



Competitive dynamics in the international airline market: Exploring antecedents of competitive actions¹

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ABSTRACT

When airlines engage in competitive actions against each other, they are expected to do so for a variety of reasons. Although the ultimate goal of these competitive actions is to increase market share against competitors and to achieve above-average profits, some antecedents in the market provide different clues for airlines in the context of implementing competitive actions. The purpose of this study is to identify the antecedents that are believed to be effective on competitive actions and whether they vary according to the types of actions taken in the context of the Turkish international airline market. In the study, the dependent variables are the number of competitive actions and the independent variables are 12 variables related to the operational structure, resources, cooperation and market relations of the airlines. The models and hypotheses developed in the research were tested by panel regression analysis. As a result, models were obtained consisting of different antecedents according to the types of competitive actions and different effects of the same antecedent according to the type of action.

1. Introduction

The field of strategic management has seen a continued development of key topics since the 1980s. These include industry structure [68], top management teams [46], strategic groups and formalisations [23], the resource-based view [3], dynamic capabilities [80], game theory [8] and network structure theory [81]. During this same period, the study of competitive dynamics also yielded its initial findings. Unlike the aforementioned approaches, this field of study concretised strategy by examining observable actions in real-world markets. This approach considers competition to be a dynamic and interactive process. Conversely, it considers each market and firm as a distinctive entity, characterised by its own attributes and resources. Furthermore, it considers the organisational forces, leadership behaviour and human agency that underlie competitive interactions [14,18].

Given that competition is a fundamental aspect of strategic management, it is essential to examine the competitive actions and counteractions that constitute the means by which firms engage in

competition [14]. Accordingly, an assessment of competitive conditions should be conducted not only at the industry or group level, but also at the firm level [4]. The field of competitive dynamics is concerned with the examination of the competitive actions undertaken by firms within an industry with the objective of attaining a favourable market position and financial performance. Additionally, it encompasses the analysis of the responses, or reactions, to these actions within a strategic and organisational context. Additionally, it is a field that examines the conditions that cause these competitive moves and the consequences of these moves [18,74]. While competitive dynamics examines the actions of actors in real markets against each other and the consequences of these actions, it also examines the probabilities of these actions and reactions to them, the conditions under which actions or retaliations will or will not occur, and the factors that increase or decrease the probability of their realisation [18,43].

The term "competitive moves" is used to describe the actions and responses of firms operating in a competitive market. The competitive interaction between firms operating in a business environment

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ultimately determines their market performance. By analysing sequences of competitive actions over time, it is possible to predict a firm's future performance and its subsequent actions. This is why the analysis of a firm's behaviour represents an invaluable competitive tool. In light of the aforementioned observation, this study proceeds to analyse competitive actions on the basis of competitor dyads.

The initial research on competitive dynamics concentrated on the actions and reactions to those actions [14,15,17,16,19,35,59,75]. Smith et al. [74] sought to ascertain whether the response of rivals to an action is influenced by the characteristics of the action itself. In their 1992 study, Chen and MacMillan examined the potential for irreversibility in actions to elicit retaliation, considering the characteristics of the actions in question. Chen and Miller [17] conducted their analysis on the basis of two headings, namely strategic and tactical actions. In a further classification, Chen et al. [21] distinguished between internal and external irreversibility. Subsequent studies, based on Mintzberg's Strategy as Pattern [60], describe competitive strategy as a repertoire formed by the accumulation of actions and analyse individual actions at the micro level [32,33,34].

A review of the literature reveals a predominant focus on the characteristics of actions and responses to those actions. However, these studies have not adequately addressed the broader contextual factors that shape those actions, including industry structure, cultural influences, and regulatory factors. While this allows the studies to be applicable in specific contexts, it makes it challenging to draw generalised conclusions. Furthermore, although the focus on Mintzberg's concept of 'Strategy as Pattern' is beneficial, this method may restrict the analysis of strategy formulation processes in a more dynamic and variable manner. In a context where strategic actions require constant adaptation, particularly in fast-changing sectors, this static approach may prove to be incomplete. A significant proportion of this research is based on case studies or data derived from specific industries, which may limit the extent to which the findings can be generalised. For instance, there has been no comprehensive investigation into the distinctions between strategic and tactical actions across diverse industries.

In the studies conducted in the context of competitive dynamics, competitive actions are categorised according to their types. However, this categorisation is not sufficiently detailed, as it is done under broader headings such as strategic or tactical, and does not focus on the types of actions. It is evident that there is a necessity for the implementation of sector-specific categorisations, particularly within the context of studies conducted within the airline industry. It is anticipated that this gap will be addressed by a systematic examination of the types of actions. The extant literature on competitive dynamics tends to focus on specific aspects of the subject, and studies have frequently been conducted without differentiating between types of action. In light of the aforementioned circumstances, the objective is to adopt a more comprehensive approach to the analysis of competitive dynamics within the Turkish international airline market. The Turkish international airline market provides an appropriate context for such an analysis. In particular, the liberalisation process, which commenced in 1983 and accelerated in 2003, has led to a notable increase in the number of market participants, the level of competition, the number of country and airport pairs, and the number of aircraft in operation [87]. In the Turkish market, we believe there is a need to further investigate how airlines' competitive behaviour adapts to regional dynamics. In light of the aforementioned context, the approach of this study is to address the root causes of competitive behaviour, the characteristics of competitive interactions and the forms of action that emerge depending on market conditions in a comprehensive manner.

In the light of the explanations made, the research questions are as follows:

- What are the antecedents of actions and reactions between airline companies?
- Do the factors affecting the actions made by airlines differ according to the types of actions?

In order to respond to the research questions outlined above, it is necessary to test the factors that give rise to bilateral competition (moves and counter-moves) between airlines within the models and hypotheses that have been established. The objective is to develop a comprehensive model of firm-pair competition between airlines. The objective is to extend the arguments put forth by the industry and the existing literature to provide an expanded model of competitive dynamics that incorporates actions and retaliations within the market. The research design and analyses are based on the unique characteristics of the industry. This difference is considered to increase the value of the research. In this context, the variables of code-sharing, which airline operators consider a competitive tool and frequently use to facilitate market entry, and membership of global strategic alliances are among those specific to the industry and are analysed within the scope of the research. In addition, business models, which are closely related to the strategies implemented by airlines, are another factor taken into consideration.

2. Theory and hypothesis

The size of a firm is an important factor in determining the level of competition [5]. The extant literature demonstrates that larger firms possess superior access to more strategic resources, exert greater market power, benefit from economies of scale and scope, create barriers to entry, and ultimately occupy a more advantageous competitive position. Large firms may employ predatory tactics, including price cuts, promotions, and higher flight frequencies than competitors, to gain an advantage over smaller competitors. This is achieved by leveraging their competitive power to increase barriers to entry, thereby protecting their profitability [72]. Conversely, the view has been put forth that managers of larger firms will exhibit inertia if they believe they are strong enough to ignore threats from smaller competitors [85]. Furthermore, it is frequently asserted that smaller firms are more flexible, faster and capable of undertaking actions that are not immediately apparent to competitors [15]. Furthermore, Aldrich and Auster [1] posit that smaller, more vulnerable organisations should be perpetually vigilant for potential threats and opportunities to prevent stagnation. These characterisations indicate that large and small firms are likely to utilise markedly disparate competitive strategies, despite the fact that the desired outputs and their outcomes may be analogous [5].

In the context of the aviation industry, larger companies may have the opportunity to enter more markets with their aircraft and increase their frequency in their existing markets, provided that they comply with the relevant economic regulations. This is particularly the case for companies that have a greater capacity than their competitors. Furthermore, in order to become larger, it is necessary to produce a greater quantity of capacity, which is measured in available seat-kilometers (ASK). In order to achieve this, larger aircraft are required in terms of both range and the number of seats they are able to accommodate. The majority of airlines with larger aircraft in their fleet are traditional airlines that connect smaller airports in the surrounding area to more distant destinations via the global flight network, utilising the hub-and-spoke network structure. The global flight network enables traditional airlines to offer their passengers uninterrupted access to any destination at any time. These companies endeavour to maintain optimal flight frequencies by maintaining expansive and diverse flight networks and reducing total travel time [37]. Furthermore, in adopting a differentiation strategy, they seek to differentiate their service processes, focusing on comfort-based components, particularly within the cabin. In this context, traditional airlines endeavour to maintain a high level of service quality throughout the entirety of the passenger journey, encompassing the processes preceding, during and following the flight [37,50]. It is therefore anticipated that the expansion of the business model will result in increased actions related to schedule, capacity and comfort, given the inherent correlation between these factors and the size of the enterprise.

On the other hand, it is expected that airlines that are smaller than their competitors will use price actions, which are one of the easiest competitive tools to implement, and will also resort to advertising and promotional actions in order to increase their market share and gain a place in the minds of their customers. For this reason, it is expected that there will be a negative relationship between size and competitive actions, including price and image components. In line with this information, the first hypotheses of the study were formulated to test the effect of relative size on the number of competitive actions.

- *H1a: There is a positive relationship between the relative size of competitors and the number of schedule-based actions.*
- *H1b: There is a positive relationship between the relative size of competitors and the number of capacity-based actions.*
- *H1c: There is a negative relationship between the relative size of competitors and the number of price based actions.*
- *H1d: There is a positive relationship between the relative size of competitors and the number of actions involving comfort-based components of airline product.*
- *H1e: There is a negative relationship between the relative size of competitors and the number of image actions.*

There may be different situations related to airlines operating relatively more flights. Either this airline flies to more destinations, or the frequency of its existing routes is higher than that of its competitors, or both situations may occur simultaneously. Among the schedule-based components, the total number of flights is of particular importance in terms of reducing the total travel time. This is due to the fact that an increase in the number of flights within a specific market will result in a reduction in the time interval between flights at varying times of the day. The interval between connecting flights provided by the hub-and-spoke network structure should be neither excessively lengthy nor brief. If the interval is too lengthy, the total travel time between the origin and destination will increase, thereby precluding the achievement of the most important feature of the airline product, namely, rapid relocation. A time interval that is too brief may result in a passenger missing their connecting flight. It is therefore essential that the time between connecting flights offered to passengers by the hub-and-spoke network structure is optimally designed [10]. The decision to increase the frequency of an existing route or to open a new route is contingent upon the availability of sufficient aircraft within the airline's fleet. This in turn requires the implementation of capacity adjustments. Each of these situations requires airlines to make competitive actions involving schedule and capacity components ([29], p. 87). For this reason, it is expected that offering more flights than the competitor will increase schedule and capacity related actions.

On the other hand, LCCs with a cost leadership strategy operate frequent flights with relatively short average flight lengths on short-haul point-to-point routes. This may increase the number of flights operated by LCCs ([11], p. 29). In addition, price is an important competitive tool often used by LCCs [50]. Therefore, a positive relationship is expected between the total number of flights and price and comfort-based behaviours. In addition, LCCs offer a simple service (no-frills) as they focus on reducing costs in all processes. In this context, a negative relationship is expected between the total number of flights and the number of comfort-based actions.

The image-based actions to be taken by LCCs offering point-to-point service with a complex flight network may be implemented in different ways for different destinations. For this reason, it is expected that there will be a positive relationship between the total number of flights and image actions. In this context, the second set of hypotheses of the study was designed to test the effect of the total number of flights on the number of competitive actions.

