



**Universidad Ramon Llull**

## **DOCTORAL THESIS**

Title	<b>Firm Sustained Growth</b>
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## **ABSTRACT**

This thesis responds to the question ‘how do firms grow sustainably?’ in dynamic environments as one of the fundamental questions in strategic management literature. It provides three concrete studies addressing various aspects of firm’s growth: the first study provides a theoretical study on the how of firm growth drawing on an open system perspective and resource-based view. It basically describes how firm’s resources grow and clarifies the characteristics that the resources show over time. The study is finalized by discussions on the heterogeneity of firms’ resources. The second study provides an empirical support for the first study and provides an empirical case on the successful and sustained growth of Airbus consortium over 20 years from 1967 to 1986. This study shows how the incremental accumulation of resources with a focus on a commonality strategy has contributed to the sustained growth of Airbus. In addition, the study shows two periods of growth (1) spark and establishment in the first decade of Airbus growth and (2) further technological advances afterwards. Finally, the last study provides a theory of an unexpected dissolved alliance interrupting the firm growth where the divorce directs the firm into crisis. It discusses how the firm can pass the crisis and return to its growth condition through the management of its resources. The study discusses how the change speed of resources could contribute to the management of resources in crisis.

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## **Chapter 1:**

### **Introduction**



## **1.1 Introduction**

The sustained growth of firm has been one of the central debates in the strategy literature to the date (Penrose 1959, Barney 1991, Eisenhardt and Martin 2000). Over the years, it has resulted in two main questions about ‘why some firms outperform others in their environment’ and more importantly, ‘why some firms can sustainably keep their performance over time’ (Barney 1991, Crook et al. 2008). These concerns have been at the heart of strategy literature since firms not only want to survive, but also want to keep a satisficing level of rent as the foundation of their sustainable growth over time (Barney 1991, Peteraf and Barney 2003). The inquiry has resulted in the development of various schools of thoughts in strategy literature over the previous decades (e.g., studies related to industry or firm attributes) addressing different aspects of the firm sustained growth (Connor 1991).

Among the stated research streams, resource-based school of thought has been one of the dominant ones (Penrose 1959) answering the question on the growth of the firm in terms of sustained rent making (Barney 1991, Peteraf and Barney 2003, Barney et al. 2011, Wernerfelt 1984). It basically brought the attention of scholars on firm internal resources (Wernerfelt 1984) and addressed the types of resources that make the firm able to create rent relative to their counterparts

(Barney 1991). These studies address the role of Valuable, Rare, Inimitable, and Non-substitutable (VRIN) resources as the basis of firm sustained competitive advantage and rent making (Barney 1991, Dierickx and Cool 1989). In the same stream, the role of isolating mechanisms was additionally discussed contributing to the firm sustained competitive advantage (Peteraf 1993).

Over the last two decades, numerous studies were conducted on VRIN within the resource-based school supporting the relationship between resources and firm competitive advantage and performance (Crook et al. 2008, Newbert 2007). While these studies support the role of the possession of such resources on the firm's performance, they stay silent on the nature of dynamic environments (Teece et al. 1997, Eisenhardt and Martin 2000, Wang and Ahmed 2006). Dynamic environments are identified with frequent and quick changes, such as shorter new product cycles or technological changes among others. In such conditions, resources may not be held as a source of competitive advantage and firms need to change these resources to sustain their growth over time (Teece et al. 1997, Eisenhardt and Martin 2000).

In this line, dynamic capabilities are discussed as a source of firm sustained competitive advantage in the case of dynamic environments (Teece et al. 1997, Eisenhart and Martin 2000). These capabilities are defined as processes helping

firms to change and reconfigure their resources to meet the needs of their changing environments (Teece et al., 1997, Eisenhart and Martin 2000, Helfat et al. 2007). In fact, changes enabled by capabilities would help the firm grow sustainably in dynamic environments (Eisenhardt and Martin 2000).

While studies on resource-based school have advanced to a great extent, there is still a request by dominant scholars for additional studies to extend the boundaries of the field (e.g. Barney et al. 2011, Peteraf et al. 2013, Ambrosini et al. 2009). The initial studies (Barney 1991; Peteraf 1993) focused on ‘what’ types of resources (mainly VRIN) result in the firm rent making and its sustainability (Barney 1991; Peteraf 1993). However, the question on ‘how’ these resources become the source of firm competitive advantage and in addition ‘how’ firms can keep their competitive advantage sustainably by changing their resources are still in progress in the literature (Barney et al. 2011; Peteraf et al. 2013).

In this stream, while prior studies address the ways through which resources can be developed and reconfigured (Ambrosini et al. 2009), for instance, the processes that are contributing to the change and development of resources, there are less studies addressing how firm’s resources are accumulated and how this accumulation contribute to the firm performance and its sustainable growth (Barney 2011, Eriksson 2014, Danneels 2011). This directed us to formulate the

main question of this thesis as ‘how do firms grow sustainably?’ and approach it from resource accumulation theory (Dierickx and Cool 1989).

Framing the thesis as a monograph based on three unpublished articles, we develop three essays to address the different aspects of the firm sustained growth. We believe the three studies provide a satisfactory foundation on the firm sustained growth since they present (1) how a firm can grow sustainably and (2) how it can manage unexpected conditions that interrupt the sustained growth. In addition, the three studies complement each other as it is discussed in the following paragraphs:

The first study (chapter 3) provides the theoretical foundation of the thesis. In the study, drawing on a teleological perspective and the concept of resources, we theorize a firm as a bundle of resources and address how the firm can grow sustainably over time. In the study, we define a firm as a bundle of continuously moving resources and theorize on its growth over time in an accumulative and incremental way. In addition, we define growth as the continuous change in the state of the firm according to the firm objective. This study was accepted and presented in the Academy of Management Annual Meeting (Philadelphia 2014).

The second study (chapter 4) provides an empirical support for the first study and addresses how the firm growth can be sustained. In the second study, conducting an empirical study on Airbus, we describe and theorize on a successful case of growth in the commercial aircraft industry, a technology-intensive sector. We present the strategic growth of Airbus over 20 years since it was formed as a consortium in 1967 to the moment it became the pioneer of the commercial aviation industry in terms of technological advancements in 1987. In the study, we basically address how incremental accumulation of resources as the main pattern of Airbus growth (discussed in the first article) along with its technological advancements contributed to the sustainability of its competitive advantage and, as a result of that, its growth from 1967 to 1987. The results of our study yield two periods of Airbus growth (1) spark and establishment, and (2) technological investments and enforcement. This paper is now under review in a peer-review journal.

While the two previous chapters discuss how the firm sustained growth would be, the third study (chapter 5) complements them by addressing a shock that interrupts the firm sustained growth and discusses how the firm can return to its growth condition. In the study, while we contribute to the intersection of firm growth and alliance literatures, we assessed a case of a trajectory of unexpectedly dissolved alliance as an external shock that can significantly affect the growth of a firm. We theoretically address a case when due to a dissolved alliance, the firm

enters into a crisis condition. In such condition, we discuss how the characteristics of firm resources can be helpful to face its post-divorce crisis and return to its stable growth condition. The study was presented in the SMS conference in 2014 (Madrid) and now is under review in a peer-review journal.

We develop an overarching framework (in chapter 2) to provide a review of current studies in the field, point out our research question and the gap in the literature, and explain how our three articles fill this gap. At the end, it is worth mentioning that our study mainly contributes to the firm sustained growth in the resource-based streams of studies in the strategy literature.

**Chapter 2:**  
**Overarching Framework**

## 2.1 Overarching Framework

Following the previous chapter addressing the overall structure of the thesis, in this chapter, we present a review of key studies conducted in the strategy literature and address the gap in this area. Since the thesis sits at studies in the area of resource-based school of thought and strategic alliances, we have provided a review of the literature on the following debates from the strategic management perspective: (2.2) a review of theoretical and empirical studies on RBV, (2.3) strategic alliances from the view of resources/capabilities, and (2.4) dynamic capabilities. The reason for this review is that our study covers the firm internal growth based on its dynamic capabilities and the external growth through strategic alliances. In this line, Table 2.1 presents studies central to the development of this thesis.

Author	Year	Area
<b>Penrose</b>	1959	Resource-based View
<b>Dierickx and Cool</b>	1989	Resource-based View
<b>Barney</b>	1991	Resource-based View
<b>Peteraf</b>	1993	Resource-based View
<b>Teece, Pisano, and Shuen</b>	1997	Dynamic Capabilities
<b>Eisenhardt and Martin</b>	2000	Dynamic Capabilities
<b>Wang and Ahmed</b>	2006	Dynamic Capabilities

**Table 2.1** Key Theoretical Articles of Study



## **2.2 Resource-Based View**

Firm growth has been one of the central debates in the strategy literature to the present (Penrose 1959, Barney 1991, Eisenhardt and Martin 2000). In this regard, over the last 50 years, two questions have been at the center of studies in strategic management literature: ‘how can firms make rent?’ and more importantly ‘how can they sustain the rent in long term?’ (Barney 1991). In other words, ‘why some firms outperform others’ and ‘why they can keep their performance over time’ (Crook et al. 2008). These questions have been central in strategy studies since firms are not only interested in making rent once, but they also want to keep that rent as the base of their sustainable growth. This inquiry has resulted in the formation and evolution of different schools of strategy studies focusing on, for instance, the role of industry or the firms’ attributes (Connor 1991).

In this vein, the RBV (Wernerfelt 1984, Peteraf 1993, Barney 1991, Conner 1991), that started by the seminal study by Penrose (1959) on the growth of the firm, brought the role of firm resources at the center of attention. The RBV addressed the role of internal resources of a firm (Barney 1991) at a moment when the dominant perspectives in the strategy literature (e.g., industry-based studies) were focused on the role of the external environment on the firm rent making (Mahoney 2001). It basically assumes the existence of a series of internal

heterogeneous resource bundles (both tangible and intangible) that enable the firm to deliver a value unique to its environment (Barney 1991, Peteraf 1993).

Barney (1991), in his study, proposes that resources which are Valuable, Rare, Inimitable, and Non-substitutable (VRIN) are the source of sustainable competitive advantage. Those firms possessing these resources are able to deliver a unique value to their customers and make rent through better efficiency and effectiveness; at the same time being in-imitable, non-substitutable, and rare help to achieve a sustained competitive advantage and grow over time. Inimitability means the resources are difficult to duplicate and not every firm can develop such resources (Dierickx and Cool 1989); non-substitutability addresses that there are not other resources that provide the same or similar value, and rarity means that the resources are not held by many firms in the market (Barney 1991).

In a similar discussion, Peteraf (1993) approaches the sustainability of competitive advantage through addressing four main underlying factors: heterogeneity of resources, *ex post* limit to competition, imperfect mobility, *ex ante* limit to competition. The existence of heterogeneity between firms provides the chance of rent creation. *Ex post* limit to competition basically addresses the isolating mechanisms with which the firm can hinder competitors from access to the firm resources. Imperfect mobility emphasizes the role of isolating

mechanisms that give the firm the chance to keep its superior resource inside the firm, such as licensing. Finally, *ex post* limit to competition discusses the position, which the firm is to capture, and which competitors should not have already taken intensively.

Amit and Schoemaker (1993) develop another approach to the firm competitive advantage. The study defines the firm strategic assets as “the set of difficult to trade and imitate, scarce, and appropriable and specialized resources and capabilities that bestow the firm’s competitive advantage”. However, the study goes beyond the approach by Barney (1991) and discusses that the firm competitive advantage and rent making should be considered in relation with a series of complementary factors present in the firm environment named strategic industry factors. The authors discuss these factors cannot be completely identified *ex ante* and are determined according to the firm’s competitors, customers, innovators external to the industry, etc. As a result, there is the need to consider both strategic assets and strategic industry factors in the case of rent making.

Looking at the development of the RBV, after the seminal study by Penrose (1959), in the 80s Resource-school emerged with initial studies by Lippman and Rumelt (1982), Wernerfelt (1984), and Barney (1986). These studies continued until Barney’s main article in 1991 which was named the “resource-based view of

the firm and sustained competitive advantage”. In the 90s as the second decade, a significant number of studies were conducted on the view till 1996 when an article based on the RBV won the best paper award of the AMJ (Barney et al. 2011). In fact, these studies were investigating whether one or more types of resources would affect the firm rent making.

In this line, McElivly and Chakravarthy (2002) investigated the role of complexity, tacitness, and specificity of firm resources on the sustainability of firm competitive advantage. The results of the study show that the stated attributes can work as imitation barriers and sustain the firm competitive advantage over time. Makadok (1999) seeks to address whether different firms with different production functions, which are represented by different resources and capabilities, result in the differences between firm performances measured as market share. The result of the study supports the idea that those firms with better resources, capabilities, and production function gain a better market share at the expense of their competitors.

