capital).*' First mover advantage deals with the ability of firms to gain positive economic rents as a consequence of early entry (Frynas, Mellahi, and Pigman, 2006). Lieberman and Montgomery (1988) consider that the process of first mover advantage arises endogenously in a series of stages. In the first stage, luck, unique resources, or foresight provides the firm with an 'asymmetry', and affords it with an ability to gain a head start over its rivals. Having generated an asymmetry, the firm then has the ability to exploit its position, in an effort to enhance the magnitude and durability of its first-mover profits.

Lieberman and Montgomery (1988) categorise the antecedent factors contributing to first mover advantage into three sources, namely, technological leadership, pre-emption of locations in geographic and product space, and buyer switching costs. Each is conditional on the development of an asymmetry, which is a necessary precursor to the development of any opportunity for first mover advantage. This overview of the literature follows this categorisation, and draws on Lieberman and Montgomery's (1988) review, as well as harnessing insights from subsequent research.

Much of the extant research suggests that first movers tend to have higher market shares than early followers, who in turn have higher market shares than later entrants (Frynas, Mellahi, and Pigman, 2006; Kerin, Varadarajan, and Peterson 2002). The beneficial impact of early market entry has been challenged by Tellis and Golder (1996) and Shankar, Carpenter, and Krishnamurthi (1998), suggesting that first mover disadvantages may also be in evidence. Given this complication, a more detailed understanding of first-mover advantage is required. As such, these advantages may arise in the form of technological leadership, spatial pre-emption in product- or location-space, and the imposition of buyer switching costs.

Technological leadership advantages can be derived from learning or experience curves, or success in patent or R&D races (Lieberman and Montgomery, 1988). Lieberman and Montgomery (1988) cite Spence (1981), who showed that if learning is kept proprietary, then it can create barriers to the entry of competitors. However, first mover advantages may be diminished by inter-firm diffusion of technology (Lieberman and Montgomery, 1988; Ghemawat and Spence, 1985; Lieberman, 1987). A number of mechanisms for such technological diffusion may be evident, including workforce mobility, research publication, technical communication, reverse engineering, or plant tours.

Pioneering firms can help to secure their technological leadership positions through patenting (Lieberman and Montgomery, 1988). However, innovation may not be limited to technology, as firms may improve managerial systems, create new organisational forms (Lieberman and

Montgomery, 1988), or develop scale economies through managerial innovation (Chandler, 1977). Such innovations may prove longer-lasting than those in the area of technology (Teece, 1980).

Lieberman and Montgomery (1988) suggest that spatial pre-emption is one means by which first mover firms can secure an advantage. *'Preemptable 'space' can be interpreted broadly to include not only geographic space, but also shelf space and 'product characteristics space' (i.e. niches for product differentiation).'*' (p. 44). Previous work in the area draws from economic approaches headlined by Prescott and Visscher (1977); Schmalensee (1978); Rao and Rutenberg (1979), and Eaton and Lipsey (1979, 1981). Essentially, this work argues that firms can occupy niches in product or geographic space in such a way that latecomers will be forced to occupy less profitable interstices (Lieberman and Montgomery, 1988), because entry into new segments is deterred by the threat of price warfare (Lieberman and Montgomery, 1988). Empirical evidence supporting the notion of pre-emption in product space is supported by Robinson and Fornell (1985). Their finding was that consumer product pioneers held product quality advantages over latecomers, and subsequently built on this advantage through the development of a broader product line.

Late entrants may seek to attract customers away from the pioneer firm (Lieberman and Montgomery, 1988). Costs arise as extra resources are dedicated to achieving this task. Three types of switching costs are identified by Lieberman and Montgomery (1988):

'First, switching costs can stem from initial transactions costs or investments that the buyer makes in adapting to the sellers product. These include the time and resources spent in qualifying a new supplier, the costs of ancillary products such as software for a new computer, and the time, disruption and financial burdens of training employees. A second category of switching costs arises due to supplier specific learning by the buyer. Over time, the buyer adapts to characteristics of the producer and its supplier and thus finds it costly to change over to another brand (Wernerfelt, 1985)... A third type of switching cost is

contractual switching cost that may be intentionally created by the seller.' (Lieberman and Montgomery, 1988, p. 46).