- *H2a: There is a positive relationship between operating more flights than the competitor and the number of schedule-based actions.*

- *H2b: There is a positive relationship between operating more flights than the competitor and the number of capacity-based actions.*
- *H2c: There is a positive relationship between operating more flights than the competitor and the number of price actions.*
- *H2d: There is a negative relationship between operating more flights than the competitor and the number of actions involving comfort-based components of airline product.*
- *H2e: There is a positive relationship between operating more flights than the competitor and the number of image actions.*

Although airlines engage in competitive activities vis-à-vis their rivals, they also engage in cooperative activities with them. The most prevalent form of collaboration in airport pair markets is the implementation of codeshare agreements. Airlines are able to sell tickets using their own flight code on a flight operated by another airline with which they have a codeshare agreement [83]. This enables the airline to operate in the relevant market utilising the resources (fleet, crew, slots, etc.) of another airline with which it has an agreement, obviating the necessity for it to operate an additional flight itself, thus facilitating market entry [36]. It is anticipated that code-sharing with other airlines will influence the number of actions that airlines take against each other. In the context of code-sharing, airlines engage in a form of cooperation whereby they sell tickets for the same flight, thereby forming a partnership in the market. In this context, it is anticipated that the cooperating firms will undertake a reduced number of actions, including those related to scheduling, capacity, and pricing, which are specifically directed at the competitor with whom they are engaged in a collaborative venture. Such actions are likely to have a detrimental impact on both the firm and the cooperation.

Alternatively, cooperating airlines may seek to gain a competitive advantage by enhancing the quality of their services in terms of comfort-based components, fostering customer loyalty through frequent flyer programmes, and engaging in various advertising and promotional activities. This is because, as Miller [56] posits, such actions can be regarded as competitive actions that do not directly target the competitor. It is thus anticipated that a positive relationship will be observed between market cooperation and the number of comfort and image actions. In accordance with the aforementioned information, the third set of hypotheses was formulated to assess the impact of market cooperation on the number of competitive actions.

- *H3a: Market co-operation among competitors has a negative effect on the number of schedule-based actions.*
- *H3b: Market co-operation among competitors has a negative effect on the number of capacity-based actions.*
- *H3c: Market co-operation among competitors has a negative effect on the number of price-based actions.*
- *H3d: Market co-operation among competitors has a positive effect on the number of actions related to comfort-based components of airline product.*
- *H3e: Market co-operation among competitors has a positive effect on the number of image actions.*

Another form of cooperation is airline membership in global strategic alliances. Alliance members offer access to private passenger lounges that can be used by their members worldwide. In addition, members can combine their FFPs and offer passengers privileges such as priority check-in and boarding. Thanks to the coordination of schedules, convenient flight connections and through check-in privileges, an uninterrupted airline service is provided ([25], p. 195). All these benefits are also interpreted as the fact that competition is no longer between airlines, but between airline cooperation groups ([44], p.153). As in the case of market cooperation, it is assumed that competitive actions such as price reduction, frequency increase, new market entry, which are directly aimed at each other, will harm the member airlines in the same strategic alliance. However, if these airlines focus on the comfort-based

components of their own airline product and try to attract passengers by improving their own services or offering a new service, they will be competing indirectly. One way of doing this is for airlines to focus on image-related activities (advertising, promotions, etc.). Therefore, it is expected that being in the same strategic alliance will have a negative relationship with schedule, capacity and price, and a positive relationship with comfort and image-related actions. In line with this information, the fourth group of hypotheses of the study was established to test the effects of being in the same strategic alliance on the number of competitive actions.

- *H4a: Being in the same strategic alliance has a negative effect on the number of schedule-based actions.*
- *H4b: The presence of competitors in the same strategic alliance has a negative effect on the number of capacity-based actions.*
- *H4c: Being in the same strategic alliance has a negative effect on the number of price-based actions.*
- *H4d: The presence of competitors in the same strategic alliance has a positive effect on the number of actions related to comfort-based components of airline product.*
- *H4e: The presence of competitors in the same strategic alliance has a positive effect on the number of image actions.*

It is expected that there will be a link between the business models adopted by airlines and the actions they take, the types of actions they take and the threats these actions pose to which airlines. Indeed, there are clear differences between the business models of LCCs and traditional airlines. For example, while LCCs operate point-to-point non-stop flights on relatively short routes, charter airlines operate flights to tourist regions, usually for holiday purposes. Traditional airlines, on the other hand, offer services on a global scale through their large and extensive networks. At this stage, competitive action on price and capacity is seen as a threat to airlines that follow the same business model. A competitive action by an incumbent airline to increase the frequency of a long-haul flight or to use a larger aircraft on that route will not make sense for a charter airline providing point-to-point service on short-haul routes or serving only a particular part of the market. For this reason, it is expected that there will be a positive relationship between the number of price and capacity related actions and the adoption of the same business model by competitors.

The LCCs that emerged after liberalisation gained momentum are trying to gain a competitive advantage by offering low prices. The presence of an LCC in the market has the effect of reducing ticket prices [86]. For this reason, price competition is likely to occur between LCCs and traditional airlines, despite their different business models. It is therefore expected that there will be a negative relationship between the adoption of the same business model and the number of price actions. A competitive action by a traditional airline in a comfort-based component of airline product (e.g. in-flight entertainment system) is unlikely to be perceived as a competitive move by a LCC whose fleet consists entirely of economy class aircraft and which tries to keep the dry operating weight as low as possible in order to reduce costs. In addition, it is assumed that measures such as advertising and promotion are mostly taken against competitors that have their own business model, incorporate their own features, have similar capabilities and appeal to a similar customer profile. In this context, it is expected that the adoption of the same business model by rivals will increase the number of comfort and image-based actions. In line with this information, the research's fifth set of hypotheses was formulated to test the effect of adopting the same business model on the number of competitive moves.

- *H5a: Competitors' adoption of the same business model has a positive effect on the number of schedule-based actions.*
- *H5b: Competitors' adoption of the same business model has a positive effect on the number of capacity-based actions.*

- *H5c: Competitors' adoption of the same business model has a negative effect on the number of price-based actions.*
- *H5d: Competitors' adoption of the same business model has a positive effect on the number of actions related to comfort-based components of airline product.*
- *H5e: Competitors' adoption of the same business model has a positive effect on the number of image actions.*

The level of maturity of an airline is thought to exert an influence on the competitive behaviours exhibited by that airline. The findings of previous studies indicate a negative relationship between the age of an airline and two key performance indicators: market share gain and the volume of actions (entering a new market). These results have been consistently observed across different research contexts [82,20]. A relatively young airline is likely to seek to expand its market share in the face of incumbent firms. In order to serve a greater number of passengers, younger airlines are expected to utilise a range of schedule and capacity-based actions, including new market entry, frequency increase, aircraft type expansion and the addition of new aircraft to the fleet [52]. It is therefore hypothesised that there is a negative correlation between firm maturity and the number of schedule and capacity-based actions.

Conversely, older airlines that are already present in the market may seek to impede new competitors from entering the market through predatory pricing [47]. In this context, it is anticipated that firms with high maturity and incumbent status may employ price actions with the objective of establishing barriers to entry. Consequently, the relationship between age and price actions is expected to be positive. Moreover, it is anticipated that these firms will engage in more competitive actions pertaining to comfort-based components than their younger counterparts. In light of the aforementioned considerations, it is anticipated that there will be a negative link between firm maturity and the number of comfort-based actions.

It is anticipated that a relatively young airline, which is a recent entrant to the market, will utilise competitive strategies to promote itself, gain market acceptance and increase its market share ([49], p. 337). One method of achieving these gains is through the utilisation of advertising and promotional activities. It seems plausible to suggest that firms with a longer history and greater experience are more advanced in developing their image than their younger counterparts. It is therefore anticipated that a negative relationship will be observed between the level of firm maturity and the number of image-related actions. The sixth set of hypotheses in the study was formulated to investigate the influence of firm maturity on the number of competitive actions.

- *H6a: There is a negative relationship between high firm maturity relative to the competitor and the number of schedule-based actions.*
- *H6b: There is a negative relationship between high firm maturity relative to competitor and the number of capacity-based actions.*
- *H6c: There is a positive relationship between the number of price actions and the high level of firm maturity relative to the competitor.*
- *H6d: There is a negative relationship between high firm maturity according to the competitor and the number of actions related to comfort-based components of airline product.*
- *H6e: There is a negative relationship between high firm maturity and the number of image actions.*

The number of employees in an airline affects the service capacity and capability of the airline ([66], p. 81). In order to take steps such as opening a new route, increasing the frequency of existing routes, and improving cabin-related services, the airline must have human resources to provide the service in question, as well as aircraft and financial resources ([79], p. 98). Therefore, it is expected that there will be a positive relationship between human resources and the number of schedule, capacity and comfort-related actions.

Furthermore, it is known that LCCs seek to increase labour productivity by producing more ASKs with relatively fewer human resources in

order to minimise their costs during the process ([73], p. 15). In addition, as LCCs reduce their costs, they reflect this cost advantage in their prices and offer lower-priced tickets to passengers ([50], p. 316). For this reason, it is expected that airlines with relatively fewer staff will use price promotions more than those with relatively more staff and that there will be a negative relationship between human resources and price actions. The seventh set of hypotheses in the research was designed to test the effect of human resources on the number of price actions.

- *H7a: There is a positive relationship between the high level of human resources compared to the competitor and the number of schedule-based actions.*
- *H7b: There is a positive relationship between the number of capacity-based actions and the high level of human resources compared to the competitor.*
- *H7c: There is a negative relationship between the high level of human resources relative to the competitor and the number of price actions.*
- *H7d: There is a positive relationship between the high level of human resources compared to the competitor and the number of actions related to comfort-based components of airline product.*

An organisation's slack resources refer to actual or potential resources that may or may not be currently in use [7]. The existence of such resources enables responses to competitive actions. In addition, it may provide opportunities for the firm to make a greater number of competitive actions through strategic innovation and activate the necessary resources [88]. If the amount of available resources is low, these opportunities may not be realised ([67], p. 15). If airlines want to take a step such as entering a new route, increasing frequency or using larger aircraft on their existing routes, they should have the resources to do so. The most important of these resources are undoubtedly aircraft and crew. On the other hand, airlines will need financial resources if they want to offer a new service or improve an existing service. In this context, having a ready resource in the company's coffers will increase the speed of implementation ([20], p. 109).

In addition, airlines want to have a good image in the eyes of passengers in order to gain more market share in a competitive market. Airlines that want to turn this situation to their advantage try to do so through competitive actions such as advertising, promotion and sponsorship. If an airline with a ready-made resource wants to launch a campaign that it believes will create a competitive advantage, it can do so quickly. In line with all this information, it is expected that there will be a positive relationship between slack resources and all dimensions of competitive actions. In this context, the eighth set of hypotheses of the study tests the relationship between slack resources and the number of competitive actions.