Maijoor et al. (1996) discussed the role of regulations as a type of resource contributing to the firm sustainable competitive advantage. The study supports the isolating role of regulation in helping a group of auditing firms to create sustained rent over almost a decade of their activities. Douglas et al. (2002) discussed the

role of firm strategic competencies as resources held by firms contributing to their sustained competitive advantage. The study supports that the ability of firms to develop new products and services, addressing the need of customers, is a strategic competence and the base of firms' sustained competitive advantage.

Furthermore, as a branch of the RBV, Knowledge-Based View (KBV) was introduced. KBV basically considers knowledge as the main source of competitive advantage. Clarifying the characteristics of knowledge, Grant (1996) develops a KBV and considers "the primary role of firm as integrating the specialist knowledge resident in individuals into goods and services". It discusses the problems related to the coordination of knowledge and cooperation between individuals as key challenges within the firm, for which the author proposes a series of ways from setting rules and directives to group problem solving. This view points out appropriate organizational structures according to the properties of knowledge that could go from hierarchy to team-based forms. Finally, the KBV addresses the relative efficiency in knowledge utilization as a criterion for setting the boundary of the firm whether the firm has to be active in one or more product markets.

Following the above studies, in the third decade, an increasing number of studies on the area have been summarized through several meta-analyses. Newbert (2007)

through a meta-review of over 300 articles about resource-based view supported the role of resources and emphasized the role of firm processes on the firm competitive advantage and higher performance. Crook et al. (2008) through a meta analysis of 124 key articles conducted on the RBV, supported the central debate by Barney (1991) on the role of VRIN resources on firm sustainable rent making. In fact, the study shows that, in average, firms with VRIN resources had a better performance in comparison to those without such resources as the central debate by the RBV.

### **2.3 Resource-Based View and Strategic Alliances**

While the studies provided above address the central debate by RBV in the case of various types of resources such as competencies and strategies, RBV has also been applied in various contexts such as strategic alliances. The literature considers alliances among prominent ways with which firms grow and sustain their competitive advantage (Ireland et al. 2002). Das and Teng (2000), in their study, extended the RBV in the context of alliances and addressed several main aspects of alliances such as their rationale and formation.

The rationale of alliances has been related to the possibility of value-creation and firm growth based on the pooling of two parties' resources (Das and Teng 2000).

In fact, firms look for various resources from their partners, specifically when they do not have all resources in-house to grow alone (Ireland et al. 2002) or when they have a vulnerable position in their market (Eisenhardt and Schoonhoven 1996). In this line, various studies discuss the possibility of exploiting the resources of their partners or establish joint activities with their partners (Hitt et al., 2000, Doz 1996). As a result, an alliance and resources allocated to it, if managed properly, can become a concrete source of growth and firm competitive advantage over time (Ireland et al. 2002).

Regarding the structure of alliances, RBV suggests the possibility of various forms of alliances from equity joint ventures to minority equity joint ventures, bilateral contract, and unilateral contracts (Das and Teng, 2000). In fact, depending on the nature and level of resources allocated to their alliances, parties may need to show various levels of commitment to their alliance (Doz 1996, Arino et al. 1998). In this line, for instance, the easier resources can be taken over by the other party or in other words the higher the risk of an alliance, more stronger relationships will be needed to commit parties to the alliance (Gulati et al. 2008).

The RBV has also been applied in the termination of alliances. Cui et al. (2011), surveying 150 alliances, found that firms' resource deployment and partnering

strategy affect the propensity of alliance termination through affecting the uniqueness of partnering resources. They discuss that resource redundancy due to the growth of the firm in the area of partnership result could in a higher likelihood of a focal alliance termination. Lunnan and Haugland (2008) supported that strategically important alliances are terminated less abruptly and established alliances are less in danger of termination.

## **2.4 Dynamic capabilities**

While the initial studies in RBV address the role of resources on the firm sustained competitive advantage, dynamic capabilities as a branch of RBV addressed the condition of the firm in the context of dynamic environments (Barney 2001). Dynamic capabilities are considered as capacities and processes helping the firm to reconfigure its resource base, address the needs of its changing environment, and make its growth sustainable (Teece et al. 1997).

Teece et al. (1997) define dynamic capabilities as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (p. 516). Eisenhart and Martin (2000) defines these capabilities as processes helping the firm to be able to adapt itself with the



changing needs of dynamic environments. Helfat et al. (2007: 4) define dynamic capabilities as ‘the capacity of an organization to purposefully create, extend, and modify its resource base’ where the ‘resource base’ includes the ‘tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis’ to keep its fit with its environment.

Looking at the strategy literature on dynamic capabilities, while still in progress, it can be divided into three streams (Eriksson 2014):

The first stream is related to the studies addressing the factors that affect the development of dynamic capabilities. Schriber and Lowstedt (2014) in their study explore and show how different types of firms’ tangible resources affect the development of firm capabilities. Their results show how similar tangible resources applied in new product developments can result in the development of different capabilities and that could affect the firms’ new product development outcomes. Narayanan et al. (2009), conducting a multiple case study, support a process model of new product development, from articulation to finalization, contribute to the development of firm capabilities and sustainable growth over time.

The second stream clarifies the nature of dynamic capabilities and considers these capabilities as capacities or processes that help the firm to purposefully change its resources (Teece et al. 1997, Eisenhardt and Martin, 2000, Winter 2003, Helfat et al. 2007). Teece et al. (1997), in this line, considers the role of processes, position, and paths as forming factors of dynamic capabilities. Similarly, we consider these dynamic capabilities as organizational and managerial processes for which firms need to consider their internal and external conditions, ways, and position in their environment (Teece et al. 1997, Eisenhardt and Martin 2000).

Winter (2003) divides capabilities into two groups: first order and second order capabilities. The first order capabilities are those that are contributing to the daily activities of the firm, those with which the firm ‘makes a living’. The second order (or higher order) capabilities as dynamic capabilities are those that contribute to the change of lower order capabilities and firm resources. In this line, for instance, Schilke (2014) found that second order alliancing capabilities contribute to the firm better performance through changing first order capabilities. In addition, it has been found that the two types of capabilities have a substitutive effect on each other.

The third stream looks at the impact of dynamic capabilities on the firm’s performance whether these capabilities bring about a higher performance or not.

The main discussion here addresses that capabilities, through changing resources contribute to a higher firm's performance (Eisenhardt and Martin 2000). Schilke (2014) supports this perspective finding that dynamic capabilities affect the firm performance through lower-order capabilities. In this line, Newbert (2007) found that those firms possessing necessary changing processes as dynamic capabilities showed a better performance versus the ones that did not have such capabilities.

Along with the studies reviewed above that address the key aspects of capabilities in the area, several studies in the domain of strategy address how firms grow by elaborating the role of dynamic capabilities and their relationship with resources. It is worth mentioning that, regarding our focus on how firms grow, we additionally looked for studies on growth in strategy literature and its intersection with resource-based studies to show the state of the art in this area. In the following paragraph, a review of these studies will be provided:

Several studies emphasize the role of firm new product development activities as a key factor in sustaining the firm competitive advantage and growth over time. Leonard-Barton (1991), investigates the role of dynamic capabilities on the firm competitive advantage and growth as a way of avoiding decline within firms. In her study, the author empirically supports that capabilities play both enabling and hindering effects on the firm's product development activities as the base of

competitive advantage and growth. Narayanan et al. (2009) develop and support a process model of new product development as the base of firm growth.

Danneels (2002) in his study presents a set of firms which have been trying to avoid a decline situation through developing their technological and customer competencies in interaction with their new product development activities. The study elaborates how the newness of a specific competency, that the firms were to develop, required different forms of development mechanisms. Finally, the study shows that firms depending on their external condition could follow a specific path of development of competencies over time. Danneels (2011), conducting a single case study based on an in-decline firm in the typewriter industry, discusses how the firm tried to go outside its decline situation through applying various changes processes. The study shows that, despite of the changes, managers' limitation in realizing the potential of their resources, the overlook of some of their capabilities, and a wrong perception about their environment finally could not stop the firm from getting into bankruptcy.

Rindova and Kotha (2000), conducting a case study analysis, related firm sustainable competitive advantage to continuous change in the case of fast changing environment. They found that firms need to keep a transient competitive advantage to be able to answer the changing needs of their environment and

experience sustainable growth in the case of fast changing environments. The results of this study magnify the role of firm dynamic capabilities and strategic flexibility in achieving such continuous change over time. Brown and Eisenhardt (1997), conducting a multiple case study in a fast changing environment, found that appropriate management of new product development activities was the base of sustainable growth of successful firms over the period of study.

Raff (2000) looking at two bookstore firms (Borders and Barnes) over 30 years found how their dynamic capabilities had been contributing to the firms' growth and to the development of new resources firstly as local and after as national providers of books in the U.S. The study basically shows firstly how the firms' capabilities were originated according to different objectives with which these firms started, and secondly how capabilities over time contributed to distinctive forms of growth: in one case around it was book keeping systems (Borders), and in the other the management of the scale of the company (Barn). Holbrook et al. (2000) assessed the role of firms' external environments beside internal conditions and questioned how growth results in the heterogeneity of four firms in the semiconductor industry in 50s and 60s in the US. While the study finds the role of firms' environment as the major factor, at the same time it finds that the firms' objectives and their R&D capabilities have played a key role on the survival and heterogeneity of the four firms in a 10 to 15 years life span.

## **2.5 Aim of the Thesis**

Following the literature discussed above, several scholars (e.g., Barney et al. 2011) point out that RBV has got to a level of maturity and that it is necessary to revitalize the theory through further advancing its dynamic aspects, further elaborating on the change mechanisms, or/and addressing its connections with other theories, and/or increasing the explanatory power of the theory in new phenomena. This need, in addition, intersects with Porter's (1991) study on the need for a dynamic resource-based theory of strategy as a missing piece of the strategy literature. Porter (1991) in this regard raises some questions on resource-based school and describes the characteristics of a resource-based theory such as its dynamic characteristics and its explanatory aspects including the origin of resources.

While the dominant RBV studies support the 'what' question in the field (as discussed and reviewed before), the question on "how" of firm competitive advantage and growth, specially in the context of dynamic environments, has been less explored (Barney et al. 2011). For this, the connection of resource-based view to other theories and explaining underlying processes has been one of the Barney's suggestions for further contributions to RBV (Barney et al. 2011). As a result, the current state of studies in resource-based school and the requests by the

scholars in the field (Barney et al., 2011, Peteraf et al. 2013) directed us to advance a new theoretical approach drawing on an open system theory as the first study of this thesis.

**First Study (Chapter 3):** In our first study, a teleological perspective (Open-system perspective) will be adapted to bring a dynamic nature into the RBV. The perspective has a dynamic nature and considers ‘a set of components that are in continuous interaction with each other, evolving toward an objective’. We will discuss the interaction of components with their external environment and how through this interaction different components grow and get new specifications. The perspective will help us to respond to the emphasis on improving the explanation power of RBV while maintaining its simplicity (Barney et al. 2011).

Drawing on the teleological perspective, we will theorize on “how” firms’ resources continuously grow and enable the firm to sustainably capture abnormal returns in dynamic environments. For this aim, firstly we will theorize the firm as a bundle of continuously evolving resources. After that, we will discuss the interaction of the firm with its external environment and how it contributes to the firm growth (Van de Ven et al. 1995). Following that, we will discuss the accumulation of resources over time as the underlying basis of the firm’s growth

and point out its characteristics (Dierickx et al. 1989). Finally, we will clarify how the items discussed above result in the heterogeneity of resources.

**Second Study (Chapter 4):** in this second study, we will address the lack of empirical studies in the area (Ambrosini et al. 2009, Helfat et al. 2013). Since the stream is still advancing, the need for qualitative studies has been emphasized (Danneels 2011). In addition, while prior studies mainly focus on a firm decline (Danneels 2011), growth has rather been less explored. Our study contributes to the literature by providing a more complete picture of growth through connecting resources, capabilities, and competitive advantage over time. It basically addresses how the firm accumulates resources to have a sustained growth. For this issue, we will conduct a case study on the successful growth of AIRBUS in the commercial aviation (aircraft) industry, a dynamic and technology intensive industry. We will theorize on the growth of AIRBUS and provide a process-based framework of continuous resource accumulation central to the growth and competitive advantage of AIRBUS over 20 years. In accordance with the first study, we will investigate if the incremental accumulation of resources contributed to the sustainable growth of Airbus. Finally, these two studies (chapter 3 and 4) will give us the basis to go to the third study.