Industry Perspective

The commercial jet industry has been active since 1956 (Benkard, 2004), with the first wide-body aircraft (the Boeing 747) introduced in 1969. Since 1970, the airframe industry has undergone a great deal of consolidation through merger and acquisition activity which has led to a high level of industry concentration (Benkard, 2004). Currently, two firms (Boeing and Airbus) dominate the production of long-range, wide-body commercial aircraft. This situation is replicated in the regional jets segment, with two players (Canada's Bombardier Aerospace, and Brazil's Embraer) dominating the segment. The structure of the international commercial airframe industry is oligopolistic, with each manufacturer producing, marketing, and selling a portfolio of models that are broadly similar in that they are designed and manufactured with the same end-use in mind, and are manufactured and designed with the same basic technologies. However, the airframes do differ from one another in terms of their technological content; thus there are differences in terms of performance, efficiency, and overall operating costs (Ferreri, 2003, also noted by Abell (1986) as cited by Ferreri).

There is little outward evidence of price based competition in the international commercial airframe industry. However, Ferreri (2003) notes that while price is used as a competitive lever, but in a latent manner, with price being incorporated into a host of other marketing strategies, including advantageous sale conditions, sales financing, customisation of the airframes on offer, advantageous offers on spare parts and maintenance, and aircrew training.

'In reality, the manufacturers are well aware of the disastrous consequences that would result from an open price war. Such an open battle would jeopardize the stability and profitability (already limited) of the sector...Therefore, the aeronautical industries apply other market strategies that, although not appearing to be price strategies, in substance are equivalent.' Ferreri (2003, pp. 105 – 106)

The historical development of the industry has featured industry consolidation, failed and successful 'bet the company' efforts, and substantial political involvement. In the last decade, McDonnell Douglas was acquired by Boeing, and both Fokker and British Aerospace exited the market. The fundamental nature of the market is oligopolistic, although each manufacturer offers a portfolio of somewhat diversified products (Ferreri, 2003). The international aerospace industry has a number of distinctive characteristics that make it interesting to study. Entry costs are particularly high. Returns to scale are also very high, although they are countered by small production runs (Benkard, 2004).

Boeing's leading position in the wider international aerospace industry has its origins in aircraft built for bombing operations both during and following World War II. This experience in manufacturing and in the defence sector has been applied in the commercial sector. At the present time, approximately 85% of the commercial aviation fleet has been designed and manufactured by Boeing (Esty and Ghemawat, 2002). Sales of commercial airframes generate around two thirds of total revenue, with defense contracts accounting for the remainder.

Boeing's archrival, Airbus Industrie, was founded in 1970 as a consortium of formerly independent European aviation firms. Principle founding members included the leading aerospace companies from Germany (Deutsche Aerospace, now a Daimler- Chrysler subsidiary known as DASA), France (Aerospatiale Matra), the U.K. (Britain's Hawker Siddeley, later BAE Systems), and Spain (Construcciones Aeronauticas, CASA) (Esty and Ghemawat, 2002).

The regional jet sector developed separately. The need for regional jets originated from US airline deregulation during the late 1970s, when major airlines tended to manage short range, less densely trafficked with shortened versions of commercial aviation aircraft. Following the development of purpose-built regional airliners such as the Boeing 737, Airbus A319, and the McDonnell Douglas MD-87, competition began to occur between these aircraft, and those that had traditionally populated the segment (Fokker 70, Fokker 100, and BAe-146). By the end of the 1980s, no dedicated regional jet had emerged to suit the needs of regional airlines (Ferreri, 2003).