- *H8a: There is a positive relationship between high slack resources relative to the rival and the number of schedule-based actions.*
- *H8b: There is a positive relationship between high slack resources relative to the rival and the number of capacity-based actions.*
- *H8c: There is a positive relationship between high slack resources relative to the rival and the number of price actions.*
- *H8d: There is a positive relationship between high slack resources relative to the rival and the number of actions related to comfort-based components of airline product.*
- *H8e: There is a positive relationship between high slack resources relative to the rival and the number of image actions.*

Rival's capability to contest is measured by resource similarity, which indicates the degree of similarity in terms of the capacity and range offered by the aircraft owned by the two airlines ([18], p. 22). The difference in the type and quantity of resources between competitors is a crucial aspect of the resource-based competitive advantage model. It is argued that the difference in resources between competitors increases competitive behaviour ([89], p. 1222). Similarly, increasing similarity

between resources has a negative effect on competitive behaviour. When one of the two airlines with similar resources makes a move on the other, the one exposed to the move will be able to respond quickly. Because it also has similar resources. Likewise, when one of the two airlines with similar resources takes an action in a market by increasing the aircraft type or reducing the price, the competitor can respond in the same way. Therefore, there is expected to be a negative relationship between the rival's capability to contest and actions related to schedule, capacity and price.

If airlines have similar resources to their competitors, they will be more cautious in taking actions to avoid retaliation ([14], pp. 112–115). For this reason, instead of actions such as *schedule* or *prices*, which can be targeted at the direct competitor, indirect actions are expected to be taken against the competitor ([17], p. 88). The actions taken in areas such as offering a new service, developing own services, advertising and promotion can be seen as indirect actions. Thus, it is assumed that there is a positive relationship between the rival's capability to contest and the number of actions, including comfort and image components. In this context, the ninth group hypotheses of the study were established to test the relationship between the rival's capability to contest and the number of competitive actions.

- *H9a: Higher capability to contest relative to the competitor has a negative effect on the number of schedule-based actions.*
- *H9b: Higher capability to contest relative to the competitor has a negative effect on the number of capacity-based actions.*
- *H9c: Higher capability to contest relative to the competitor has a negative effect on the number of price actions.*
- *H9d: Higher capability to contest relative to the competitor has a positive effect on the number of actions related to comfort-based components of airline product.*
- *H9e: Higher capability to contest compared to the competitor has a positive effect on the number of image actions.*

The degree of homogeneity of the aircraft in an airline's fleet is thought to have an impact on competitive behaviour. Airlines with a homogeneous fleet may be able to act more quickly in operational processes. For example, it may be easier to replace aircraft. On the other hand, it can be said that fleet homogeneity increases the efficiency and productivity of flight and maintenance personnel and reduces maintenance, storage and personnel training costs. Fleet homogeneity reduces the amount of ground support equipment and spare parts inventory and increases flexibility in crew scheduling.

The fleets of traditional airlines are heterogeneous, while those of LCCs are homogeneous. This is because traditional airlines produce products with different characteristics (in terms of customer profile, flight length, etc.) and therefore require different types of aircraft. Traditional airlines attach great importance to the schedule-based components of the airline product in order to maintain a large and uninterrupted network with the hub-and-spoke network structure and to deliver passengers to any destination at any time. Accordingly, there is expected to be an inverse relationship between fleet homogeneity and the number of schedule-based actions.

In addition, fleet homogeneity may reduce the flexibility to respond to market changes. This is because an airline with the same type of aircraft will not be able to take this action if it wants to use a larger aircraft in an existing market or if it wants to switch to an aircraft with a lower capacity when it sees that demand is falling. Therefore, capacity changes will only be possible by adding or cancelling flights ([73], p. 11). Therefore, fleet homogeneity is expected to have a negative impact on capacity-related actions.

It is expected that airlines that follow the LCC business model and have a homogeneous fleet will use price-based competitive actions more often, while they will prefer competitive actions with comfort-based components less often. In this context, it is expected that there will be a positive relationship between fleet homogeneity and price-based

competitive actions and a negative relationship with comfort-based competitive actions. In this context, the tenth set of hypotheses tests the relationship between fleet homogeneity and the number of competitive actions.

- H10a: Having a more homogenous fleet than the competitor has a negative effect on the number of schedule-based actions.
- H10b: Having a more homogeneous fleet than the competitor has a negative effect on the number of capacity-based actions.
- H10c: Having a more homogeneous fleet than the competitor has a positive effect on the number of price actions.
- H10d: Having a more homogeneous fleet than the competitor has a negative effect on the number of actions related to comfort-based components of airline product.

An airline that has a large number of passengers at the origin-destination (O-D) points of a flight route can allocate more resources to that route in order to compete with other airlines operating in that market [6,38]. When an airline has a significant market share at both ends of a route, it has many flights from these points to various points (and from these points to other destinations). In this way, the airline can quickly shift its aircraft or human resources to these destinations when needed. Resource deployment capability refers to how quickly a focal firm can mobilise its available resources to the market(s) in which it interacts with a particular competitor. It indicates the firm's willingness to compete with its rival using its available resources in a given market ([82], p. 770). When the resource deployment capability, represented by the average O-D market share, is low, it is understood that it has less market share in all markets than the competitor. In this context, airlines with low resource deployment capability are expected to be more aggressive towards their competitor(s) in order to increase their market share. The capacity of airline companies to expand their market share is contingent upon the ability of passengers to travel to any destination at any time and without interruption with the airline of their choice. In order to achieve this, it is necessary for the flight networks of airline companies to be extensive and comprehensive. In a competitive environment, those who demand transportation services may require the ability to access these services at any given point in time. One potential strategy for meeting this requirement is to enter a new market that has not been previously served. Furthermore, by entering into code-sharing agreements in markets where the airline does not have an operational presence, the airline can offer its passengers the seats of the airline with which it has an agreement by selling its own tickets and thereby gain access to new markets [69]. All efforts to increase the existing market share require more schedule-based competitive actions. Therefore, it is expected that there will be a negative relationship between resource deployment capability and the number of schedule-based actions.

One of the easiest ways for airlines to compete is to offer lower prices to passengers than those offered by existing and potential competitors. In this context, it is anticipated that airlines will pursue high-priced strategies with the objective of expanding their market share, transporting a greater number of passengers, enhancing their occupancy rates, and generating above-average profits by covering their costs [2]. It is therefore anticipated that airlines with a low average O-D market share will frequently resort to price adjustments in order to increase this share, raise their profile through activities such as advertising and sponsorship, and that there will be a negative relationship between resource allocation ability and price moves. The eleventh group of hypotheses tests the relationship between resource deployment capability and the number of competitive actions.

- H11a: Higher resource deployment capability compared to the rival has a negative effect on the number of schedule-based actions.
- H11b: Higher resource deployment capability relative to the rival has a negative effect on the number of capacity-based actions.

- H11c: A higher resource deployment capability relative to the rival has a negative effect on the number of price actions.
- H11d: Higher resource deployment capability relative to the rival has a positive effect on the number of actions related to comfort-based components of airline product.
- H11e: Higher resource deployment capability relative to the rival has a negative effect on the number of image actions.

Market commonality focuses on the bilateral market interactions between firms. Moreover, market commonality measures the intensity of the focal firm's common market relationship with its rival and highlights the strategic importance of these markets from the perspective of both the focal firm and the rival [14]. A focal firm that experiences high market commonality with a particular rival may develop the ability to know its competitor better and better predict its behaviour (including its actions or lack thereof) ([82], p. 765). Previous research has shown that the degree of interaction between firms is likely to influence their competitive behaviour [38,5]. A high degree of market commonality between a focal firm and a competitor provides an opportunity for the firm to gain rich experience in dealing with the competitor [17]. This experience provides the firm with more information about the rival and allows the firm to better understand the rival's competitive strategy and intentions [68]. In addition, high levels of market commonality lead firms to engage in mutual avoidance for the reasons discussed above. In other words, when two firms frequently face each other in more than one market, they will be unwilling to make a move against each other for fear of retaliation ([5], p. 251, [18], p. 19; [42], p. 479).

When an airline takes an action into the market of a competitor with a high market share, such as increasing frequencies, using a larger aircraft or lowering fares, the rival airline may respond quickly. If the mutual actions reach a certain level, both sides will be negatively affected and the actions will not achieve the desired results. Therefore, it is argued that a high level of market commonality creates a situation of mutual avoidance between pairs of competitors ([18], pp. 18–19; [5], p. 251). Accordingly, market commonality is expected to have a negative impact on schedule, capacity and price-related actions.

On the other hand, it is expected that the actions that airlines with high market commonality will take against their competitors will be indirect actions, such as offering a new service, developing their own services, advertising and promotion, or sponsorship activities, rather than actions that directly affect the competitor, such as *schedule* or *price* ([17], p. 88). Miller [56] also states that an action such as a general improvement in service processes will not be perceived as a visible move by competitors and will not lead to retaliation. Therefore, it is expected that there will be a positive relationship between market commonality and the number of competitive actions related to comfort and image. In this context, the twelfth set of hypotheses tests the relationship between the degree of market commonality between competitors and the number of competitive actions.

- H12a: There is a negative relationship between high market commonality with the rival and the number of schedule-based actions.
- H12b: There is a negative relationship between high market commonality with the rival and the number of capacity-based actions.
- H12c: There is a negative relationship between high market commonality with the rival and the number of price actions.
- H12d: There is a positive relationship between high market commonality with the rival and the number of actions related to comfort-based components of airline product.
- H12e: There is a positive relationship between high market commonality with the rival and the number of image actions.

The expected relationships between dependent and independent variables are summarised in Table 1.

Table 1
Summary of Hypothesis.

Models →	Model 1	Model 2	Model 3	Model 4	Model 5
Independent Variables	Schedule	Capacity	Price	Comfort	Image
Relative Size	+	+	-	+	-
Total Flights	+	+	+	-	+
Codeshare (Market Cooperation)	-	-	-	+	+
Strategic Alliances	-	-	-	+	+
Business Model	+	+	-	+	+
Age (Firm Maturity)	-	-	+	-	-
Human Resources	+	+	-	+	+
Slack Resources	+	+	+	+	+
Rivals Capability to Contest	-	-	-	+	+
Fleet Homogeneity	-	-	+	-	-
Resource Deployment Capability	-	-	-	+	-
Market Commonality	-	-	-	+	+

3. Methodology

3.1. Data and Variables

In the study, there are 12 independent variables, 3 of which are dummy variables, which are thought to have an effect on the number of actions. The 12 independent variables selected represent a mix of operational, strategic and market-related factors that are expected to influence different types of competitive actions (schedule-based, capacity, price, comfort-based and image-based actions). These variables collectively provide a comprehensive framework for assessing how both internal capabilities and external market factors influence competitive actions of different dimensions. Table 2 shows the variables, data and data sources.

3.1.1. Independent variables

Relative Size (RTS): For relative size, the ASK value of the airline’s is used. The size is obtained by proportioning the ASK values between the focal firm and the rival to each other.

Total Flights (TLF): The total number of flights is obtained by proportioning the number of flights performed by the airlines in the relevant calendar year to each other.

Market Cooperation (MCOP): This is a dummy variable. If two competitors are codesharing, the variable takes the value 1, otherwise it takes the value 0.

Strategic Alliances (SAL): This is a dummy variable. It takes the value of 1 if the competitor pairs are in the same alliance and 0 otherwise. In the research, the strategic alliances in which airlines are included in 3 different groups. These are Star Alliance, One World and Skyteam.