**Third Study (Chapter 5):** Finally, for the third study, Barney et al. (2011) point out that the new theorizations can address new phenomena contributing to the explanatory power of the RBV. For this study, we will focus on an unexpected terminated alliance as an external shock that can push the firm outside of its growth condition. In fact, shocks are relevant phenomena that can affect the firm growth (Chakrabarti 2014). This is also in line with prior studies that address how post-divorce crisis can result in the complete exit of firms from their businesses which needs further investigation (Gulati et al. 2008, Harrison 2004). Most of studies in the literature focus on alliances before the point of termination. Despite of its importance, both alliance and resource-based literatures have remained silent on post-divorce crisis of parties who get into crisis (Gulati et al. 2008, Harrison 2004, Bruner and Spekman 1998).

Regarding our contribution to the resource-based school and alliance termination literature, it can be seen that most of studies focus on termination of alliances before the point of termination and there is no study to the present that looks at the post-divorce crisis of an alliance party. Previous studies that cover alliance termination can be divided into two main stream: (1) studies that examine “why” alliances terminate or in other words address the causes of alliance termination (Cui et al. 2011, Cui and Kumar 2012, Lunnan and Haugland 2008, Xia 2011); and (2) studies that examine “how” alliances terminate and argue the processes by and/or ways through which an alliance is terminated (Alajoutsijärvi et al. 2000,

Peng and Shenkar 2002, Gulati et al. 2008, Tähtinen 2002). As a result, as a very relevant and timely study we will contribute to the intersection of RBV and alliance termination literature to address the post-divorce crisis of a failed party. We mainly argue how a failed party can manage the crisis of its ex-alliance to return to a stable growth condition according to the characteristics of its resources.

**Chapter 3:**  
**Unfolding Dynamic Change: A Teleological,  
Resource-Based View of the Firm**

### 3.1 Abstract

Considering and explaining *movement* as *the cause of formation of all resources*, we provide a dynamic resource based theory to describe a firm growth. Mainly drawing on *open-system theory (teleological perspective)*, we consider a firm as a bundle of continuously moving resources that is a sub-set of a bigger environment of moving resources morphing toward an objective. Firstly, we clarify what *the movement* is, how it unfolds, and how as a result of that, resource bundles progress toward the firm objective in an incremental way. Then, we discuss how strategic choice and determinism, as the two main forces, give the firm ability to partly shape its destiny and its environment while at the same time it is being shaped by its environment. Finally, we discuss on the characteristics of a firm growth and the heterogeneity of resources bundles as a central debates in strategy literature. We finalize our article by providing examples from strategy literature.

## 3.2 Introduction

Until now, the *continuous management of change for the sustainable growth of a firm* through the creation of a sustainable (competitive and comparative) advantage has been the center of attention in strategy studies (Barney 1991, Wernerfelt 1984, Porter 1991, Barney et al. 2011, Crook et al. 2008). In this vein, Resource-Based Theory (RBT) of the firm (Wernerfelt 1984, Peteraf 1993, Barney 1991, Conner 1991) is one of the dominant research programs (Lockett et al. 2008) addressing this concern. RBT addressed the role of internal resources in a firm at a moment when the dominant perspectives in strategy literature (e.g., Industrial Organization) were focused on the role of the external environment on the firm rent (Mahoney 2001). It basically assumes the existence of a series of internal *heterogeneous* resource bundles (both tangible and intangible) that enables the firm to deliver a value unique to its configuration of resources (Barney 1991). In fact, those resources that are Valuable, Rare, Inimitable, and Non-substitutable (VRIN) (Barney 1991). In this line, Crook et al. (2008), conducting a meta-analysis of studies on RBT over almost 16 years, showed the higher performance of firms with VRIN resources supporting the central debate by Barney (1991).

After the initial studies on RBT (Wernerfelt 1984, Peteraf 1993, Barney 1991, Conner 1991), as a new stream, dynamic capabilities were introduced as the

underlying factors in creating change and keeping the sustainability of firms' competitive advantages (Teece et al. 1997, Eisenhardt and Martin 2000, Teece 2007). These capabilities were defined as firm capacities to modify and keep its resource basis relevant to its continuously changing environment over time (Teece et al. 1997). In this line, the following studies addressed resource management (e.g., Sirmon et al. 2007) and the demography of resources (Kim and Kuilman 2013) in bringing about the necessary changes and sustainably keeping the firm competitive advantages. Sirmon et al. (2007), addressing the need for further elaboration of change (bundling) mechanisms of resources, provide the discussion on "structuring resource portfolio, bundling of resources to build capabilities, and leveraging capabilities to provide value to customers" (Sirmon et al. 2007). Following that, Kim & Kuilman (2013) supported the role of the stated bundling mechanisms such as addition, modification, and removal on sustainably keeping the firm advantage advantages.

Despite the advances in the literature, there is emphasis on the need of further studies to improve the explanation power of the theory while maintaining its simplicity (Barney et al. 2011). Barney et al. (2011) mention that there is the need to revitalize RBT through further elaboration of change mechanisms or/and its connections with other theories to explain the same phenomena and increase the explanatory power of the theory. This need interestingly intersects with Porter's (1991) study on the need for a dynamic theory of strategy (as a dynamic theory of

the firm) as a missing piece of the strategy literature. Porter (1991) raises some questions and describes the characteristics of the dynamic resource-based theory (such as its dynamic characteristics) and explanatory aspects (such as the origin of resources). That “how” basically firm resources get to a point (e.g. VRIN or heterogeneity in a more general term) enabling a firm to capture abnormal return. These concerns open an avenue for us to further clarify “how” a firm *dynamically* unfolds to be able to sustainably create an abnormal level of return over time.

For this aim, drawing on open-system perspective, the concept of resource bundles, and considering a firm as the unit of analysis, we clarify the dynamics of a firm growth by taking a normative approach. First, we consider a firm as a bundle (Penrose 1959) of *continuously moving* resources that are *evolving as a sub-set of a bigger bundle of resources* (the environment) toward an objective. We discuss how, due to **the movement** in an accumulative way, the firm grows over time through the interaction of its internal resources along the interaction with its external environment. As a result of this growth, the firm as a bundle of resources transforms continuously toward its objective. In addition, through this growth, the firm partly shapes both itself and its environment through its *strategic choices* while at the same time it is partly shaped by its *deterministic environment*. Finally, these are diverging and converging forces that result in the heterogeneity or similarity of firms as bundles of resources within an environment.

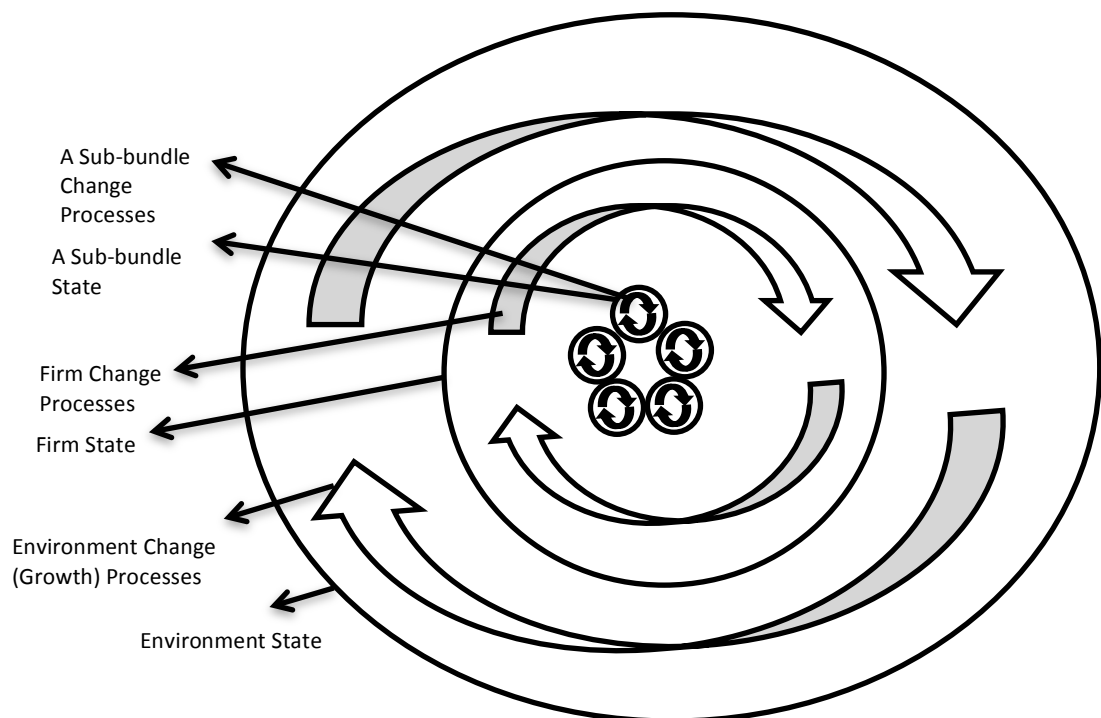
Our study mainly contributes to the strategy literature, specifically, studies in resource-based theory and dynamic capabilities through explaining *the “how” of the firm growth* (as a bundle of resources) through its continuous interaction with its external environment. It can also be considered a dynamic theory of strategy as it satisfies the criteria addressed by Porter (1991), mainly by addressing (1) both the internal and external conditions of the firm, (2) the continuous change of the environment (exogenous change), and (3) the role of the firm in shaping its environment. Finally, our theory can be considered an initial step to *a theory of resource bundles*, of which the firm can be one of these bundles.

### **3.3 The Firm as a Bundle of Evolving Resources**

*As the starting point in our theory, we consider the whole environment within which the firm is active as a “space” (Witteloostuijn and Boone 2006) of continuously moving and expanding interconnected resources. We consider **movement, while standing on its own, as an independent continuously self-generating Being** as the main cause of configuration and formation of resources. This is in fact the movement resulting in the interaction of resources with each other and makes it possible to understand (1) a firm and (2) change in general. As a result, a firm can be defined as a bundle (Penrose 1959) of continuously moving resources that are*



*evolving as a sub-set of a bigger bundle of resources (the environment) that all together are morphing toward an objective. These resources can take the forms of and be defined as “assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. [both tangible and intangible] controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (Barney 1991). This is in fact in line with the open-system theory (teleological change perspective) in which the whole environment is considered as a system of interconnected components that are continuously interacting to reach an objective (Van de Ven and Poole 1995). Figure 3.1 shows a visualization of a firm within the stated continuously moving environment.*



**Figure 3.1 Firm Growth State**

In the following, (1) we define what a firm state is, (2) clarify our conceptualization of resource space, (3) address how movement unfolds under open-system theory, and (4) discuss strategic choice and determinism as the basis of our theory and continue our discussion afterwards.

### **3.3.1 State**

We define *states* as *the characteristics (attributes, qualities, and quantities) that can become actualized within resources*. By actualization we mean emanation of these characteristics into resources that basically deliver the essence of resources. This actualization for instance can be (1) observed in the ongoing change of the nature (such as change in seasons, day and night, etc.) or can be (2) done by a conscious actor through instrumentalization or verbalization such as playing a musical instrument or writing (consequently), that can be either planned or emergent. As a result, by a *firm state*, we mean *both tangible and intangible characteristics (qualities and quantities) of the firm that can be captured through observation of already actual or emergent resources*, such as a firm's assets, employees, properties, processes, knowledge, trust, reputation, culture, revenue, costs, etc. (Barney 1991).

### 3.3.2 Resource Space and Movement

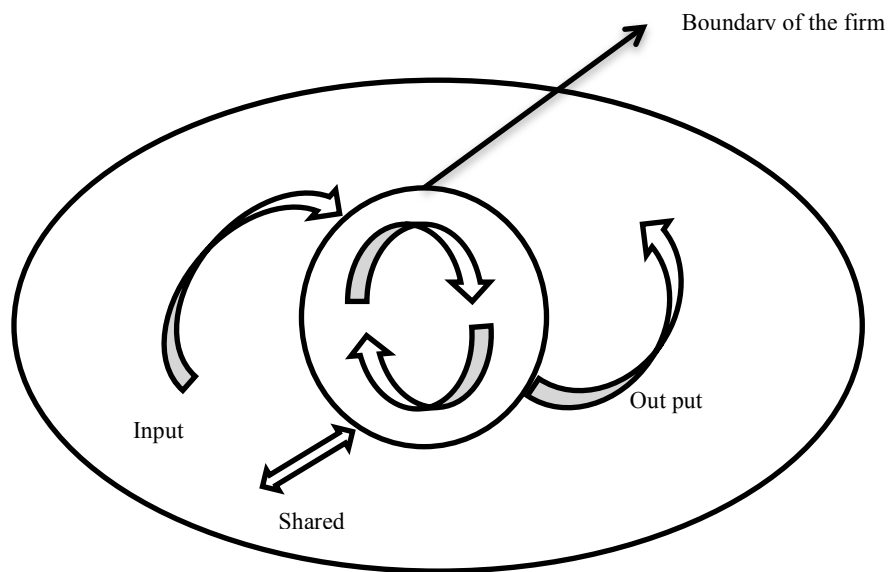
For simplicity of understanding, we assume *the existence of a space with infinite states embedded within the movement and beside that a space of “the resource”*. Due to the movement and as a result of interactions among resources, these infinite states can *emanate* (Conner 1991) into the resource space; however, if these two spaces exist, they are not separate. The emanation due to the movement has an original point (e.g., the big bang) and unfolds in a “*path-dependent*” way. By path-dependency, we mean the *connectivity* between the two states: between (1) the states that have become actual and (2) the potential states that have the potential of actuality (Cockburn et al. 2000), when a resource bundle (as a firm) morphs from one configuration to another potential one (Augier and Teece 2008, Augier and Teece 2009). This means that at the observation point of a resource bundle (e.g., a firm), depending on the path that the resource bundles have gone through to a point (Cockburn et al. 2000, Noda and Collis 2001), there will be a series of *potential* states into which the resource bundle can *become* actual.