Bombardier's response to this opportunity saw the re-development of its Challenger jet into a regional jet configuration. This provoked some concern from existing competitors, such as Fokker, British Aerospace, Saab (with the S-340, and the turboprop Saab S-2000), and the Alenia/Aerospatiale/ATR consortium that was responsible for the ATR-42 and ATR-72 turboprop aircraft, who were faced with the difficulty of modifying existing turboprop airframes into regional jet airliners. Embraer was able to achieve this, and entered the regional jet segment with the EMB-145, and the EMB-135. Both were derived from the EMB-120 turboprop, taking its fuselage and combining it with a new wing (Ferreri, 2003). Following Fokker's bankruptcy (in 1996), the removal of the F100 jet and the F70 regional airliner from the market created something of an available niche for competitors in the regional airliner segment (Ferreri, 2003).

Despite these developments in the regional jet segment, turboprop aircraft dominated the regional airliner segment until the mid 1990s. However, in October, 1994, an American Eagle ATR-72 crashed due to ice accumulation on its wings and fuselage. Following this event, turboprop aircraft were viewed rather negatively in the U.S. From this point, airlines tended to prefer regional jets over turboprops, although the global demand for turboprop aircraft did not change to any great extent over the 1990s, since then, regional jet airliners have grown in popularity. Regional jet airliners have increasingly been used by airlines for transferring passengers between major and regional affiliates, extending the range of hub systems, and creating new point to point connections. Turboprop aircraft still fulfil a role in feeding hub systems, with a particular emphasis on shorter routes (Ferreri, 2003).

In this study, the commercial aircraft industry is segmented into three levels. Wide-body aircraft are double-aisle, long-range airplanes, with high passenger capacity (200-550 passengers). Common examples include the Boeing 747, the Airbus A340, and the recently developed Airbus A380. Narrow-body regional airliners tend to have a shorter range, with single-aisle seating arrangements. They typically carry around 100-200 passengers. Examples include the Boeing 737, and the Airbus

A320. Regional jets include the Embraer ERJ 170 series, and the Bombardier CRJ 440. Turboprop aircraft are smaller again, with propeller-driven engines, shorter ranges, and passenger capacities of less than 100 (Irwin and Pavcnick, 2004). Examples include the ATR 72, De Havilland Dash 8, Saab 340, and the Antonov An-140.

In the commercial airframe industry, the manner in which firms specify their aircraft may be of considerable importance. Academic literature in this area promises considerable insight into the role, nature, and determinants of relative product-space location choices in the context of international strategy.

Research Questions and Hypotheses

This study seeks to address the question:

What are the long-run determinants of competitive positioning among rivalrous airframe producers?

The question seeks to uncover a number of determinants (or, predictors) of competitive positioning in product-space terms. By way of definition, this involves finding a number of factors that lead to model positioning vis-à-vis competing airframes, within a particular space defined by a number of pre-defined or implicit aircraft attributes (depending on the methodology used). The nature of the international airframe industry is such that at the various levels of the industry, the competing firms are reasonably well defined and quite limited in number. For this reason, they can be considered as 'rivalrous' if they are competing for the same customers, in delivering a similarly specified airframe to fulfil a particular niche within the product space.

In order to address the question, a number of theoretical lenses are applied to the product space competitive events within the international commercial airframe industry, in an effort to shed light on the various actions firms may undertake as they act in a rivalrous manner. The questions are, as follows:

- 1) *To what extent does the oligopolistic reaction framework explain the sequence of entry into product-space segments?*

An obvious starting point for competitive actions taking place in product-space is the act of entry of a new model or distinct derivative or variant airframe within the competitive space. The oligopolistic reaction framework has largely developed within the FDI literature, as a possible explanatory variable explaining imitative or mutually avoiding geographic entry events. The view, in this study, is that given similar background states of oligopoly, risk aversion, and major requisite investments to fund a product space entry, similar processes of avoidance, imitation, or firm identity impacts could be evident in the international commercial airframe industry.