Business Model (BSM): This is a dummy variable. If the competitor pairs carry out their activities with the same business model, the variable takes the value 1, otherwise it takes the value 0. In the study, the business models of airlines were evaluated in 3 different groups. These are; those who adopt the traditional airline business model and follow the differentiation strategy, those who adopt the low-cost airline business model and follow the cost leadership strategy, and finally the charter airline business model, which focuses on a certain part of the market and aims to carry holiday passengers to tourism regions with travel-hotel packages.

Firm Maturity (AGE): Firm maturity refers to the age of the firm. It covers the period from the year the firm was established until today. Firm maturity is obtained by proportioning the ages of the focal firm and the rival to each other.

Human Resources (HMR): Human resources is a variable obtained by proportioning the number of employees of the focal firm and the rival

Table 2
Variables, Data and Data Sources.

V	Name of Variables	Abbreviation	Data Used	Related Studies	Data Sources
I	Relative Size	RTS	Available Seat-Kilometers	[78,5,115]	Flightglobal, ICAO Data Plus, Official Airline Guide (OAG)
I	Total Flights	TLF	Total Flights	[29,11]	OAG
I/D	Market Cooperation	MCOP	Codeshare	[49,36]	Flightglobal, Routesonline, news websites and Airline Annual Reports
I/D	Strategic Alliances	SAL	Strategic Alliances	[44]	Star Alliance, SkyTeam and Oneworld official websites
I/D	Business Model	BSM	Airline Business Model	[50,37]	Flightglobal
I	Age (Firm Maturity)	AGE	Firm Age	[49,20,82,52]	Official websites of Airlines
I	Human Resources	HMR	Staff	[66,79]	Financial Reports, EMIS Store, ICAO Data Plus, Thomson Reuters Bloomberg, Capital500
I	Slack Resources	SLR	Current Ratio	[67,88,20]	Financial Reports, EMIS Store, ICAO Data Plus, ChAviation, Thomson Reuters Bloomberg, unternehmensregister*
I	Rival's Capability to Contest	RCC	Aircraft Number	[14,89]	Planespotters, ICAO Data Plus, Airline Annual Reports
I	Fleet Homogeneity	FH	Average O-D Market Share	[53]	OAG
I	Resource Deployment Capability	RDC	Passengers in O-D Markets	[82]	OAG, ICAO Data Plus, Eurostat
I	Market Commonality	MCOM	Number of Competitive Actions	[14,5,38,82]	Routesonline, Airlines' Official Twitter Pages, Annual Reports and Official Websites
D	Schedule-Based Actions	SBA		[57];	
	Capacity Actions	CPBA		[28];	
	Price Actions	PBA		[77]	
	Comfort-Based Actions	CTBA			
	Image Actions	IBA			

*Used-for German Airlines.

I: Independent; I/D: Independent & Dummy; D: Dependent

to each other.

Slack Resources (SLR): Slack resources are represented by the current ratio. It is possible to say that the higher the current ratio, the less the cash shortage of the firm, but at the same time the more resources it does not use.

Rival's Capability to Contest (RCC): In order to measure the rival's capability to contest, the degree of similarity of firms' resources is utilised. In order to measure resource similarity in competitive dynamics research, the degree of similarity of firms' resources is revealed with a formula similar to the formula used in market commonality. This formula is as follows:

$$RS_{ij} = \sum_{m=1}^n [(A_{im} / A_i) (A_{jm} / A_m)] \tag{1}$$

- RS_{ij}: Resource similarity between firm i and j
- A_{im}: Number of aircraft of type m of firm i
- A_i: Number of all aircraft of firm i
- A_{jm}: Number of aircraft of type m of firm j
- A_m: Number of all aircraft of type m

According to this formula, airlines' resources are the aircraft they use and the degree of similarity of each aircraft type is calculated in terms of numbers. On the other hand, unlike in previous studies, aircraft with the same characteristics but produced by different manufacturers are considered as the same aircraft type. For example, the A320 produced by Airbus and the B737–800 produced by Boeing have similar characteristics in terms of number of seats and range. In this context, as in the example above, aircraft with similarities in terms of range and number of seats are considered as the same type and analyses are performed with grouped aircraft types.

Fleet Homogeneity (FH): The fleet homogeneity index is calculated as the number of aircraft with the largest fleet share of the family divided by the fleet size. The value of the index is influenced by the number of aircraft families as well as the spread of the fleet across aircraft families ([53], p. 55). If all of an airline's aircraft are of the same type, the index value is 1. The value of the index is influenced by the number of aircraft families as well as the distribution of the fleet across aircraft families. An airline with a fleet of nine aircraft of the same type and one aircraft of a different type will have a fleet homogeneity index value of 0.9, while an airline with a fleet of five aircraft each of two different families will have a homogeneity index value of 0.5. Thus, the fleet homogeneity index reflects not only the number of aircraft types operated, but also their equal or irregular distribution in the fleet ([53], pp. 55–56). Fleet homogeneity is obtained by comparing the homogeneity scores of the focal firm and its competitors.

Resource Deployment Capability (RDC): The resource deployment capability of an airline is assessed by looking at the extent to which it is dominant or active in origin and destination markets relative to a particular competitor [82]. To measure deployment capability, the logarithm of the ratio between the focal firm's average end-point market share and the competitor's average end-point market share is taken ([82], p.770).

Market Commonality (MCOM): Market commonality gives the degree of overlap of the common markets in all markets in which the firms operate from the perspective of the focal firm. In other words, it gives the degree of similarity of the markets in which two firms operate simultaneously in all markets. Market commonality, which will be used as a continuous variable within the scope of the study, has an asymmetric feature. This is because the calculation is made separately from the perspective of each firm. Market commonality is calculated as follows ([14], p.118):

$$M_{ij} = \sum_{k=1}^n [(\frac{P_{ik}}{P_i})(\frac{P_{jk}}{P_k})] \tag{2}$$

- M_{ij}: Market commonality between firm i and j
- P_{ik}: Number of passengers carried by firm i on route (or airport pair)

K

- P_i: Total number of passengers carried by firm i on all routes
- P_{jk}: The number of passengers carried by j on route (or airport pair) K
- P_k: Number of passengers carried by all firms on the route (or airport pair) K

3.1.2. Dependent variable

Number of Competitive Actions: It gives a quantitative expression of the actions made by the focal firm against its competitor or competitors. Within the scope of the research, the competitive actions obtained by content analysis were grouped under 5 main headings and each category was evaluated as a separate dependent variable within the scope of the research.

The classification made by [28] within the scope of airline product was used in the grouping of competitive actions. For the types of competitive actions, the list of competitive moves developed by Miller and Chen [57] and added by Sönmez and Eroğlu [77] was utilised. Information on the types of actions in these models is given in Table 3.

Schedule-based components include the number and variety of destinations served, flight frequency, flight time, connection times, connection quality and on-time performance. The group of variables that are not directly included in the airline product but are considered as a separate group due to the type of competitive actions are capacity related actions. Another airline product component is the price. In this context, there are fare levels of tickets. In the study, the 3rd model was determined as the price component. Comfort-based components include elements such as cabin design, seat spacing, variety of catering offered, privileged lounges at airports and the services offered there, in-flight entertainment systems. Within the scope of the research, the model four includes actions related to comfort components. The last component related to airline product is the image component. The airline's reputation for safety, branding, Frequent Flyer Programmes (FFPs), advertising and promotional activities are the elements considered in this context ([28], p. 237).

3.2. Research models

This study aims to examine the factors that determine the antecedents of different types of competitive actions and panel data analysis is used to reveal these factors. The models developed within the scope of the study are as follows:

- Model 1: $SBA_{it} = \beta_0 + \beta_1RTS_{it} + \beta_2TLF_{it} + \beta_3DummyMCOP_{it} + \beta_4DummySAL_{it} + \beta_5DummyBSM_{it} + \beta_6AGE_{it} + \beta_7HMR_{it} + \beta_8SLR_{it} + \beta_9RCC_{it} + \beta_{10}FH_{it} + \beta_{11}RDC_{it} + \beta_{12}MCOM_{it} + \epsilon_{it}$ (3)

- Model 2: $CPBA_{it} = \beta_0 + \beta_1RTS_{it} + \beta_2TLF_{it} + \beta_3DummyMCOP_{it} + \beta_4DummySAL_{it} + \beta_5DummyBSM_{it} + \beta_6AGE_{it} + \beta_7HMR_{it} + \beta_8SLR_{it} + \beta_9RCC_{it} + \beta_{10}FH_{it} + \beta_{11}RDC_{it} + \beta_{12}MCOM_{it} + \epsilon_{it}$ (4)

Table 3
Grouping of Competitive Actions.

SCHEDULE (SBA)	CAPACITY (CPBA)	PRICE (PBA)	COMFORT (CTBA)	IMAGE(IBA)
Route Entry	Dispatch Bigger	Discount for Route Entry	Launch New Service	FFP
Increase Frequency	Airplane to the Route	Ticket Discount		Advertising
Codeshare on a Route	Dispatch Smaller Airplane to the Route		Service Improvement	Promotion activities
Route Exit	Adding New Aircraft	New Price Promotion		Sponsorships
Decrease Frequency				

• Model 3: $PBA_{it} = \beta_0 + \beta_1RTS_{it} + \beta_2TLF_{it} + \beta_3DummyMCOP_{it} + \beta_4DummySAL_{it} + \beta_5DummyBSM_{it} + \beta_6AGE_{it} + \beta_7HMR_{it} + \beta_8SLR_{it} + \beta_9RCC_{it} + \beta_{10}FH_{it} + \beta_{11}RDC_{it} + \beta_{12}MCOM_{it} + \varepsilon_{it}$ (5)

• Model 4: $CTBA_{it} = \beta_0 + \beta_1RTS_{it} + \beta_2TLF_{it} + \beta_3DummyMCOP_{it} + \beta_4DummySAL_{it} + \beta_5DummyBSM_{it} + \beta_6AGE_{it} + \beta_7HMR_{it} + \beta_8SLR_{it} + \beta_9RCC_{it} + \beta_{10}FH_{it} + \beta_{11}RDC_{it} + \beta_{12}MCOM_{it} + \varepsilon_{it}$ (6)

• Model 5: $IBA_{it} = \beta_0 + \beta_1RTS_{it} + \beta_2TLF_{it} + \beta_3DummyMCOP_{it} + \beta_4DummySAL_{it} + \beta_5DummyBSM_{it} + \beta_6AGE_{it} + \beta_7SLR_{it} + \beta_8RCC_{it} + \beta_9RDC_{it} + \beta_{10}MCOM_{it} + \varepsilon_{it}$ (7)

The models developed to identify the factors affecting the number of different types of competitive actions are shown in Eqs. (3), (4), (5), (6) and (7) above. Model 1 and Model 2 aim to identify the determinants of the number of schedule-based actions (SBA) and capacity-based actions (CPBA), while Model 3 and Model 4 aim to identify the determinants of the number of price-based actions (PBA) and comfort-based actions (CTBA), respectively. Model 5 deals with image-based actions (IBA).