In the following we address how movement unfolds in resources and a firm as a bundle of resources comes into actuality:

- *Firstly, the movement, and as the result of that, resources grow (or*

*are formed) in an accumulative way* (Dierickx and Cool 1989, Maritan and Peteraf 2011, Amit and Schoemaker 1993). In this growth, dynamic capabilities (specially R&D capabilities), while themselves are bundles of resources, act as the main forces of movement that push the bundle forward both in terms of accumulation and reconfiguration of resource bundles (Teece et al. 1997, Eisenhardt and Martin 2000). The stated accumulation between the two actual and potential states could be in terms of similarity for example in the case of firm R&D activities or acquisitions (Maritan and Peteraf 2011, Helfat and Lieberman 2002). However, it is worth mentioning that the potential states are not necessarily dependent on *the contextual locus of resource accumulation* and the sparking point of accumulation can come from another area due to the *interconnectedness of asset stocks* (Dierickx and Cool 1989). For instance, the resources (e.g. knowledge) accumulated in one context (e.g. department, business unit, product, etc.) can be applied and contribute to the growth of another context once the firm sparks the growth of the new (or another) department, business units, products, etc. This is in fact due to the available communalities, in terminology of Eisenhardt and Martin (2000), at a specific level of abstraction between at least two resource bundles, while they could be contextually different.

- *Second*, as we have taken an open-system perspective, the key aspect in the theorization backs to the interaction of a firm with its external environment (please see Figure 3.2). *Input* of resources into the firm (assets, knowledge, energy basis, new acquired units, etc.), *output* of resources from the firm to the environment (products, externalities, knowledge, etc.), and the sharing of resources between the firm and its environment can be considered as key forms of interaction between the firm and its environment (Rousseau 1979, Koza and Lewin 1998). Through this interaction, while the firm (as bundle of resources) grows on its own, at the same time it has a level of growth with its environment (Murmann 2013, Koza and Lewin 1998, Lewin et al. 1999). In the former (internal growth), these are *internal* sparks around which resources accumulate, while in the case of external growth these are external sparks such as alliances or collaborations that start the accumulation of resources (Murmann 2013, Koza and Lewin 1998, Lewin et al. 1999). It is worth mentioning that at the same time, the environment on its own has also its own level of growth due to the movement of other resource bundles within the environment (Murmann 2013, Koza and Lewin 1998, Lewin et al. 1999).



**Figure 3.2** A Bundle of Resources and its Interaction with the Environment

- *Third*, a potential state of resources is not necessarily already known (e.g. codified) and stocked (as a result of accumulation). This means that it can become stocked during the process of accumulation, which can be both planned/intentional or emergent (Brown and Eisenhardt 1997). For instance, firms are not necessarily aware of the final products or their following strategies and they will come up after their expansion or product development activities (Brown and Eisenhardt 1997).
- *Forth*, the current amount of resource stocks affects the amount of

potential states that become actualized as *asset mass stocks* (Dierickx and Cool 1989, Helfat 1997). *Finally*, there is an *evolving maximum level (rate)* of evolution capacity of a resource bundle (e.g., firm) such that the bundle cannot exceed due to *time compression diseconomies* (Dierickx and Cool 1989) and the *scarcity (e.g. strategic market factors) and limitations (e.g. property rights) of the resources (as input constraints)* (Barney 1991).

For instance, consider an R&D-based firm in a high velocity industry where the firm growth and survival is highly dependent on the processes of new product development and accumulated resources within the firm (Brown and Eisenhardt 1997). A new product becomes actualized after a period of research, design, and test: a potential state of resource bundles (final product A) has come into actuality based on the initial state of resources (e.g. the R&D knowledge of the firm as an initial level resource stock and complexity inherent within it), the activities performed when discovering or creating the product (Brown and Eisenhardt 1997), and the resources entered into the firm as inputs. Following the new product (named A), the firm may have the chance to introduce another new product (assume B) based on the current stock of strategic resources (e.g. knowledge) accumulated through the initiation of the previous product (new potential complex states) (Schoemaker 1990). However, there is a maximum level of growth rate in the process due to the limitations on input such as property rights (Barney 1991) or the

necessary amount of time for internal accumulation of the necessary missing stocks due to unavailability in the strategic factor market (Dierickx and Cool 1989). Assuming the firm evolves around its new products, what happens is that different bundles of resources embedded within the firm (e.g. structure, processes, and arrangement) continuously change to make the firm able to keep its fit level with its environment (Rindova and Kotha 2001).

### **3.3.3 Progress and Continuous Change of Resources as Outcome**

As an important result of *the movement*, resource bundles continuously change and become actual regarding the firm objective (Rindova and Kotha 2001). In fact, this is the way that we define *progress* as *the dynamic and continuous change in the state of resources moving toward the firm objective*. However, it is worth mentioning that our theorization is more tangible in the case of high velocity industries (Brown and Eisenhardt 1997), where the rapid pace of technological change and the high level of uncertainty push the firms to change their strategies and reconfigure their resources continuously (Teece et al. 1997; Eisenhardt and Martin 2000). This is when firms are continuously transforming themselves from one state to another state to be able to keep both internal fit between its different components as a system and external fit with their environment (Brown and Eisenhardt 1997). The provided discussion is nicely described as *continuous*



*morphing* in the terminology of Rindova and Kotha (2001) when the authors describe how Yahoo and Excite continuously have been transforming their strategies and structures to continuously renew their transient competitive advantage in response to competition and continuous changes in their environment's needs (Rindova and Kotha 2001). In fact, through this progression, a firm as a bundle of resources goes through a life-cycle of birth, growth, and maturity till the moment that it finally may die or may be adapted and reconfigured into new bundles of resources to answer to the changing needs of its environment (assuming a firm is active in a market with only one product) (Eisenhardt and Martin 2000).

### **3.3.4 Strategic Choice and Determinism**

Finally, in the defined setting above, the *potentiality* and *infinity* of states into which a resource bundle can **become** actualized provide the *opportunity* (Teece et al. 1997) of “strategic choice” (Child 1997) for a resource bundle (mainly an actor). In fact, an actor (e.g. managers or entrepreneurs) can be considered as the holder of knowledge (mainly as dynamic capabilities) and authority (both formal and informal) at individual level who can contribute to the adaptation of an appropriate strategy for allocation and “orchestration” of resources (Augier and Teece 2008, Augier and Teece 2009). In addition, the role of actors can be addressed in the case

of setting and identifying a system objective specially regarding our open system perspective as the foundation of our theory. This objective partly delivers the *intentionality* and direction of a firm growth versus a blind biological evolution (Augier and Teece 2008, Augier and Teece 2009). However, it is worthy to note that as the whole environment is continuously moving and morphing, the objective of the system is not necessarily already identified; it can be partly emergent, partly planned, and reframed continuously.

At the other side, the configuration of resource bundles (e.g., industry, market) also contains a level of determinism (Hrebiniak and Joyce 1985). This determinism is imposed on the firm due to the actions of the other actors (e.g., competitors within the firm industry or market), a lack of necessary resources (e.g., complementary resources), and limitation of a firm geographical location, among other reasons (Hrebiniak and Joyce 1985). Strategic choice gives the firm the chance to shape its environment, while at the same time, it is being shaped by the (potential) constraints and opportunities that the environment provides (Augier and Teece 2008, Augier and Teece 2009). For example, it is expected that the firm can play significant role in shaping its environment in cases where the firm (1) is a part of monopoly or duopoly, (2) is large in size, (3) has a large market share, or (4) takes a central role in its network, *ceteris paribus* (e.g., Hrebiniak and Joyce 1985). As a result, the level and effects of both deterministic (environment) and strategic choice dimensions contribute to the new potential states that come into actuality and the

ways through which resource bundles may go (Lawless and Finch 1989). This interaction is in fact what does not allow a complete pre-planning, creating uncertainty and emergent situations that have to be caught and planned upon the actuality within a specific context (Brown and Eisenhardt 1997).

Here, we answer the following question that “What will be the characteristics of a firm’s growth?”

Regarding the characteristics of growth, it can be observed that the firm goes through periods of fast growth followed by periods of slow growth, known as the Penrose effect (Penrose 1959). The periods of slow growth can be translated as periods of *contraction*, while the periods of fast growth can be considered *expansion* periods. This can also be considered as change in the growth rate of the firm, as (highly) positive growth slopes will be followed by less positive or negative ones (Mahoney and Pandian 1992). As mentioned above, the firm will go through a path of growth that is partly shaped by the firm itself through its own choices (Cockburn et al. 2000, Helfat 1994) and is partly shaped by the environment through resource constraints and opportunities provided to the firm (Alvarez and Barney 2010, Noda and Collis 2001, Helfat 1994).

Under these conditions, the results of different paths of growth, considering an initial state of the firm's resources (Cockburn et al. 2000, Noda and Collis 2001, Boeker 1989), may (1) diverge into different sets of *heterogeneous* resource bundles (e.g., different firms, and at other levels of analysis products, organizational forms, markets) (Rugman and Verbeke 2002, Cockburn et al. 2000, Noda and Collis 2001), or (2) converge (Noda and Collis 2001) into (semi) similar final states or results, such as (semi) similar configurations of resources, products, and services as the *equifinality* of the firms' destinations (Gresov and Drazin 1997).

Noda and Collis (2001), through a longitudinal study of seven cellular phone companies, address this main concern of why firms within an industry are heterogeneous. Their findings magnify the roles of three main factors: (1) the initial condition of the firms' resources beside the two (2) converging and (3) diverging forces. The initial condition of the firm, such as geographical locations and firm initial experiences, has been addressed as the basis for the initial direction of the firms' strategies and actions. This initial condition itself has been shaped due to competitive interaction between different players in the market, geographic and socioeconomic attributes, firm level strategy and the firm ability in shaping its environment through its managerial choices.

Diverging forces, such as managers' asymmetrical expectations and local learning, and different types of feedbacks received upon firm strategic actions, were among the forces pushing firms into creating new directions. At the other side, converging forces, such as firms' imitating activities and strategies, were directing the firms to similar paths and final ends. In fact, after the formation of these firms, this has been the interplay between these divergence and convergence forces that has shaped the paths that the seven companies into which had grown. This interplay, depending on the strength of the forces, for instance (1) relying more on the local learning and taking innovative actions forced by management as divergence forces *versus* (2) looking at competitors and following their steps as convergence forces, contributed to the total amount of variance in the level of heterogeneity between the firms. Similarly, in the study of firms in the pharmaceutical industry, Cockburn et al. (2000) supports the role of initial conditions and convergence forces (discussed above) on the heterogeneity and similarity of firms in the industry.

Based on the discussion above we provide two representative examples from studies in strategy literature to support our ideas:

**Example 1:** Ariño and de la Torre (1998), by studying a Joint Venture (JV) and its parent companies from its birth to its death, interestingly address the firm internal growth and its growth with its external environment and its parents. The authors

explain that the JV (the child), as an *independent entity*, is formed to introduce a new product into the Scandinavian market by bundling the parents' complementary resources. The JV started as a 50/50 equity alliance where it included R&D, production, marketing, and distribution of products. After its formation, the JV started growing and introduced its products after a period of research and production according to its parents' initial aims. In this initial period, the related industries and markets had a moderate level of competition and this opened enough level of *strategic* choice for the JV to introduce its product into pre-identified market. The JV introduced two main products including (1) soap and skincare and (2) dietary substitute, and it became successful in some of its target markets and its product found a dominant position (*the market as a part of environment is shaped due to the **output** of the firm*). However, some of the products did not succeed in the markets and further research and additional formulas from the parents were necessary to adapt the product. Over time, due to its endogenous evolution and achieving surplus capacity, the JV faced the opportunity to target and expand into new markets (e.g., the U.S and Asian market and starting new products).