Research Proposition 1) That interactions in product space show aspects of oligopolistic reaction, including follow the leader segment entrance behaviour

- 2) *To what extent is the intensity and conduct of competition across the airframe industry's product-spaces characterised by multipoint competitive interaction?*

Multipoint competitive interaction, or multimarket competition (as it is known in the parlance of international marketing) describes the nature of competitive interactions between rival firms that are interacting in a particular market, be it geographic, product-related, or in some other competitive arena. A number of processes or phenomena are highlighted by this literature which are of interest in the present study, namely the development of mutual forbearance between competing firms as they seek to mitigate the effects of zero-sum competition, the presence of intra-industry mechanisms for the coordination of multimarket competition, and the development of spheres of influence, where one firm is considered by its rivals to enjoy a situation of competitive ascendancy. Overall, the insight provided by multipoint competitive interaction provides a way of investigating the process of competition, which unfolds over multiple rounds of competition, and

where oligopolistic or duopolistic rivals have the opportunity to learn one another's competitive signalling.

Research Proposition 2) That firm interactions in product space are explained by aspects of multimarket competition, including the active creation of spheres of influence, and the pursuit of mutual forbearance

3) *To what extent is the success of product-space ventures explained by the first-mover advantage framework?*

In keeping with international strategy, this sub-question sheds light on the fundamental issue of the success and failure of firms in international competition (Rumelt et al., 1994). In this study, however, the level of interest is focussed on the success or failure of individual product space ventures. However, it is well known that in the international commercial airframe industry, firms may often 'bet the company' on the success of a particular product venture. The theoretical framework adopted in this sub-question reflects an understanding of dynamic competition that has been under development in the international strategy literature since a seminal article by Lieberman and Montgomery (1983). In this study, the first mover advantage framework provides a useful and readily falsifiable means of predicting the relative degrees of success enjoyed by proximate product space ventures.

Research Proposition 3) That interactions in product space show aspects of first mover advantage, including the development of a competitive 'response lag' via unique market positioning.

Concluding Comments and Areas of Potential Contribution

The study is positioned to make a number of contributions to the literature. This work will make a contribution by uniting several streams of literature drawn from international business and international strategy and testing their explanatory power in a unique industry context. To date, an

integration of theoretical contributions from multimarket competition, oligopolistic reaction, and dynamic strategy has not been undertaken in this context. While many researchers have considered this industry at the level of jet airliners (primarily, Boeing versus Airbus), little work has been done on the other levels (narrow-body regional airliners, and turboprop aircraft), which are characterized by more complex patterns of competitive interaction.

Current research in international business has not taken full account of the dynamic elements that may exist in inter-firm rivalry. This study extends existing work in the action-reaction framework to include a consideration of product-space. The first area of contribution is an extension of the 'sphere of influence' concept from geographic and market-based considerations into product space. This contribution responds to Jayachandran et al.'s (1999) proposition that product line rivalry represents a means by which multimarket competition may be generated in the process of firms' experiencing overlap in their spheres of influence. The second area of contribution concerns an extension of the oligopolistic reaction framework to the context of product-space entry. The third area of contribution is the addition of a qualitative aspect to the study of multi-market competition. Gimeno (1999) notes that the logic of competitive interaction depends on subjective beliefs and expectations about the likelihood and severity of a competitive reaction. A fourth area of contribution is in building on a limited literature exploring cross-border multimarket interactions. The contribution is implicit within the selection of the aerospace industry to provide the data source for the project, as the industry operates globally. The fifth area of contribution resides in the overall application of these established frameworks to what is one of a limited number of truly global industries, as airframe manufacturers operate worldwide, and do not experience the geographic restrictions seen in other industries. Finally, this study recognises the multi-level nature of the aerospace industry, and examines multiple product space interactions in these terms.

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