3.3. Sample

The airline industry is considered an ideal research context for competitive dynamics due to well-defined markets, acknowledged intense competition among key players, and rich sources of publicly available information [82,38,75]. In addition, multiple market relationships, similarities in resources used in the market and high interaction also make the airline industry a suitable environment for the study of competitive dynamics ([39], p. 327). The Turkish international airline market is also considered a suitable context. With the liberalisation in 1983 and especially in 2003, the number of players, competition, countries, airport pairs and aircraft in the market has increased significantly. The population of the study consists of competitor pairs formed by airlines. In other words, the unit of analysis is the competitor pair. The sample of the research consists of the 26 largest airlines (not only Turkish but also foreign airlines) in the international airline market in Turkey in terms of the number of passengers. The research was conducted with $26 \times 25 = 650$ competitor pairs formed by 26 airlines. 26 airlines carry more than 90 % of the passengers in the Turkish international market according to ICAO data. In addition, the share of the selected airlines in global revenue passenger-kilometres is between 20 % and 22 %. The analyses carried out at the level of competitor pairs examine the relative position of all the airlines in the sample in relation to each other. As the analysis process would become very complex, it is preferred not to have a larger number of airlines.

3.4. Analysis of competitive actions and models

In order to test the functionality of the models designed within the scope of the research, Panel Data Analysis was conducted with Stata 13 programme. The research is conducted at competitor pair level. For this reason, data such as ASK, total number of flights, operating age are included in the data set by proportioning them in the context of the focal-rival firm [82,20]. For example, airline A and airline B constitute two different competitor pairs such as A-B and B-A. In the A-B competitor pair, A is the focal firm and B is the competitor firm. On the other hand, in the B-A rival pair, B is the focal firm and A is the rival firm. For the ASK variable in the research, assuming that the ASK value of A airline is 1000 and the ASK value of B airline is 500, this value will be 2 (1000/500) for the A-B competitor pair and 0.5 (500/1000) for the B-A competitor pair.

In order to determine the types and number of competitive actions, the raw text data obtained was subjected to content analysis and coded. Afterward, it was determined for which airlines the type of action determined from the codes could have an impact. Finally, the total number of competitive actions at the competitor pair level was obtained for the relevant year and airline.

The research encompassed the analysis of 14482 competitive moves

made by 26 airlines between the years 2014 and 2018. The analysis was conducted on the basis of competitor pair. As the relevant competitive moves are analysed at the competitor pair level, they do not exclusively encompass actions taken in Turkish markets. To illustrate, an action undertaken by Singapore Airlines, one of the airlines under examination, in the UK market is also regarded as a competitive move, given that this action poses a threat to British Airways, another airline within the scope of the study.

Table 4 gives examples of the raw texts subjected to content analysis, coding, and inferences made regarding the types of actions.

It is also possible that the actions made for a certain airport pair market (flight route) may affect different competitors offering connecting flights on this route. In this context, airlines offering connecting flights were also evaluated within the scope of the research. An example of this analysis is given in Fig. 1.

In the example in Fig. 1, the airlines likely to be affected by the entry of Pegasus Airlines on the Berlin route are classified according to whether they offer direct or indirect flights. The airlines offering direct flights are those registered in the countries concerned and which can operate flights on the market between Turkey and Germany to the extent that traffic rights allow. However, in addition to airlines operating direct flights on this market, airlines combining the same origin and destination points with connecting flights should also be included in the analysis. In this case, instead of all connecting flights, only those connecting flights that are meaningful for passengers should be identified. In order to identify meaningful connecting flights, the detour factor was used. In studies on the quality of connections, it is accepted that the ratio between direct and connecting flights is significant up to 40 % and that higher values indicate meaningless connections [12,24,27,40]. In order to calculate these values, it is necessary to compare the connecting flight distances offered on the relevant flight route with the direct flight distance. The comparison of direct and connecting flight distances was carried out on the Great Circle Distance website.

On the other hand, it was considered that a competitive action taken by an airline with a traditional business model on comfort-based components in business class would not have an impact on airlines with a low-cost or charter business model offering only economy class services, and they were excluded from the scope.

Table 4 Examples of Competitive Actions.

Date	News	Action Type
26.09.2018	KLM Introduces New Cabin Interior and Inflight Entertainment System Aboard 777-200 Fleet	Service improvement
1.08.2017	...Istanbul-London from 59 Euro...	Ticket Discount
30.3.2016	...A new Business lounge at Paris-CDG...	Launch new service
18.12.2017	...New route Antalya from 99 Euro....	Discount for Route Entry
8.2.2018	THY will have sponsorship Galatasaray's jerseys in champions league matches.	Sponsorships
7.6.2017	Travel smart with 'Le Pass', Air France and HOP!'s new pre-paid flight coupons	New promotion
22.12.2016	...Special status miles for inbound and outbound flights at IST...	FFP
3.12.2018	Football giants Milan and Real Madrid will host a football match in Dubai, the headquarters of the Emirates.	Advertising and Promotion
1.12.2018	Aegean Airlines starts Rhodes - Lyon service in Summer 18	Route entry
26.2.2018	Turkish Airlines Increases Rotterdam Service from late-Nov 2017	Frequency increase
15.4.2018	Air France - KLM expands North America codeshares from Dec 2016	Codesharing on a route
10.1.2017	Turkish Airlines October/December 2015 New York JFK Operational Aircraft	Dispatch Bigger Airplane to the Route
4.5.2018	Lufthansa added brand new B777 to the fleet	Adding new aircraft fleet

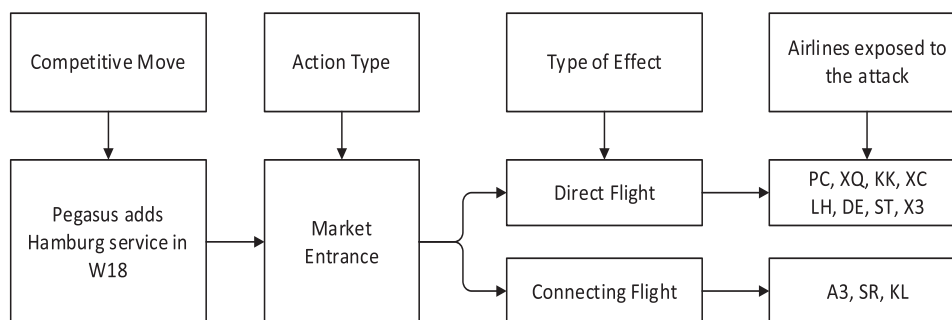


Fig. 1. Example of Competitive Action Analysis.

4. Findings and Discussion

4.1. Descriptive statistics and preliminary analyses

Descriptive statistics of the airlines within the scope of the research are given in Table 5.

Twenty-three of the airlines are still in operation. Three airlines had to cease operations after 2018 due to bankruptcy. Five airlines in the study were founded between 1990 and 2000, while seven were founded after 2000. The oldest airlines at the end of 2020 are British Airways and KLM, while the youngest airline is TUI Fly. It can be seen that airlines established in recent years have adopted more of a low-cost and charter business model. Sixteen of the airlines in the study are traditional airlines, five are low-cost airlines and five are charter airlines. Fourteen airlines are not members of a global alliance. Of the twelve airlines with strategic alliance membership, six are members of the Star Alliance, three are members of Oneworld and the remaining three are members of the SkyTeam alliance group. All of the airlines with strategic alliance membership use the traditional airline business model. However, some of the traditional airlines (Air Astana, Atlas Global, Emirates, Ukraine International) are not members of these alliances. Of the twenty-six airlines included in the study, five (19 %) are based in Turkey, four each in Germany (15 %) and the United Kingdom (15 %) and two (8 %) in the United Arab Emirates. The remaining airlines represent eleven

different countries, one from each country. Descriptive statistics for the variables are presented in Table 6.

Table 6
Descriptive Statistics.

Variables	N	Mean	Std. Dev.	Min.	Max
Schedule-Based Actions	3250	8.810	13.001	0	107
Capacity Actions	3250	3.895	5.574	0	54
Price Actions	3250	10.026	14.478	0	130
Comfort-Based Actions	3250	5.078	5.757	0	34
Image-Related Actions	3250	2.330	2.987	0	25
Relative Size	3250	3.800	7.380	0.010	98.713
Total Flights	3250	3.159	5.759	0.018	56.425
Market Cooperation	3250	0.099	0.298	0	1
Strategic Alliances	3250	0.065	0.246	0	1
Business Model	3250	0.445	0.497	0	1
Age (Firm Maturity)	3250	1.809	2.058	0.074	13.571
Human Resources	3250	4.981	11.099	0.008	119.941
Slack Resources	3250	1.207	0.782	0.172	5.807
Rivals Capability to Contest	3250	0.034	0.039	0	0.333
Fleet Homogeneity	3250	1.164	0.654	0.280	3.571
Resource Deployment Capability	3250	3.341	6.134	0.015	65.667
Market Commonality	3245	1.925	0.268	1.707	7.845

Table 5
Summary Statistics of Airlines.

Name	Icao Code	Year Started	Status	Business Model	Strategic Alliance	ASK (000000)	Total Flights	Employees
Aegean Airlines	A3	1992	Active	Mainline	Star Alliance	13841	65924	2206
Aeroflot	SU	1932	Active	Mainline	SkyTeam	102996	301545	21638
Air Arabia	G9	2003	Active	Low-Cost	-	19551	59466	1980
Air Astana	KC	2001	Active	Mainline	-	12992	42818	4545
Air France	AF	1933	Active	Mainline	SkyTeam	167995	344018	60524
Atlas Global	KK	2001	Ceased	Mainline	-	7417	27040	1122
British Airways	BA	1919	Active	Mainline	Oneworld	177314	362727	38917
Condor	DE	1955	Active	Leisure	-	31609	38176	3495
Corendon	XC	2004	Active	Leisure	-	4435	10398	640
Easyjet	U2	1995	Active	Low-Cost	-	90337	502683	11050
Egypt Air	MS	1932	Active	Mainline	Star Alliance	27105	83297	30291
Emirates	EK	1985	Active	Mainline	-	353588	186908	61067
Germania	ST	1986	Ceased	Low-Cost	-	8820	22820	951
Jet2	LS	2002	Active	Leisure	-	18932	49322	4607
KLM	KL	1919	Active	Mainline	SkyTeam	112710	239242	31226
Lufthansa	LH	1926	Active	Mainline	Star Alliance	189772	517994	53298
Pegasus Airlines	PC	1990	Active	Low-Cost	-	30566	155502	4958
Qatar Airways	QA	1993	Active	Mainline	Oneworld	178551	166740	30694
Royal Jordanian	RJ	1963	Active	Mainline	Oneworld	11435	36151	4138
Singapore Airlines	SG	1947	Active	Mainline	Star Alliance	119589	85706	14802
Sun Express	XQ	1989	Active	Low-Cost	-	15135	28535	3768
Swiss International	SR	1931	Active	Mainline	Star Alliance	52080	146730	9310
Thomas Cook	MT	2003	Ceased	Leisure	-	26836	30393	2923
TUI Fly	X3	2007	Active	Leisure	-	14478	28434	2502
Turkish Airlines	TK	1933	Active	Mainline	Star Alliance	162710	453776	23374
Ukraine International	PS	1992	Active	Mainline	-	14184	45228	2983

26 airlines were analysed at the competitor pair level over a 5-year period, resulting in 3250 observations for each variable. Since the research observations are pairs of competitors, the descriptive statistics here reflect the proportional data between two pairs of competitors. The action types variables give the average number of actions made by one airline to the other competitor. The value of the number of actions is 0 because there were no actions between some pairs of competitors. It can be seen that the maximum value is 130 for price-related actions and 107 for schedule-related actions. The variables of market cooperation, strategic alliance and adoption of the same business model are dummy variables and therefore have values of 0 and 1. For variables with high standard deviations, logarithmic transformation was applied to make the data set close to a normal distribution.