For these further levels of growth, the JV initiated new strategies (*as internal spark within the firm*) and negotiated for further *inputs*, such as distribution channels and further production formulas from its parents. In some cases, these requests were accepted, and the JV found the chance to co-evolve with its parents (e.g., receiving new knowledge, shelf sharing and new arrangements between and within the JV

and its parents in the U.S. market) and its environment (e.g., entering and achieving significant share in the U.S. market). However, in some cases the stated requests were rejected (*as input constraints*), and the JV's lack of knowledge and need for more time to develop the related knowledge (*as lack of capacity and time compression diseconomies*) hindered its growth in these areas. The more the JV grew, the more it became complex (e.g. structurally) due to the higher level of interdependencies within itself and also with its parents in different activities. However, in some cases, due to the internal evolution of parent companies such as change in their strategies some of the arrangements shared arrangements were stopped and decreased the complexity. After four years, the JV evolved to a point that it majorly deviated from its initial objective creating a misfit with its parents' objectives. Thus, the JV dissolved and came to its end.

What can be observed is that after its formation (as its initial condition), the JV went through a growth path that firstly was initiated and affected by the initial complementary resources and the objectives of its parents. After its formation, we can see that both strategic choice and deterministic factors affected the path in which the JV grew. Firstly, strategic choices of the JV for example to enter into new markets (e.g. the US) or starting new products (e.g. new formulas for its detergent) based on its available resources mainly its R&D capabilities and distribution channels that helped the JV to partly shape its future by its own hands. However, the determinism and constraints on the firm such as constraints on access

to necessary resources (e.g., related distribution channels and necessary knowledge, and the time needed to develop the related skills) and additional constraints imposed by the parents in stopping the JV from entering into shared-interests markets hindered the further growth of the firm in those areas. Also, competition and barriers to entry in the following stages of the JV growth were among other factors that hindered the firm from further expansion into Asian markets as the role of environment in partly shaping the future of the JV's destination.

**Example 2:** Raff (2000), in his chronological study, shows the growth of Borders' book selling firm in the US context. The author shows how Borders' brother started small bookstores in Michigan with the aim of providing a comprehensive range of book to their audiences. These audiences were initially faculties and students in the University of Michigan. At early moments, there was a moderate level of competition and this provided Border brothers the chance to enter and sell used books to these audiences. The study nicely describes the accumulative forms of growth in different aspects, such as the range of books and topics sold, and the size of the firm (stores, shelves, etc). In addition, it nicely shows how the firm became more advanced in different phases (e.g. in 1971 and 1974) in terms of their services (discussed in the following) and how the firm's capabilities helped to reconfigure its internal resources in these years, resulting in a higher level of efficiency and effectiveness.



The stated advances can be seen as the level of internal growth according to its available resources (*e.g., the progress of title categories due to the accumulation of huge number of topics; more advanced and customer-centered services and adding guide for customers; etc*), and that Borders was able to expand its business due to achieving further internal capacity (*e.g. surplus financial resources*) through ongoing opportunities available to the firm (*e.g., possibility of acquisition of already established stores within their city*). In the following stages, enough level of growth made it possible for the firm to enter other geographical areas and to provide its services at national level. In addition, further growth provided the chance to internalize different parts of its value chain. To be able to manage the firm and also as an outcome of the firm growth, Borders additionally developed a controlling system that was growing back to back of the firm. After 20 years this controlling system itself became a unique competitive resource for starting new businesses and expansions into new areas and as a source of rent making.

In fact, the study shows that a low level of competition in early years in addition to a huge unmet demand, provided an acceptable level of *strategic choice* for Borders to start and grow its business in Michigan. Through the years, Borders found the opportunity to internalize different parts of its business (for example, from supply to final distribution) and became a national player. In fact, over the years, Borders became more and more complex and it went through several periods of transition reconfiguring its business. At the other side, considering the role of the

environment, the availability of other competitors in other geographical areas did not allow the firm to enter into some areas. Also the firm strategy focused on the profitable areas and did not aim to enter into others (*e.g., university centered cities already being serviced by competitors*). This interplay between these two forces shaped the way Borders grew, however, as we can see in the study, the firm strategic choice rather than the environment determinism played a stronger role in shaping the firm destiny as a national player.

### **3.4 The Components of the Theory: Some Clarifications**

Here, we address how our theory complies with current studies in the strategy and organization theory streams. Van de Ven and Poole (1995), in their seminal study, provide four main motors of change by reviewing a vast number of studies. We note that our theory has overlap with all four motors of change discussed by (Van de Ven and Poole 1995), including teleological, life-cycle, dialectical, and evolutionary motors. The teleological motor, as open-system perspective, basically addresses that the system is in continuous interaction with its outside environment to reach an objective (*e.g. following values*), and it reaches an *equifinal* state through different paths (Gresov and Drazin 1997) similar to what was discussed in our theory. In this line, however, the objective of the system is not necessarily

already identified; it can be partly emergent, partly planned, and is continuously reframed during its growth.

The life-cycle motor (Van de Ven and Poole 1995) addresses the *progression* of resources in their life cycles in addition to the adaptation of resource bundles to their environment in the process. Similar to our theory, resources on their own progress (and have a tendency) toward different (more) complex states (e.g., a more transcendent state), and through this progression, they can go through a cycle of birth, growth, maturity and afterward may die or revitalize into more complex new resource bundles. The possibility of strategic choices gives the ability of dynamic adaptation and the ability of resource bundles to shape their environment. The evolutionary motor (Van de Ven and Poole 1995) addresses the natural selection of the fittest imposed over a (group of) firm(s) by the environment. Our theory, considering the determinism imposed on the firm (discussed above) (Hrebiniak and Joyce 1985, Lawless and Finch 1989), addresses the role of the environment in shaping the firm condition in the way that a series of resource bundles (e.g., firms, departments) may give birth, survive (and be enforced), or may be selected out. In fact, the initial condition of a firm as the first form of determinism (e.g., where a firm geographically emerges at first hand) and the determinism imposed on the firm due to competition and resource scarcity address the way that selection mechanisms may act. However, in this condition, managerial strategies such as positional strategies can somehow neutralize these selection mechanisms and raise the idea of

adaption versus blind environmental selection (Barnett et al. 1994).

The last motor, the dialectal motor, basically discusses the conflict of interests between thesis and anti-thesis that results in the emergence of a synthesis (Van de Ven and Poole 1995). Although we did not address this idea directly in our theory, but it embodies this dialectical motor as one of main ways that movement unfolds. For instance, a *synthesis* (e.g., as a spark) can be considered a new bundle of resources (e.g., as an idea) that comes to actuality due to the interaction of thesis and anti-thesis (as bundles of resources) due to the internal conflict of conscious actors (specifically at the individual level) (Grant 1996).

Finally, the resource-based theory provided here has the characteristics of a potential resource-based theory of strategy addressed by Porter in 1991. First, we have provided the related change mechanisms that unfold through a *path-dependent progression* to answer (1) the static problem (explaining the change mechanisms) and (2) the problem of causality in RBT (the link between actual and potential states). Additionally, our discussions cover the other stated criteria by Porter (1991) mainly addressing (1) both internal and external conditions of the firm (*our clarification about strategic choice and determinism*), (2) the continuous change of the environment (*the whole space of continuously moving and evolving resources excluding the effect of the firm*), and (3) the role of the firm in shaping its

environment (*discussed directly in section 3.3.4*).

### **3.5 Discussion and Conclusion**

Resource-based theory can be considered one of the main influential research programs (Lockett et al. 2008) in strategy stream since the seminal work by Penrose (1959). The theory mainly aimed to determine the value of a firms' internal resources (Wernerfelt 1984, Peteraf 1993, Barney 1991, Conner 1991) at a time when theories were valuing a firm's external condition on its above-average financial returns (or rents). Barney (1991) mainly assumes the existence of a series of heterogeneous firms as the foundation of RBT and that those firms having resources with four VRIN attributes have the chance to make abnormal return (rents). Following the studies on RBT, dynamic capabilities (while themselves can be considered as bundles of resources) were introduced as the reconfiguration engines of resources to keep the fit level of a firm with its changing environment (Teece et al. 1997, Eisenhardt and Martin 2000). Despite of these advances, Barney et al. (2011) ask for the revitalization of the RBT through the discussion about more elaborate change mechanisms and for an inherent dynamism in the theory. In fact, the main question is how resources have got to the point that are VRIN.

To address this need, we provided a new configuration of RBT by settling it down in the open-system (teleological) perspective (Van de Ven and Poole 1995). We considered *the movement* as the cause of formation of resources and considered a firm as a (sub) bundle of *moving* resources as a sub-set of a larger space of moving resources (the environment) morphing toward an objective. Following that, we discussed how the firm (as a bundle of resources) grows and transforms continuously toward its objective, as the outcome of this growth. We discussed strategic choice and determinism as two fundamental forces contributing to where firms will go and how firms shape their destinies and their environment while at the same time are being shaped by their environment. Finally, we concluded our discussion by addressing the characteristics of a firm's growth and the nature of firm heterogeneity.

Our theory introduces some new aspects that can become a basis for further empirical studies in the field. First, the dynamic approach and the settlement of the RBT in the body of the open-system perspective can be considered as one of the most unique contributions. That is how a firm, as a bundle of resources, grows through both its internal growth and additionally interaction with its external environment due to *the movement*. This in fact gives that dynamic nature to RBT as the missing part of the theory and brings DCs at the heart of the theory. In addition, our framework, through discussion about strategic choice and determinism addresses how a firm has the chance to partly shape its destiny and its environment

versus blind natural selection approaches. Finally, our theory opens up a way for researchers to have a micro and elaborate approach to RBT (noted by Barney et al. 2011) and dynamic capability research programs for further studies.

As we considered a firm as a bundle of resources, the provided theory can be considered in a more general term as an initial step to “*a theory of resource bundles*”. It can be adapted and tested in all sets of tangible and intangible resource bundles from individuals, departments, and firms to processes, knowledge, and science, to industries and societies, and at a very abstract level, concepts and phenomena. This flexibility also can partly answer the need in the strategy literature to study change and evolution at different macro, micro, and meso levels of analysis (e.g., Pettigrew et al. 2001). In the end, our theorization gives readers the ability to examine and place infinite pieces of reality next to each other and formulate a better understanding about *one moving reality* (as a whole) that is continuously renewing itself.

## **Chapter 4**

### **Unfolding Airbus' Strategic Growth: A Case Study**



## **4.1 Abstract**

Conducting a process-based case study, we present the successful growth of the Airbus consortium over 20 years, answering the question ‘how do firms grow sustainably?’ in the context of a dynamic technology-intensive industry. The study magnifies the underlying role of (1) the incremental and piecemeal accumulation of assets plus (2) commonalities on the Airbus sustainable growth over the period. The growth is achieved through three cycles of new product development over the 20 years of Airbus’ life. In addition, our results show two primary periods of growth for Airbus: (1) consolidation, when Airbus was formed and became established as a consortium in parallel with its first aircraft, and (2) technological advance, when Airbus explored the technological capabilities of its partners and became a pioneer in the commercial aircraft industry in terms of technological advances.

## 4.2 Introduction

Over the previous decades, the question of how firms grow sustainably has been at the center of strategic management research (Barney 1991, Peteraf 1993, Dierickx and Cool 1989). Studies from the resource-based school have provided the dominant views addressing the sustainability of firm growth (Penrose 1959). These studies first address firms' strategic and unique assets as a source of competitive advantage (Barney 1991, Dierickx and Cool 1989). Second, they emphasize the role of isolating mechanisms in the sustainability of competitive advantage (Barney 1991, Peteraf 1993). However, the question of sustainability becomes particularly crucial in the case of dynamic environments (e.g., high velocity industries) in which firms face a high level of uncertainty (Brown and Eisenhardt 1997, Wirtz et al. 2007). Uncertainty basically encompasses potential and unknown events such as rapid technological changes, shorter business cycles, or shocks that make firms unable to predict and act *ex ante*. Unpredictable events undermine firm strategic assets and render them a misfit to their environment (Helfat et al. 2007). As a result, firms must look for ways to accumulate new strategic assets and change (Eisenhardt and Martin 2000).

To respond to the uncertainty of dynamic environments, studies from the dynamic capability perspective address the role of dynamic capabilities in adding and

reconfiguring resources and, as a result, in the sustainability of firm growth (Teece et al. 1997, Eisenhardt and Martin 2000). These capabilities are considered to be processes or capacities (Teece et al. 1997, Eisenhardt and Martin 2000) that allow the firm to purposefully change their resource base (Helfat et al. 2007) to maintain their transient competitive advantage and experience sustainable growth over time (Eisenhardt and Martin 2000, Rindova and Kotha 2001). In this line, firms' R&D capabilities to develop new technologies and new products, especially, have been identified and discussed as one of the primary driving forces behind changing resources and the growth of firms (Danneels 2002, Eisenhardt and Martin 2000, Schilke 2014a, Leonard-Barton 1992). These capabilities, in fact, help the firm to continuously develop and improve its technologies and products when product life cycles become shorter, technologies advance rapidly, or there is intense competition in the environment (Helfat et al. 2007).

Reviewing the literature, despite the relevance of strategic asset accumulation as a source of competitive advantage and firm sustainable growth (Dierickx and Cool 1989) and the role of firm (e.g. R&D) dynamic capabilities in changing firm assets (Eisenhardt and Martin 2000), *empirical studies* extending and supporting *how* strategic assets are accumulated and how capabilities contribute to this accumulation are scarce. In addition, since we are interested in the “how” of firm growth, the relevant empirical studies are essentially case studies or qualitative in general (Van de Ven and Poole 2005) and previous studies have emphasized on the

necessity of such method in the literature (Ambrosini and Bowman 2009, Helfat et al. 2007, Easterby - Smith et al. 2009, Danneels 2011).

Prior *empirical studies* (“*how*” *questions*), especially those with a focus on new product development, for instance, have supported the underlying role of processes such as the addition and modification of firm capabilities, through which firms change their resource base (Danneels 2011). Alternatively, these studies have empirically demonstrated how firm capabilities are developed in interaction with their new product development processes (Danneels 2002, Prašnikar et al. 2008, Narayanan et al. 2009). However, available studies primarily emphasize change during the period of firm decline (Danneels 2011, Tripsas and Gavetti 2000, Langlois and Steinmueller 2000), while studies on the growth period in the case of large firms are rare. Last but not least, despite its importance, the commercial aircraft industry has been neglected as a study context to date.

Analyzing the *successful* case of the Airbus consortium as a pioneer in the commercial aviation (aircraft) industry, we present and theorize about a case of sustainable growth, drawing on the Asset Accumulation Theory (AAT) by Dierickx and Cool (1989) and Dynamic Capabilities (DCs) by Eisenhardt and Martin (2000). We present how the Airbus consortium was sparked as a joint partnership between France, Britain, and Germany in 1967 and how, by 1987, it had become a pioneer in

the commercial aviation industry through its technological advances. The study presents “how”, among other possible ways, firms can sustainably grow by providing a cyclical process-based model of new product development as the basis for firm asset accumulation. Our findings magnify the role of two core factors in the sustainable growth of Airbus: (1) the incremental and piecemeal accumulation of strategic assets that contribute to Airbus’ competitive advantages and (2) the centrality of the ‘*maximum commonality*’ strategy in this asset accumulation. This growth represents the progression of Airbus in terms of technology, credibility, and its development of various types of aircraft over the period of study. Additionally, we identify two primary periods of growth for Airbus: (1) consolidation, when Airbus was formed and became established as independent entity and (2) technological advance, when Airbus explored the technological capabilities of its partners to a greater level.

This study contributes to the strategic growth literature by empirically extending the asset accumulation theory and to dynamic capabilities in the context of a dynamic industry. Our study complements the previous studies in the literature by providing a more complete picture of how dynamic capabilities function and, more importantly, how firms accumulate resources that result in their sustainable growth over time. In the following, first, we present a model of firm sustainable growth. Next, we comment on the method and the data collected for the study. Then we present the growth of Airbus using an analytic description and theorizing about the

events through which Airbus developed over time. Finally, we provide the findings of confronting analysis and end the study with our concluding remarks.

### **4.3 A Model of Sustainable Growth**

We center our study on the AAT by Dierickx and Cool (1989) and the DCs by Eisenhardt and Martin (2000). We define growth as an accumulation of assets that results in an increase in size and/or an improvement in the nature of firm assets. Dierickx and Cool (1998), addressing the sustainability of firm competitive advantage, suggest that strategic assets such as capabilities, technologies, or reputation should be built and accumulated over time because they may not be available and cannot be bought (Dierickx and Cool 1989) in the “strategic factor market” (Barney 1986). These ongoing built and accumulated assets are central to the firm’s competitive advantage and are basically the source of sustainable rent creation within the firm. What makes these resources special and the source of competitive advantage is the unique way in which they are built and accumulated over time (Dierickx and Cool 1989). The uniqueness and specially the time required for accumulation make the imitation of assets by competitors very difficult or sometimes impossible, giving the firm the chance to sustainably maintain and continue its growth (Teece 2000). However, the accumulation and sustainability of

assets becomes critical in the case of a dynamic environment with a high level of uncertainty and frequent technological change (Dierickx and Cool 1989).

In dynamic environments, firms need to accumulate assets to respond to the changing needs of their environment (Eisenhardt and Martin 2000). We discuss the role of dynamic capabilities, which are central to the accumulation of assets in dynamic environments and when there is need for change. DCs are firm capacities and processes that allow it to purposefully reconfigure its resource base (Helfat et al. 2007) and maintain its transient competitive advantage in response to the changing needs of its dynamic environment (Rindova and Kotha 2001). As a result, DCs allow the firm to change the nature of the current stock of assets and develop a new nature and direction. These capabilities can be divided into two groups: second-order and first-order capabilities (Winter 2003, Schilke 2014b). First-order capabilities help the firm to ‘make a living’ through its daily activities (Winter 2003), while second-order capabilities are of a higher order and are used to reconfigure the remaining lower-order capabilities and firm resources (Schilke 2014a, Danneels 2002, Schilke 2014b). In the case of dynamic technology-intensive industries, firms’ R&D capabilities have been discussed and supported as second-order capabilities that primarily contribute to the reconfiguration of resources (Schilke 2014a, Eisenhardt and Martin 2000, Danneels 2002, Leonard-Barton 1992). In fact, R&D capabilities allow the firm to accumulate new technological resources and to introduce new technologies and products based on the changing

nature of the environment (Eisenhardt and Martin 2000, Schilke 2014a, Schilke 2014b) to serve as a basis of firm sustainable growth.

Drawing on the two theories, we propose a process-based model as the basis for firm sustainable growth in dynamic technology-intensive industries with a focus on new product (e.g., aircraft) development (see Figure 4.1).

Consider an R&D-based firm in a dynamic technology-intensive industry in which the firm's growth and survival are highly dependent on the firm's ability to change and to continuously accumulate new resources (e.g., Brown and Eisenhardt 1997). In such contexts, in accordance with prior studies, new product development is one of the main drivers of firm asset accumulation (e.g., Danneels 2002; Eisenhart and Martin 2000; Schilke 2014a). A new product and its underlying technologies become actualized after a period of research, design, and testing considering the needs of the environment, the firm objective, or the interaction between the two (Danneels 2002). For instance, as a potential result of resource bundles, a final product (named A) with an initial level of complexity, purposefully comes into actuality based on the initial stock of resources (initial technologies, physical assets, etc.) (Dierickx and Cool 1989), the firm's R&D capabilities, the activities performed to design/create the product (Brown and Eisenhardt 1997), and finally, the resources entering the firm as inputs such as raw materials and technological

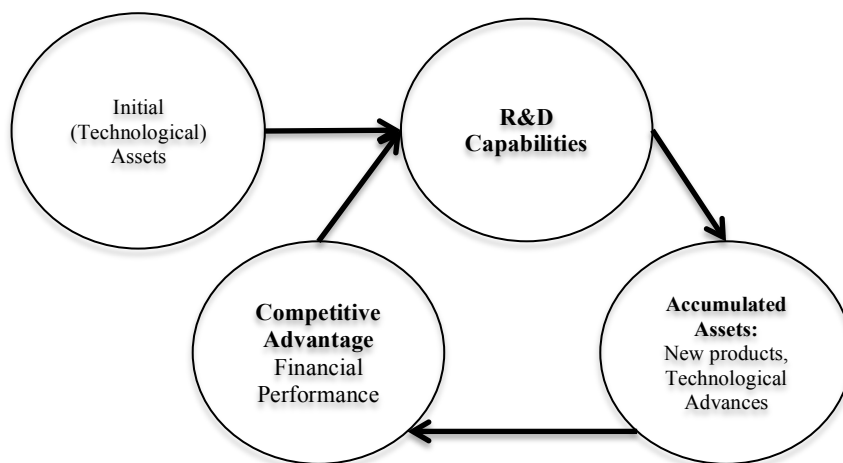


inputs (Dierickx and Cool 1989). The new product and the accumulated assets contribute to the firm's competitive advantage and its financial performance.

At this point, by completing a cycle of new product development and introduction, the firm has moved from its initial level of asset stocks and has added a new level of asset stocks. However, the journey has just started. If in the previous cycle, the firm has been able to meet its objective at a satisficing level, it needs to enter a new cycle and develop new technological advancements and products to address the dynamic nature of its environment (e.g., new market needs, new technologies, economic shocks) (Danneels 2002, Schilke 2014a). As a result, based on its current stock of strategic assets (product A and its related technological advances), R&D activities (Danneels 2002) and (new) inputs, the firm has the opportunity to introduce new technological advances and product(s) (named B) with a more complex and improved nature (Schoemaker 1990).

The sustainability of growth centers on a cycle in which, after the introduction of the first product, the firm continuously accumulate and develop asset stocks. In each cycle, the unique accumulated resources (stocks) become a foundation that the firm, through its dynamic R&D capabilities, can capitalize on for its next level of growth and new advancements (Henderson and Cockburn 1994, Helfat 1997). However, there is a maximum growth rate to the process (Penrose 1959) due to the

time required for the internal accumulation of the necessary stocks, their unavailability in the strategic factor market (Dierickx and Cool 1989), or property rights restrictions (Barney 1991). Assuming that the firm evolves around its new products, the different bundles of resources embedded within the firm (e.g., technological base, products, processes) change to maintain the firm's fit with its environment (Rindova and Kotha 2001) (See Figure 4.1).



**Figure 4.1** A Cyclical Model of Resource Accumulation

To support our model, we next comment on the context, method, and data used for the study.

## **4.4 Research Method**

For this study, we chose the commercial aircraft industry because of its dynamic nature. The uncertainty in this industry is the result of continuous innovation, technological advances, competition between large players, and various types of shocks (e.g., economic shocks). Technological advances and new product development are, in fact, the key to growth in this industry, and aircraft producers are very representative of the model in the previous section. These firms need to innovate and advance continuously to address the various forms of uncertainty in their environment, and these firms mostly develop and grow around their new aircraft. Given the enormous investments required to develop and build new technologies and aircraft in the commercial aircraft industry, alliances are frequent and are key to growth among the players (Garrette et al. 2009). Additionally, the commercial aircraft industry has been less studied and explored despite its market share and importance in the management area.

In our study, Airbus was selected first because the case fit well with our theoretical model and the aim of studying sustainable firm growth with a focus on new product development (Yin 2003). Second, Airbus is a representative and impressive case of successful growth, with over 50 percent market share. Extreme cases can provide a richer context for realizing and specifying underlying processes or relationships

(Yin 2003). In addition, regarding the bold success of Airbus, a satisficing level of representative subjective and objective data and documents are available describing the journey of Airbus over the last four decades (Yin 2003). However, because the study was concentrated on the initial stage of Airbus growth as the unexplored part of the literature, we selected the initial 20 years of Airbus growth, from when it was formed between France, Britain, and Germany until the moment that it became a pioneer in the industry in terms of technological advances in 1987.

To support the study model regarding the “how” of firm growth, we drew on process-based case studies (Van de Ven 1992) based on narratives (Pentland 1999). In this regard, first, process is understood as “the sequences of incidents, activities, and stages ‘[events in general]’ that unfold over the duration of a central subject’s existence” (Van de Ven 1992). Second, these are stories that describe and create connections between sequences of events. In fact, stories help a researcher to understand a context, make sense of the relationships between events, and develop plausible explanations for the nature of phenomena (Pentland 1999). Stories therefore do more than just mirror phenomena as a sequence of events, but at a deeper level, they move “from description to explanation” (Pentland 1999) and help to capture the complexity of processes and reveal the underlying patterns producing a specific result (e.g., sustainable growth) (Van de Ven and Poole 1995). However, it is worth mentioning that precise and coherent data are a necessary base for a good academic story.