4.2. Determination of factors affecting competitive actions

Table 7 presents the OLS Regression results where the number of competitive actions grouped according to action types is used as the dependent variable.

In order to determine the econometric model to be used, F test was used to test the classical model against the fixed effects model and Breusch-Pagan [9] Lagrangian Multiplier (LM) test was used to test the classical model against the random effects model. In both tests, the hypothesis *H0* was rejected and therefore, it was understood that the classical model was not appropriate and one of the fixed effects or random effects models should be used ([64], p. 12). Hausman [48] test was used to choose between fixed effects and random effects models ([45], p. 651). Hausman test results showed that it is appropriate to use the fixed effects model for all models ([64], p. 9).

4.2.1. Determinants of schedule based actions

Hypotheses H1a and H2a, which test the positive relationship between relative size and total number of flights and the number of schedule-based actions, are confirmed. As the relative size and the total number of flights increase, the number of schedule-based actions also increases. Schedule-based actions include starting a new route or increasing the frequency of an existing route. The ability to undertake more such actions requires having a wider range of flights compared to the competitor (flying to more destinations) or being able to operate more flights on existing routes ([29], p. 87). It is inevitable that

traditional airlines that can offer both conditions together will produce more ASK ([37], p. 370; [62], pp. 339–340). In this context, these airlines view schedule-based components as an important competitive tool. Hypotheses H1a and H2a, which were confirmed in the study, support the above situations.

H6a, which tests for a negative relationship between firm maturity and schedule-based actions, is confirmed. Airlines with low market maturity are newly established and relatively new to the market compared to their competitors. These airlines may engage in more aggressive behaviour than their competitors in order to maintain their market position and complete the growth and development phase of the product life cycle. It is inevitable for these airlines to take steps such as opening new routes, increasing frequencies, code-sharing for the reasons mentioned above ([49], p. 337). Hypothesis H6a, which was confirmed in the study, supports this situation.

The relatively high number of available resources and employees has a positive effect on the number of schedule-based actions and hypotheses H7a and H8a, which test this positive relationship, are confirmed. In order to increase the number of schedule-based actions, it is necessary to operate to more destinations or to have a higher frequency on existing routes compared to competitors. Airlines with a higher number of employees and ready-to-use resources compared to their competitors will have sufficient resources to make actions such as starting a new flight or increasing frequency within the scope of schedule-based actions ([20], p. 109; [66], pp. 81–82). For this reason, it is an expected result that the airline with relatively more ready-to-use resources can make more actions ([82], p. 770). Hypotheses H7a and H8a, which were confirmed in the study, confirm this situation.

It is revealed that firms with lower fleet homogeneity and resource deployment capability than their competitors are more likely to make schedule-based actions and hypotheses H10a and H11a are confirmed. Traditional airlines have fleets with different types of aircraft and their fleet homogeneity is relatively lower than that of airlines adopting other business models ([28], p. 136; [47], p. 60). In addition, these airlines connect small settlements to various points around the world through their hub airports with their Hub-and-Spoke network structures. In doing so, they need both small and large aircraft. Consequently, traditional airlines with different types of fleets have the opportunity to utilize these characteristics on schedule-based components. In the resource deployment capability, which is measured by the average

Table 7
OLS Regression Results.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Relative Size	0.34 **	-1.43 ***	-0.01	-2.08 ***	-1.40 ***
Total Flights	2.66 ***	1.17	1.82 ***	-0.89	2.59 ***
Market Cooperation	-0.07	0.99	-0.06	3.22 ***	1.08 ***
Strategic Alliance	Omitted				
Business Model	Omitted				
Age (Firm Maturity)	-0.51 *	-1.91 *	0.56 **	0.39	-1.84 ***
Human Resources	0.24 *	1.31 ***	-0.22 *	4.26 ***	
Slack Resources	0.23 ***	1.13 ***	0.77 ***	0.91 ***	0.91 ***
Rival's Competition Ability	0.83	3.15	-2.35 *	-0.38	1.69
Fleet Homogeneity	-0.29 ***	0.78 **	0.14 *	0.33	
Resource Deployment Ability	-2.69 ***	-0.92	-1.32 ***	-0.23	-0.98
Market Commonality	-0.69 ***	2.14 ***	-0.12 *	3.20 ***	1.01 ***
Constant	-0.18	-1.32 **	-1.72 ***	-1.77 **	0.22
Breusch-Pagan LM Test	1135.95 ***	2511.28 ***	1107.56 ***	1202.21 ***	1750.28 ***
F-Test	203.35 ***	295.78 ***	169.45 ***	508.35 ***	273.25 ***
Hausman Test	102.94 ***	96.22 ***	346.75 ***	209.50 ***	152.94 ***
N	2430	3245	2685	3245	3245
R2	0.10	0.05	0.12	0.09	0.06

* p < 0.10; ** p < 0.05; *** p < 0.001

Model 1: Schedule-Based Actions

Model 2: Capacity Actions

Model 3: Price Actions

Model 4: Comfort-Based Actions

Model 5: Image-Related Actions

market share in all O-D markets, a low average O-D market share compared to the competitor will reduce the deployment capability ([82], p. 767). The airline with a low average O-D market share may engage in more aggressive competitive behaviour to increase its current market share. One way of doing this is to enter a new market that has not been served before. This will increase the number of schedule-related actions taken by the airline. Hypotheses H10a and H11a, which were confirmed in the study, support the above situations. Hypothesis H12a, which tests the negative relationship between market commonality and schedule-based actions, is confirmed.

It is observed that airlines use schedule-based actions less frequently as market commonality increases. Airlines are more reluctant to engage in schedule-based actions against competitors with high market commonality. This is because firms operating in similar markets are likely to counter-move when exposed to a competitor's action ([14], p. 112). When reciprocal moves reach a certain level, both sides may be adversely affected. Therefore, it is argued that high market commonality creates a situation of mutual avoidance between pairs of competitors [18,5]. Hypothesis H12a, which was confirmed in the study, supports the above conditions.

Although market co-operation (H3a) and rival's capability to contest (H9a) were expected to have a negative effect on schedule-based actions, no significant effects were found as a result of the research findings. The results indicate that the anticipated influence of these variables on competitive dynamics may deviate from the original assumptions. To illustrate, while market cooperation was anticipated to diminish schedule-based competitive actions due to the potential for cooperative benefits, the absence of notable findings indicates that other intrinsic factors, such as the intensity of competition or the particular characteristics of cooperation arrangements, may serve to either mediate or neutralise this effect. Similarly, the competitor's ability to challenge, which is believed to deter aggressive schedule-based moves due to increased risks of retaliation, did not yield any discernible effect. This may indicate that firms are inclined to prioritize other strategic considerations, such as market positioning or customer demand, over the perceived competitive threat.

Strategic alliance (H4a) and adopting the same business model (H5a) could not be included in the model due to the binary (1 and 0) nature of the data set. When these variables were excluded from the analyses, no change was observed in the model. However, since it is thought that both making strategic alliances and adopting the same business model may have an effect on competitive actions, these two variables were not excluded from the scope of the research in order to shed light on future research. To illustrate, strategic alliances have the potential to alter the dynamics of competitive actions by enabling the sharing of resources and the implementation of joint market entry strategies [51]. Similarly, the adoption of an identical business model may create an environment of strategic convergence, thereby influencing the manner in which firms respond to competitive pressures [22]. The omission of these variables from the model indicates a methodological shortcoming and underscores the necessity for future studies to investigate these aspects using more comprehensive or qualitative methods, thereby capturing their intricate interactions within the competitive landscape.

4.2.2. Determinants of capacity-related actions

Hypotheses H7b and H8b, which test the positive relationship between human resources and the number of capacity-based actions, are confirmed. The high level of available resources is an input for the competitive actions planned by the firms [54,58]. Because when a new aircraft is to be included in the fleet, this is only possible with the availability of financial resources. At the same time, the airline should also have sufficient crew to dispatch that aircraft ([79], p. 98). The capacity-based actions of these firms are also expected to be high for the reasons mentioned above. The research findings are consistent with this information.

H6b, which tests the negative relationship between firm maturity

and capacity-based actions, is confirmed. It is believed that airlines that are younger than their competitors will resort to competitive actions such as enlarging the aircraft type, and adding new aircraft to their fleet by leasing or purchasing in order to increase their market share ([52], p. 213). It is seen that the research findings support these arguments.

Relative size (H1b) was expected to have a positive effect on capacity based actions, but the results of the study showed that the effect was negative. The ability of traditional airlines with high relative size to increase frequencies as they wish in each market depends on the degree of liberalisation of economic regulation ([29], p. 36). In liberalised markets, airlines can easily take actions such as increasing frequencies, entering new markets or using higher capacity aircraft in the market. On the contrary, there are restrictive elements to these components and competitive actions are caught up in these restrictions. In some cases, slots may also be a constraint on the capacity related actions of operators ([84], p. 375). In this case, it may be easier for the airline to start using a higher capacity aircraft without changing its current frequency and without being caught by slot regulations. In an environment where capacity is constrained, airlines want to maximise their profits through revenue management ([63], p. 133). For this reason, airlines may take action to add aircraft to the fleet or to operate a larger aircraft on an existing route, not as an anti-competitive action, but to take advantage of an opportunity they see in the market. For example, during holiday periods when demand is very high, airlines try to meet this demand by adding a new aircraft to their fleet through leasing or by replacing aircraft in their existing fleet with aircraft with a larger passenger capacity. It is thought that the above situations may work in the opposite direction of the expected effect between the two variables. The fact that the effect in question is in the opposite direction to that expected raises the question: 'Do airlines implement capacity-related actions into effect during periods of high demand?' It would be beneficial to answer this question in future research.

Fleet homogeneity (H10b) and market commonality (H12b) were expected to have a negative effect on capacity-based actions. However, a positive relationship was found. In other words, it was observed that the number of capacity-based actions increased as fleet homogeneity and market commonality increased. The number of capacity-based actions of airlines with relatively high fleet homogeneity is higher than that of airlines with a heterogeneous fleet. The high number of capacity-based actions by airlines with high market commonality may have been made to take advantage of a market opportunity rather than to think about the competitor, or to perform an action with less visibility than other types of moves ([17,56], p. 88). In this context, it can be said that firms with high market commonality will prefer actions with less visibility in order to avoid retaliation, and airlines will tend towards types of actions that cannot be considered as a move by the direct competitor, such as adding a new aircraft to the fleet.

The total number of flights (H2b) was predicted to have a positive effect on capacity-based actions, while market co-operation (H3b), rival's capability to contest (H9b) and resource deployment capability (H11b) were predicted to have a negative effect; however, no significant effects were found as a result of the analysis. The absence of substantial evidence to support these hypotheses highlights the intricate nature of the elements influencing capacity-based actions. This indicates that the underlying dynamics may be more intricate than initially anticipated.