To develop the Airbus story, we collected substantial amounts of data including (1) original available public data from the Airbus website (reports, recorded interviews, and a history of Airbus), (2) news, (3) documentaries, and (4) scholarly papers and cases studies already conducted on Airbus. These sources provided us with a rich pool of both *objective* (e.g., data on aircraft, technologies, orders, and deliveries) and *subjective* (e.g., reports and available interviews) data for our study. After the first round of data collection, we followed a snowball approach and looked for additional references within the data. For instance, in the case of documentaries and scholarly articles, we traced additional references addressed or cited to complement or cross-check our data.

After the two rounds of data collection described above, we identified all of the events, activities, and stages in a timeline that together describe (form) the growth of Airbus over the period of study (see Table 4.1) (Van de Ven 1992). According to the identified events, we started analyzing our data and writing the story of Airbus in chronological order (Pentland 1999). While writing the story, in some areas we faced voids in the data that pushed us to collect new details and increase the depth of the data around those specific events, particularly in the case of new technological advances and types of aircraft. To enforce the reliability of the data and analysis, we cross-checked the different sources of data available to us for each event.

Year	Internal Events/Forces	Environmental Events/Forces
1967	Initial agreement is reached between the French and German economic ministers, sparking the start of a new project.	
	A meeting occurs between Germany, France, and Britain. A memorandum is signed between the countries to initiate the aircraft.	
	Initial planning and design of the A300 begins.	Collaborates with Lufthansa and Air France to design the A300.
1968		<p><b>Limitations to input:</b> Rolls-Royce declines to produce the BR207 for Airbus.</p> <p><b>External pressures:</b> Pressure emerges regarding the viability of the A300 as two-engine 300 seat aircraft.</p>
	<p><b>Internal Change:</b> A change in the design of the A300 leads to a new aircraft called the A300B.</p>	
1969	<p><b>Alliance formalization:</b> The formal contract to launch the aircraft is signed.</p>	
	<p><b>A Separation:</b> The British Government separates from the partnership because of the deviation of the A300B from the original plan and other internal plans.</p> <p><b>Alliance recovery:</b> The German party and Hawker Siddeley [the British partner] substitute for the British Government.</p> <p>The partners' stake changes.</p>	

<b>1970</b>	<p><b>Legalization:</b> Consortium is legally registered as GIE (Airbus Industrie). Airbus becomes an independent entity.</p>	<p><b>Initial orders:</b> Air France places 10 orders for the A300B.</p>
<b>1971</b>	Spain joins the consortium with a 4.2 percent stake.	
<b>1972</b>	The A300B completes its successful first flight.	
		Lufthansa places its first order (3 orders).
<b>1974</b>		<p>Korean Airlines places its first order (4 orders). South Africa places its first order (4 orders). Air Inter places its first order (3 orders).</p>
<b>1975</b>	First A300B delivery to Air France (6 aircraft)	Indian Airlines places order.
<b>1977</b>	<p>Obtains "ETOPS" permission for the A300B (permission for long-distance trips). Introduces CatIIIA Autoland Technology. The 40th A300 is delivered.</p>	Thai Airline places first order (2 orders).
<b>1978</b>	<p><b>New Aircraft:</b> Launches the A310, a short-range aircraft with 200 seats.</p> <p><b>A Return:</b> The British government returns to the alliance, obtaining 20 percent of the consortium.</p> <p>New technological investments are made.</p>	<p>East Airlines places 23 orders for the A300 (March 1978).</p> <p>The need for small aircraft becomes apparent.</p> <p>SwissAir places order for the A310.</p> <p>Air France and Iberia place order for the A310.</p>
<b>1979</b>		<p>The Oil Crisis occurs, starting the economic recession.</p> <p>An increasing need appears for low-cost and efficient aircraft.</p>

1981	Announces decision to build the A320 with 150 seats.	
		Receives new orders for the planned A320.
1982	Introduces a new cockpit for the A310.	
1983	Uses composites in the secondary structure of the A310.	
1984	The A320 is officially launched.	
1985	Composite is used in the primary structure of the A310.	
1987	The A320 completes its first flight.	
	Introduces Fly-By-Wire.	

**Table 4.1** Table of Events

Having finished the story, we worked to confront and extend (Danneels 2011) the theoretical model (basically its constructs and the relationship between them) and the data. We first benefited from the literature to identify the already tested construct indicators in our theoretical model, especially in the case of R&D capabilities (see Table 4.2). This review provided a tangible understanding of the indicators and improved the validity of our analysis. Afterwards, we carefully checked what the data and the context represented about the model constructs. For instance, in the commercial aircraft industry, each order has significance. Because commercial aircraft carry people with a high level of risk, there are strict standards and requirements for aircraft and aircraft producers. Each new aircraft must



experience various tests under varied conditions (e.g., cold weather, hot weather, storms); these tests may take more than two thousand hours of flight for a new aircraft. As a result, orders can be considered to be a strong indicator of a reliable aircraft and aircraft producer. In the case of technological assets, the advanced technologies had an *objective* nature (the number and models) and they were representative of Airbus' technological growth during this period. Finally, it is worth mentioning that the objective nature of the data helped us to minimize any bias that could arise in the case of subjective analysis and improved both the validity and the reliability of our analysis.

<i>R&amp;D Capabilities (focus on new product development)</i>	<i>Data</i>
Introduce new generation of products (Schilke 2014)	Developing the most efficient and economic aircraft in the industry Producing a product not only comparable to the products but a level beyond them
Extend product range (Schilke 2014)	Extending the family of aircraft
Enter new technological field (Schilke 2014)	Pushing the boundaries of technological advancement step forward
Identify promising new technologies (Danneels 2008)	Looking for new engine design

**Table 4.2** Capability Indicators

After identifying the indicators, we confronted the theoretical model with the story. The theoretical model allowed us to focus and avoid major deviations from the objective of study (Yin 2003). However, although we were primarily focused on the theoretical model of study, in parallel, we considered any novel insights independently provided by the data. We were then able to capture or rule out the role of events and factors except for those identified according to the theoretical model to ensure the associations between events. After finishing this stage, once the result of this analysis was available, we could move to a higher level of abstraction and look for the underlying pattern of Airbus growth as it contributed to sustainable growth, addressing the primary question of our study. In this process, the qualitative nature of analysis pushed us to go back and forth between the data and the advancing theory in two levels of abstraction to develop a satisfactory version of the article. Finally, once the article was finished, we left it untouched for three weeks twice, and after these two gaps, all of the authors independently reviewed the article one more time and, through discussions, finalized the study.

## **4.5 Data Analysis**

In the following, we divide the strategic growth of Airbus into two primary periods: (1) airbus spark and establishment (1967-1977) and (2) technological advancement

and consortium enforcement (1977-1987). Regarding the focus of our study in relation to the strategic growth of Airbus and its technological advances (please see Figure 4.1), we identified three core assets of Airbus and focused on the growth of these assets over time, including (1) partnership between parties, (2) the technology developed between partners, and (3) credibility. However, it is worth noting that when necessary, we addressed the role of other factors in the chronological growth of Airbus.

#### **4.5.1 Period 1: Airbus Spark and Establishment (1967-1977)**

Flight was one of the very first dreams of humans: the initial sketches and hand-made wings by *da Vinci* in 17th century take us to the first short flight by the Wright brothers' initial aircraft in 1903 and then to the growth of various forms of aircraft over the next decade in Europe and the United States. Starting in 1913, the aircraft industry flourished and continued its growth until the 1960s, when the US companies became the pioneers of the commercial aircraft industry. US firms had the majority of the market share and, in addition, benefited from over 50 years of uninterrupted experience and advancement. European aviation companies, however, had been affected by World War II and remained behind and dependent upon their American counterparts in terms of technological advances until the end of the 1960s. However, during the 1960s, the idea of Airbus as a potential player in the

commercial aviation industry came to life—a player that 30 years later became a pioneer in the commercial aviation industry and that delivered more than 1000 aircraft over five continents. In the following, we provide the analytic story of Airbus in its first 20 years of life:

***Collaboration as the basis of Airbus:*** Before the 1960s, European aviation companies were doing business at a national level. During the 1950s and 1960s, these companies introduced new generations of commercial aircraft such as the Comet (English) and the Concorde (French & British supersonic aircraft). However, these products competed, and further, none had the potential to take a strong position in the market against American aircraft. In fact, it was unlikely that any of these companies alone could gain a strong position due to (1) the enormous R&D costs of such projects; (2) the lack of resource stocks comparable to 60 years of American experience, which were necessary for the development of technologies and products at a comparable level and in a timely manner; (3) the high risk of failure for such projects; and (4) competition between them within their market. As a result, the ambitious aim of being a pioneer in the commercial aviation industry that would “voo the whole world and will go over all continents” (Airbus website) sparked the idea of Airbus as a joint partnership between the French transport minister Jean Chamant and the German economic minister Karl Schiller in 1967 at the Paris Air Show. The Europeans were aware of the following truth:

*“without a joint programme of aircraft development and production, Europe would be left trailing in the wake of the Americans, who dominated the industry – and, with the planned long-range 747 “jumbo” on the horizon, looked set to consolidate their supremacy”(Airbus Website).*

***Signing the Collaboration Memorandum:*** This initial spark brought the three European countries, France, Britain, and Germany, together a few months later in September 1967 to sign a memorandum of understanding for the development of the A300, a short-to-medium range twin-engine aircraft, as the first phase of their collaboration. In fact, nothing could better fit the situation than a joint partnership to develop a new generation of aircraft that could satisfy the need for more economical and low-cost aircraft, which was the primary demand of the market in the late 1960s. The countries tried to ignore their national barriers and come together as a united body to benefit from the maximum level of each country’s capabilities and expertise and to develop and build the most advanced and economical aircraft in their industry. In addition, they were seeking to become independent of their American partners; this dependence had limited their growth. Therefore,

*Airbus was sparked “for the purpose of strengthening European cooperation in the field of aviation technology and thereby promoting economic and technological*

*progress in Europe, to take appropriate measures for the joint development and production of an airbus” (Airbus Website).*

In this process, France and Britain each took 37.5 percent and Germany took 25 percent of the work for the development of the aircraft. The French “Sud Aviation” took the role of “lead company” to coordinate activities between the different partners, and English was used as the partnership language. To run the program, they were expecting to establish a legal entity (called “Airbus Industrie” as “Groupe d’Interet Economique” (GIE), under French law) to create commitment and hold all responsible for the corporation. This step was important to allow the partners to benefit from their complementary resources and to avoid any clashes in their activities. In fact, relying on only their agreements and a *mere* relationship would be problematic in the long term because each party wanted to change and direct the plan according to its own interest. With Airbus Industrie setting the necessary strategies and providing direction to the partners, potential problems were mitigated and strategy development was placed in the hands of a single entity.

***Facing Criticism:*** In 1967, after conducting the necessary initial planning, Airbus started developing its very first aircraft and took the bold move of designing a 300-seat, two-engine aircraft called the A300. This project was bold because at that time, an aircraft of that size and with those characteristics for long distances would

have at least three engines (in comparison to a US version with a similar size). Airbus was in close collaboration with its partners and two dominant airlines, Air France and Lufthansa, to develop the aircraft. However, its partners and collaborating airlines doubted whether this aircraft would even be possible, which put pressure on the entire collaboration. To address the criticisms, Airbus was searching for a more powerful engine with more thrust. Airbus negotiated with Rolls-Royce to design and deliver an engine with the necessary requirements, named the RB207 model. However, Rolls-Royce was engaged with a more appealing order (the RB211, an engine with less thrust for an American company), and stopped the RB207 project. This event increased criticism of the A300 because Airbus no longer even had the necessary engine.

Finally, the criticism pushed Airbus to modify its early plan and shift to a smaller-size 250 seat aircraft (A300B) that could fly with the current Rolls-Royce engine (RB211). This change mitigated concerns over the viability of the aircraft and proved to be beneficial for Airbus in the subsequent years. First, because of a worldwide economic recession in the late 1960s, airlines were revising their forecasts regarding passenger numbers and were looking for smaller aircraft. The A300 with 300 seats could have faced problems in the market. In addition, developing a smaller aircraft had a lower risk of failure because of the lower level of investment and complexity in the aircraft's development. Finally, Airbus could

adapt the smaller RB211 Rolls-Royce engine and could therefore buy the engine off the shelf, significantly decreasing the cost of the aircraft.

***Launching the A300B Program & Exploring the Technological Potential of a Consortium:*** After these initial developments and after determining that the A300B would be the first aircraft of the joint partnership, on 29 May 1969 during the Paris Air Show, the three countries finally signed the contract for the Airbus consortium for building the A300B, a short-to-medium range twin-engine aircraft. However, the consortium did not become a legal entity until 1971. Following the 1969 contract, the program was launched at the Sud Aviation site in Toulouse, and the tasks of the different partners were identified.