The proposed positive link between the total number of flights (H2b) is predicated on the assumption that heightened operational activity will enhance the capacity of firms to implement capacity-based strategies, such as the introduction of additional flights or the utilisation of larger aircraft. However, the absence of a significant effect may indicate that other constraints, such as airport slot availability, regulatory restrictions or operational costs, may limit the translation of higher flight volumes into capacity expansion [70]. Furthermore, it is conceivable that firms may prioritise the maintenance of efficiency or profitability over capacity expansion, which may serve to diminish the anticipated positive impact of flight volumes. The predicted negative impact of market

co-operation (H3b) was also not observed. This may be due to the nature of co-operation agreements, which may focus on areas such as code-sharing or joint marketing rather than directly affecting capacity decisions.

Similarly, the rival's capability to contest (H9b) is expected to deter firms from pursuing capacity-based actions due to increased competition or the risk of retaliation. However, the absence of significant findings may indicate that firms' capacity decisions are less influenced by perceived threats and more by internal factors such as financial strength, market demand or strategic objectives. Finally, the absence of a significant effect for resource deployment capability (H11b) calls into question the assumption that firms with greater flexibility in reallocating resources will be more constrained in their capacity-based actions. Moreover, the efficacy of resource deployment capability may be contingent upon external factors such as market stability or economic conditions, which are not explicitly addressed in the analysis.

4.2.3. Determinants of price actions

Hypothesis H2c. which suggests that the relationship between the total number of flights and price actions is positive, is confirmed. As the total number of flights increases, the number of price actions increases. LCCs following a cost leadership strategy operate point-to-point short-haul routes with relatively lower average flight lengths. In this case, the number of flights of LCCs increases ([11], p. 29). On the other hand, price is an important competitive tool for LCCs ([13], p. 77). Therefore, it can be expected that the number of price actions will be higher for airlines with a higher number of flights. The research findings support the above judgements.

Hypothesis H6c. which was established to test the positive relationship between firm maturity and price actions, is confirmed. Predatory pricing is one way of restricting competition. Airlines may use it when it is less costly than other ways of creating barriers to entry and when they want to create barriers to entry ([47], p. 264). As a result of the increasing liberalisation of economic price regulation, airlines have begun to use price as a competitive tool more frequently ([84], p. 56; [29], p. 46). They have also become monopolistic rents by using price reductions as barriers to entry ([47], p. 317; [13], p. 92). This positive relationship between the two variables in the study is in line with the above findings.

Hypothesis H7c. which tests for a negative relationship between human resources and price actions, is confirmed. Price is an important competitive tool, especially for LCCs, and they do this by keeping ticket prices lower than their competitors. This is due to their low cost advantage at each stage of the service delivery process ([50], p. 316). As labour is also an important source of cost for airlines ([73], p. 15), LCCs seek to reduce labour costs. For this reason, firms with relatively fewer human resources are found to use price actions more than firms with relatively more employees.

Hypotheses H8c and H10c, which test the positive relationship between the number of price actions and slack resources and fleet homogeneity, are confirmed. A high level of readily available resources increases the number of price actions. Therefore, the presence of readily available resources may be a factor that increases an airline's ability to engage in competitive actions ([32], p. 863). The fact that airlines have a homogeneous fleet has a positive effect on price actions. A homogeneous fleet reduces airline costs such as maintenance, training and inventory. One of the most important characteristics of LCCs is that they have a homogeneous fleet. As LCCs operating with a homogeneous fleet adopt a cost leadership strategy, they offer lower ticket prices by reflecting the cost advantage they gain from their prices ([73], p. 11; [50], p. 316). In light of this information, it can be seen that airlines that operate with a more homogeneous fleet, with relatively high levels of slack resources, resort to price actions more frequently.

Hypothesis H11c. which tests for a negative relationship between resource deployment capability and price actions, is confirmed. This result can be explained by the fact that an airline with a relatively low average market share is expected to act more aggressively to increase its share ([82], p. 767). It can be said that one of the competitive tools used to increase market share is price-related actions ([37], p. 377). This is because one of the easiest ways to gain bargaining power with buyers, one of the five forces in the industry, is to set prices lower than those offered by existing and potential competitors.

The number of price actions decreases as resource similarity, which reflects the rival's ability to compete, and market commonality, which reflects multiple market relationships, increase. If one of the two airlines, which have similar characteristics in terms of range and capacity and operate simultaneously in more than one market, offers a price cut in a common market, passengers are likely to prefer the airline offering the lower ticket price. The competitor exposed to this move may respond with a price cut, fearing that passengers will abandon it and go to the competitor. If this situation persists, airlines may be forced to offer prices below their costs and suffer losses as a result. It has been shown that airlines that do not want to choose this option are more cautious about price actions ([30], p. 344; [14], pp. 112–115). This suggests that airlines are less motivated to take action against airlines with high market commonality and similar resources ([39], p. 322; [4], p. 260). The results of the research support the above situations.

The variables relative size (H1c) and market cooperation (H3c) were predicted to have a negative effect on the number of price-related actions, but no significant effects were found as a result of the analysis. The failure to confirm the hypothesis of relative size (H1c) calls into question the assumption that large firms tend to avoid price competition and instead pursue more profit-oriented or differentiated strategies. It seems probable that large firms will deploy a variety of strategies to maintain their competitive advantage in the market, without engaging in price wars. For instance, they may choose to invest in customer loyalty programmes or brand image in order to maintain their market share [55]. Furthermore, even if large-scale enterprises avoid price competition, this tendency may not necessarily result in a direct reduction in the number of price-related actions. The inclination towards price competition may represent a more dominant strategy, particularly in instances where operators adopt a low-cost airline model. This may serve to constrain the impact of relative size.

With regard to the variable of market co-operation (H3c), the failure to confirm the hypothesis that co-operation will reduce price competition suggests the existence of potential divergences in the extent and nature of co-operation. In some cases, rather than reducing competition, operators may choose to pursue alternative strategies to expand their market share, such as those involving codesharing or codeshare agreements [26]. Furthermore, the phenomenon of price competition is frequently subject to external influences, including regulatory frameworks, market conditions, and the elasticity of demand, which operate independently of direct cooperation.

4.2.4. Determinants of comfort-based actions

Hypothesis H3d. which tests the positive relationship between market cooperation and the number of comfort-related actions, is confirmed. When there is cooperation between pairs of competitors, the focal airline is more likely to take actions to improve its own service and influence passengers in this direction than to take schedule and price actions directly targeting the cooperating rival. This is because market cooperation has a negative impact on competition, and airlines are less likely to engage in schedule and price actions against each other in the presence of cooperation ([36], p. 744; [41], p. 738). The results of the study are consistent with this information and show that when there is cooperation, airlines tend to take actions that the competitor does not perceive as direct actions against them.

Hypotheses H7d and H8d, which test for a positive relationship between human resources and slack resources and actions involving comfort-related components, are confirmed. An airline that wants to increase the number of cabin crew in order to provide a better service to its passengers will not be able to do so if it does not have sufficient financial and human resources. If an airline wants to undertake a new service development initiative, it needs the resources to implement it. These resources are financial and human ([79], p. 98).

Hypothesis H12d. which tests for a positive relationship between market commonality and the number of comfort-related actions, is confirmed. Airlines are more cautious in taking actions to avoid retaliation against a competitor in multiple markets ([30], p. 344; [14], pp. 112–115). Therefore, it is expected that its actions against rivals will be directed towards offering a new service or improving its own services, rather than actions that can directly target the competitor, such as *schedule* or *prices* ([17], p. 88). Miller [56] also argues that an action such as a general improvement in service will not be perceived by competitors as a visible action and will therefore not lead to retaliation. For these reasons, a high degree of market commonality increases the number of actions that include comfort-related components, and the research evidence supports this.

It was expected that there would be a positive relationship between relative size (H1d) and the number of actions containing comfort-based components, but the effect was negative. It is known that traditional airlines produce more ASK with more seats and longer range aircraft ([62], pp. 339–340). Within this context, traditional airlines focus on the comfort-based components of the airline product and try to realise their activities by maintaining a high level of service quality before, during and after the flight ([50], p. 317; [37], p. 374). In this study, however, the opposite of the expected effect was observed. It is suggested that the reasons for this effect can be better explained by examining the comfort-related actions taken by airlines and by conducting research on business models.

It is predicted that there is a positive relationship between the rival's capability to contest (H9d) and the resource deployment capability (H11d) and the number of comfort-based actions. A negative relationship was predicted between the total number of flights (H2d), firm maturity (H6d) and fleet homogeneity (H10d), and the number of comfort-based actions. However, the analysis showed that these variables did not have significant effects. In more competitive markets, such as those characterised by intense price competition, capacity constraints or scheduling challenges, the ability of competitors to compete can have a more pronounced impact on their ability to gain and retain customers. In contrast, comfort-based actions may be more closely aligned with longer-term strategic objectives, such as enhancing the customer experience or fostering brand loyalty [65]. This may result in competitive pressures affecting comfort actions to a lesser extent. Similarly, while resourcing capability provides operational flexibility, it can often be directed towards strategies that offer shorter-term and quantifiable returns. This may serve to restrict the influence of resourcing capability on comfort-oriented strategies.

While the total number of flights is assumed to reflect the overall strategic priorities of a business, the fact that this size is not directly related to actions focused on comfort may indicate that such actions are directed towards more specific objectives. In contrast, the concept of firm maturity suggests that more established and experienced firms (and in markets) tend to pursue strategies based on customer loyalty [71]. However, this does not necessarily provide a comprehensive explanation of whether investments in comfort are prioritised. Similarly, while fleet homogeneity is frequently linked to cost advantages and operational efficiency, it may represent a construct that does not facilitate the prioritisation of comfort-based actions [61].

4.2.5. Determinants of image actions

Hypothesis H1e. which tests the negative relationship between relative size and image actions, is confirmed. Relatively small airlines are expected to resort to image-based actions in order to increase their current market share ([31], p. 875). Although such actions are important for traditional airlines and the relationship between relative size and image actions is expected to be positive, we find that the relationship is inversely related to the number of actions undertaken. One of the reasons for this is that, due to economies of scope, relatively large companies carry out fewer actions but serve more routes. When a relatively large airline takes a competitive action involving the image component, this action will also affect other routes owned by the airline. Therefore, many routes will be promoted at the same time when a campaign is launched. This takes advantage of economies of scope. Furthermore, [29] states that in the EU market in the early 2000s, LCCs benefited from widespread brand awareness in countries other than their own.

Hypothesis H2e. which examines the positive relationship between the total number of flights and image actions, is confirmed. The image-based actions to be undertaken by LCCs offering point-to-point services may be realised in different ways for different destinations. For this reason, it is expected that competitive actions will increase as the number of flights increases. As a result of the analysis, the effect was found to be positive. Hypothesis H3e, which tests the positive relationship between market cooperation and the number of image actions, is confirmed. It is shown that when there is market cooperation between airlines, the number of actions containing image components increases. It is expected that airlines will be less willing to engage in schedule or price actions against each other when there is market cooperation ([36], p. 744; [41], p. 738). Therefore, it is predicted that cooperating firms will engage in indirect actions, the effects of which will be seen later, rather than components such as price or schedule that directly target the competitor ([17], p. 88).

Hypothesis H6e. which examines the relationship between firm maturity and image actions, is confirmed. It is expected that a relatively younger airline, which is newer in the competitive market, will engage in competitive actions to promote itself and gain acceptance in the market ([49], p. 337). Hypothesis H7e, which tests the positive relationship between slack resources and image actions, is confirmed. For example, an airline that wants to enter into a new sponsorship agreement will need financial support to fulfil the terms of the agreement. In this context, it is beneficial for the company to have ready resources. The realisation of advertising and promotional activities that require financial resources may be possible if the airline has resources that can be used in this area ([82], p. 770). The research findings support the above situations.

Hypothesis H10e. which tests the positive relationship between market commonality and the number of comfort-related actions, is confirmed. Higher market commonality increases the number of actions involving image components. Airlines are more cautious in taking actions to avoid retaliation against a competitor that competes in more than one market ([30], p. 344). Therefore, the preference for more indirect actions rather than competitive actions to which the rival will respond quickly is likely to be realised in the context of the mutual avoidance assumption ([14], p. 112). It was predicted that the rival's capability to contest (H8e) has a positive effect on image actions and resource deployment capability (H9e) has a negative effect, but no significant effects were found. While a competitor's ability to compete can often give rise to more intense competition in areas that are more directly comparable, such as capacity or price, image actions have been found to be associated with strategies that are more abstract and long-term. To illustrate, image actions are frequently oriented towards

transforming customer perception or enhancing the prestige of a brand [76]. Such actions may be determined by the firm's own internal strategic objectives or position in the market segment, irrespective of the competitor's capabilities. Furthermore, the effects of image actions are less tangible and more challenging to measure. This suggests that they may generate indirect effects that are not directly linked to competitor behaviour. Even when firms possess the capability to allocate resources in an optimal manner, they may choose to direct this capacity towards avenues with more immediate and quantifiable returns, rather than investing in strategies that aim to enhance customer perception and brand equity.

5. Conclusions

The objective of this study is to identify the factors that are considered to be effective in airline competitive actions. The competitive actions were obtained through content analysis and data mining and categorised in accordance with the classification of airline products proposed by Doganis [29]. The factors affecting competitive actions were modelled on the basis of an analysis of the types of actions. The objective is to ascertain whether the same causal factors exert the same influence on different types of actions.

The findings of the study indicate that the factors believed to influence competitive actions between rival dyads vary according to the specific actions in question. Consequently, the factors believed to be influential in various competitive actions are identified. Furthermore, the evidence indicates that the antecedents vary according to the specific type of action under consideration. This study employs a distinct analytical approach to the examination of competitive actions, which differentiates it from other research in this field. In particular, the actions based on schedule, price and capacity were subjected to detailed analysis, and distinct competitive assessments were formulated for each route. Pairwise evaluations of airport pairs were conducted, taking into account the diversion factor, the resources available to the airlines, and the current schedule. While the research models incorporate antecedents that have been previously investigated, such as slack resources, market commonality, resource similarity, relative size, and resource deployment capability, this study also introduces new antecedents that have not been previously researched, including fleet homogeneity, market cooperation, number of flights, and human resources. These new variables were incorporated into more comprehensive models for testing purposes.

The research makes a number of significant contributions to the existing literature on competitive dynamics. Despite the existence of numerous studies on competitive actions and their defining characteristics, it is postulated that the analysis of these actions in the existing literature is, in general, relatively superficial. In this study, the analysis of actions is conducted with consideration of a number of parameters that are specific to the air transport sector.

The findings indicate that the relative size has a notable influence on the remaining components, with the exception of price. This effect is observed to have a positive impact on schedule-based actions and a negative impact on actions related to capacity, comfort, and image. It was discovered that as the relative size between competitor dyads increases, the number of schedule-based actions increases, while the number of capacity, comfort and image actions decreases. Consequently, in lieu of a universal conclusion that relative size increases or decreases the number of actions, we proceeded to test models wherein relative size exerts disparate effects on distinct action types.

Looking at the coefficients of the variables that significantly affect the actions, it can be said that most of the coefficients are economically significant and consistent with the sector dynamics. The high impact of Human Resources on comfort-based actions emphasizes the importance of investing in customer experience. The negative impact of Relative Size on capacity and comfort-based actions suggests that large airlines focus on existing markets rather than aggressive capacity expansion.

Slack Resources has a similar effect across all models, meaning that airlines increase their competitive moves as they gain financial flexibility. Large airlines focus on maintaining their existing markets and different strategies rather than increasing capacity. Airlines with more flights use pricing and image strategies more actively. While collaborations strengthen competition based on comfort and image, they have limited impact on schedule and price-based competition. Airlines with financial flexibility generally adopt more aggressive strategies. While older airlines focus on price competition, young airlines aim to grow through schedule and capacity-based actions.

The results indicate that the effects of antecedents vary depending on the type of action undertaken. For example, previous studies have demonstrated that an increase in market commonality or market cooperation is associated with a reduction in competitive behaviour and the number of competitive actions [82,20]. Nevertheless, the findings of this study indicate that even when market commonality or market cooperation increases, there are still diverse forms of competitive actions. Consequently, competitive endeavour is an enduring phenomenon, manifesting in a variety of forms.

One of the distinctive features of this study is the diversification of the resources examined. While previous studies have only considered aircraft as a resource, this study employed a more comprehensive approach, analysing aircraft, human resources and financial resources simultaneously. In contrast to previous studies, the degree of similarity between aircraft was evaluated not only in terms of aircraft type, but also in terms of range and seat capacity. This approach was adopted because it is believed that aircraft with comparable characteristics in terms of range and seat capacity (e.g., B737-800 and A320), despite being of different types, should be regarded as equivalent for the purpose of assessing them as competitive tools. Given the disparate nature of the types of equivalent aircraft, treating them as distinct sources may yield inaccurate results. The findings of this study indicate a need for diversification in the sources to be analysed.

Firms that are affected by an action also affect the competitive dynamics of the market. Therefore, focusing only on the competitive action in the market will not provide an adequate understanding of the market dynamics. It is therefore important in the analysis process to identify not only the characteristics of the conduct itself, but also to whom or against whom it is directed. In air transport, the provision of services takes place in the market (route) between pairs of airports. Each route is therefore a different market. Competitive actions such as scheduling, capacity and pricing are in many cases market specific. Therefore, if an airline takes an action in a particular market, this action will affect those who provide the airline product in that market. In this study, the results of the analyses conducted in accordance with these propositions are believed to be more concrete than previous studies and contribute to the competitive dynamics literature.

In the context of a competitive market, it is crucial for airlines to consider a range of factors before taking action. These include the characteristics of the industry, the market positions of competitors, the resources available, business models, and the size and scope of networks. The objective is to identify the most strategic move, whether it be a retaliatory action or one that aims to have a significant impact. In this context, it is hypothesised that the antecedents revealed by the different models in this research will assist airlines in conducting a more comprehensive analysis of the market prior to the initiation of action-retaliation sequences. It is imperative that the action initiated by the airline produces the desired results, such as an increase in the number of passengers carried and an increase in market share, in order for the action to achieve its intended purpose. It is insufficient to consider solely the increase in the number of passengers carried and the increase in market share. Should airlines engage in destructive pricing with the intention of eliminating their competitors, or should they increase their frequencies beyond what is necessary, they may find themselves in a situation where prices remain below costs for an extended period of time. It is therefore evident that merely carrying more passengers or

increasing market share will not be the desired outcome. Furthermore, the objective of achieving a return above the industry average must also be taken into account. The aforementioned scenarios are contingent upon the airlines' comprehensive examination of the market in which they operate, the characteristics of their competitors, the resources and capabilities at their disposal, and the broader industry landscape.

Taking the right action at the right time, without retaliation, is crucial to achieving superior returns. As mentioned earlier, this requires a good analysis of competitors and the competitive market. This study identifies the antecedents that lead airlines to take or not to take competitive actions, and how these antecedents influence which type of action is taken. In this respect, it is believed that the research will help airlines that want to analyse their competitors and the industry before taking competitive actions.

The results of this study indicate that the competitive dynamics of the Turkish international airline market have significant strategic implications for businesses and policymakers alike. It is recommended that airline operators optimise their resources, fleet structure and market partnerships in order to support competitive actions. It would be beneficial to encourage strategic alliances and cooperation models across the sector, particularly given that homogeneous fleets are better equipped to manage price competition, while market collaborations enhance customer comfort and foster image-oriented competition. Furthermore, providing assistance to new market entrants in strategies such as advertising, new market entries and increasing flight frequencies may contribute to the diversification of the sector. In this context, it is crucial to regulate detrimental competitive practices, such as below-cost pricing, and to ensure that price-based competition is aligned with the long-term sustainability of the sector.

It is imperative that airlines invest in data-based decision support systems in order to enhance their competitive market analysis. In light of the pivotal function of human resources in competitive actions, the implementation of industry-specific training programmes and competency-building initiatives has the potential to enhance operational efficiency. Furthermore, firms should be empowered to pursue more strategic competitive actions by conducting a comprehensive analysis of their resources and capabilities. Such policy measures would contribute to the creation of a competitive environment in the airline industry that is both fair and sustainable. Furthermore, it will facilitate the development of more comprehensive policy models for future research.

In order to allow panel data analysis, the study is limited to 26 airlines. Airlines operating in the international aviation market in Turkey and having a certain number of passengers during the period of the study are included in the scope. Another limitation of the study is the use of secondary data only. As all available secondary data of these 26 airlines cover the period between 2014 and 2018, the study is limited to a 5-year period.

In particular, the route-specific competitive behaviour analyses have evaluated airlines offering direct and indirect flights in the same dataset. In future research, such analyses can be carried out separately for direct and indirect flights for each route. Categorising connecting flights into a new category according to the length of the transfer and determining whether the identified values and the length of the transfer have different effects on competitive actions could be a topic for further research. On the other hand, adding more airlines to the analysis carried out at the level of competitor pairs through social network analysis may reveal different aspects of the relationships between companies.

Strategic alliances and the adoption of the same business model are also likely to affect competitive behaviour. This is because features such as cooperation within the alliance, code-sharing flights and the ability to use special lounges at many international airports show that airlines cooperate even when they compete. Airlines with the same business model are also likely to have similarities in terms of the type of network they use, the resources they own and the services they provide, such as pre-flight and post-flight, which are likely to affect competition between

airlines. The effect of these variables, which were included in the model as dummy variables in the research but could not be evaluated in the model as a result of the tests, can be re-evaluated by including them in the analysis in a different way (for example, by creating new dummy variables at the airline level instead of the competitor pair).

Ethics statement

Not applicable because the paper uses archival data from a public domain and does not state or imply any personal information

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CRedit authorship contribution statement

Yaşar Mehmet: Writing – original draft, Resources, Methodology, Formal analysis, Conceptualization. **Gerede Ender:** Writing – review & editing, Validation, Supervision, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

The authors are unable or have chosen not to specify which data has been used. Authors can confirm that all relevant data are included in the article and/or its supplementary information files.

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