To build a product not only comparable to current aircrafts in the market but also a level beyond them, Airbus needed to rely heavily on the technological capabilities of its partners. *In fact, the parties were interested in pushing the boundaries of advancements in aircraft rather than just bringing similar products to market.* The initial idea behind forming Airbus was to benefit and leverage the expertise and knowledge of the partners and, beyond, to use their synergies for further technological advancements. Béteille, one of the fathers of Airbus, mentions that they had to collect and combine all of the technological capabilities of their partners. This collaboration could provide a great advantage because over the years,



each of these partners based on different forms of education had been able to develop unique technological capabilities to contribute to the aircraft. In addition, Béteille mentions that they had to take greater risks because they wanted to introduce a significant new product that would revolutionize the commercial aviation industry.

The tasks were allocated according to the resource base and the technological capabilities of each partner. "French took the cockpit, the control systems and the lower center section of the fuselage. Hawker Siddeley [the British partner], would make the wings while the Germans would make the forward and rear fuselage sections, plus the upper part of the center section" (Airbus website). In fact, it was very important for the partnership to first allocate the tasks to create coherence between parties and avoid redundancies in the project.

*A Separation:* Despite the changes in the aircraft specifications, there were still pressures on the young Airbus partnership regarding the viability of the aircraft. The British were also engaged in a national aircraft development that was limiting its ability to contribute further resources to Airbus. In all, the environmental pressure plus the deviation of the A300 from its early specifications led Britain to separate from the partnership on 10 April 1969 and withdraw all of the resources it had allocated to the A300. This withdrawal was a significant breakdown that placed

the entire partnership under threat of shut down and created a void in the consortium's resource base. Making this problem more critical, Airbus was still not stable and was still taking shape as a young partnership. This separation added to the current difficulties of Airbus, primarily revolving around managing the partnership, the continuous coordination between partners, problems related to product development such as the capability-based coordination of the A300 and input problems, primarily the lack of engine. In fact, the partnership was virtually abandoned during this period (Muller, 1997).

***Alliance Recovery:*** West Germany had anticipated such a separation stepped in, offering to support up to 50 percent of the program if the French would do the same. The Germans considered Airbus as a great opportunity to rebuild the European commercial aviation industry, which had been affected by World War II. The fast response of Germany stopped a serious crisis and saved the partnership. In addition, despite the withdrawal of Britain, the British company [Hawker Siddeley] stepped in and supported the A300B with 35 million pounds for the design of wings. However, there was still a need for an additional 35 million, which again Germany supported with a loan.

***A300B Development and Taking an Initial Shape:*** To develop the A300B, in the early months, Airbus worked closely with its potential customers, primarily Air

France and Lufthansa, to develop a product that would fit the needs of its customers. To achieve this goal, they developed a system of listening to their customers that helped them to keep their aircraft appropriate for the market. In this regard, Beteille says, “*I wanted to try to understand what the customers really wanted*”. Additionally, Airbus was determined to not to lose sight of *the central picture* of economic efficiency and being the builder of “the most economical aircraft”. In terms of the engine problem, they finally adapted an engine from General Electric (CF6-50A- American engine) that they planned to produce jointly with a French company called Snecma. The engine was equivalent in function to other products (primarily those from Rolls-Royce), but it was more economical, addressing the primary aim of Airbus to develop the most economical aircraft. As additional new developments, composite-based components were contributing to the efficiency and the light weight of the aircraft. While the components of the A300 were coming together and the aircraft was taking its initial shape, at a higher level, Airbus itself was taking shape around its initial aircraft. In fact, a high technology consortium with one unique product was being developed through the interaction between the partners’ resources and the emerging aircraft. Through this interaction, little by little, the parties were obtaining a better understanding of their own roles and contribution to the aircraft.

It is interesting that while Airbus was realizing its initial form, the Airbus “fathers” (Beteille & Kracht) were also considering the development of a family of aircraft as

“the future” of Airbus that would cover all sectors. At that time, they had a very firm vision of eventually gaining 30 percent market share.

***First order:*** On 3 September 1970, Air France signed the first order for six upcoming A300s (250-seat aircraft). This success reinforced the partnership’s determination to develop the aircraft, which was expected to become an actual product in 2 years. In addition, the order helped Airbus to gain a minimum level of credibility as an aircraft builder and to justify the investments in the A300 that had been criticized by partners and by the market. Further, these orders helped Airbus to little by little expand its position in the market and start accumulating credibility, one of the strategic assets that contributed to its growth.

***Formalization and the Growth of the Consortium:*** The consortium finally became a formal entity on 18 December 1970, when ‘Airbus Industrie’ was registered legally under French Law. France Aerospatiale and Germany's Deutsche Airbus each took a 50 percent stake. This event had several impacts on the growth of Airbus. First, it helped the consortium to unite itself and to establish a single interface for the A300 strategy through design, development, flight-testing, sales, and marketing. Second, from the earliest moment, it was very important for Airbus to be independent. In fact, the collaboration would be in danger without independence because it was likely that each partner might want to advance its own

interests in, for example, the selection of aircraft type, the capability-based allocation of resources, or the expansion strategies of Airbus. The legal registration of 'Airbus Industrie' helped to separate Airbus from its partners and make it an independent entity with economic objectives.

In addition, Airbus Industrie had the crucial capability of "commercial expertise" for the management of the consortium. This capability was necessary for the continuous management of the alliance in terms of strategy and technology because it kept the alliance from deviating from its economic objectives (Muller, 1997). Additionally, through the efforts of Germany, the coordination of research and production, client interface and the highly symbolic function of test flying were in the hands of Airbus Industrie and out of the partners' control. The strategic growth of Airbus was in the hands of 'Airbus Industrie'.

Third, the formation of 'Airbus Industrie' would stabilize the partnership and provide more maneuvering space, furthering the parties' commitment and supporting further risks, primarily technological investments to follow technological advances. With the commitment of France and Germany to the project and a minimum level of confidence in the partnership, in the following year (1971), Spanish "Construcciones Aeronauticas" (CASA) joined the partnership and took a 4.5 percent stake and the responsibility for designing an A300 horizontal tail

plane. For these changes, France and Germany each reduced their stake to 47.9 percent. In fact, CASA designed and developed composites for some parts of the aircraft to make it lighter and a better wiring design that improved the aircraft's efficiency. Finally, to facilitate physical growth, Airbus had to apply new technological devices such as the "Super Guppy", a U.S. built transport aircraft to accelerate the movement of resources among the different Airbus sites in Toulouse, Spain, and Germany.

***Flight Test, Introduction, and Initial Successes (1972-1973):*** Finally, the result of 6 years of work by the consortium became available to test. On 28 October 1972, the A300 flew successfully for over 1 hour and 23 minutes, and the concept of the most economical aircraft in the market became a reality. However, despite the A300's introduction, Airbus had to convince active airlines that the A300 was one of most efficient and economical aircraft available in the market. Additionally, they had to convince customers that A300 had been the result of a very close collaboration between the best European aviation companies. These facts were not at all clear to their customers, and time was needed to realize the value of this product. As a result, it was challenging to demonstrate the value of the partnership and the aircraft to the market and potential customers. Airbus went on a campaign at the Paris Air Show, where the A300 flew before thousands of guests. In addition, Airbus planned a spontaneous two week flight in which the A300 flew from Toulouse to South Africa, to Brazil, to Mexico, and to seven states in the U.S.

before finally returning to Toulouse. This spontaneous flight had an impressive effect on the customers in these different areas, and Airbus was able to collect over 10 orders that year. In fact, as one of the managers said, “nothing like an aircraft itself could better sell the aircraft”. In May 1973, Lufthansa became the second airline to order the A300 (ordering 3 plus 6 options).

This sale could be considered a success for Airbus, which had found it difficult to become established and to build an aircraft over the last 6 years. The sale helped Airbus to get an additional level of credibility beyond the initial order by Air France, and it contributed to the next stage of Airbus growth.

***The Subsequent Orders (1974-1977):*** In 1974, Airbus obtained another order from Korean Airlines. In the same year, they delivered the initial 6 A300s to Air France. In 1975, these orders were followed by orders from Indian Airlines followed by orders from African Airways and Air Inter. After these orders, an 18-month period started in December 1975 in which no orders came to Airbus (a black period), endangering the additional production of aircraft in Toulouse. However, Airbus managers kept their vision and continued to sell their product. These conditions continued until 1977, when Airbus received two orders (plus 2 options) from Thai Airlines in May 1977. This order was followed by 23 orders in March 1978 from Eastern Airlines, which was among the top four American airlines (this represented

the first order from an American airline). This order was a great success for Airbus because the US market was very competitive; receiving just one order from that market was a significant success as Airbus sought to expand its presence in the US market.

All in all, the initial period of Airbus growth provided the company with a level of stability. In fact, Airbus had obtained a sufficient level of credibility, the consortium had become stable, and they had presented their initial product to the market. Through 10 years of activity, Airbus had become a stable aircraft producer active in the industry. Over these years, Airbus was able to deliver 81 A300s to 14 airlines active in 100 cities in 43 countries. In addition, Airbus had an additional 133 firm orders and 88 more options; further, after only 10 years, they had achieved 26 percent of market share in dollar value. This stability allowed Airbus to pursue additional growth by introducing a new product that they had been planning since 1976.

#### **4.5.2 Period 2: Technological Advancement and Consortium Enforcement (1977-1987)**

*Change in strategy (1978):* By this point, Airbus had moved from being a young partnership during the previous period to being a relatively established and stable



consortium. In addition, it had got enough credibility by delivering 30 aircraft to the market to be a strong and growing player compared to their American counterparts. This position gave Airbus the courage to move one step closer to their ambitious aim of becoming the dominant player in terms of technological advancement and market share. As a result, in this period, Airbus found it necessary to engage deeply in technological advancement; they therefore encouraged all of their partners to expend effort and push their current technological boundaries one step forward. However, it is worth noting that these investments were not being made for the sake of technological advancement but were investments toward delivering the most economical aircraft to their customers. In fact, during this period, Airbus strategy concentrated its efforts around technological advances that would provide the most economical aircraft in the market.

***Technological Advancements and Setting Standards, Launching the A310***

**(1978):** The early Airbus advancements were related to the A300 (and its different versions), which was the *first two-engine* aircraft and a very bold move that put *three-engine aircraft* behind in the 1960s. The use of composites (lighter and more resistant materials than pure metals such as aluminum) in the A300's secondary structure was another advancement initiated and designed by the Spanish partner, CASA. These composites made the aircraft lighter and more efficient and provided the potential to carry more cargo. A version of the A300 (A300B4) in 1977 obtained ETOPS permission to be *the first two-engine aircraft* to take long-distance

routes. However, a new stream of advancements was launched when Airbus announced a new aircraft, the A310, a short- and medium-range aircraft with 218 seats in July 1978.

The A310 was, in fact, a derivative of the A300 with which Airbus tried to further exploit the innovative skills and technological know-how of its partners. The A310 was launched considering the need of the market (SwissAir and Lufthansa) for smaller aircraft. Airbus developed the A310 in collaboration with two airlines: SwissAir and Lufthansa. As a result of advances made in 1983 (which will be discussed later), with the A310, Airbus introduced (1) a new cockpit system and (2) a new type of composite, a lighter-weight carbon fiber reinforced plastic, used in the secondary structures such as spoilers, airbrakers, and rudder, that lightened the aircraft and opened further capacity for carriers (these composites were initially tested in the A300). On 15 March 1978, SwissAir became the first airline to place an order for the A310, including 10 more options. Lufthansa quickly placed an order for 10 A310, and Air France and Iberia were among the subsequent customers. On 1 April 1979, Lufthansa increased its order to 25 plus 25 options, and two days later, KLM added another 10 plus 10 options. On 6 July, Air France raised its orders to from 4 to 35 and in the same year, Martinair, Sabena, and Air Afrique joined the list.

***The Return of the British Government and Consortium Enforcement (1978):***

Once Airbus (1) secured its position within the market with its two primary products, the A300 and especially the A310, and (2) definitively demonstrated its technological advancements, the British asked to return and become a full partner. This move followed 10 orders from British Airways for A300s in 1978, which was one of the conditions for the British partner to return: that British airlines should become engaged with Airbus products if Britain wanted to return to the Airbus consortium. To return, Britain provided Airbus with 50 billion pounds in a returnable loan and received back approximately 20% of the total stake in “Airbus Industrie”, equivalent to the amount it would have as a partner of the consortium. For these changes, the shares of Germany and France decreased to 37.5 while the share of Spain (CASA) remained intact. The return was threefold. First, Britain’s involvement provided strong enforcement in terms of technological advancements for the consortium because they had advanced engine design capabilities that would benefit Airbus. Second, Airbus could become a stronger entity with the financial resources of the new partner. Third, by this move, the party would become a collaborator instead of being a potential competitor and the consortium would include four key players in the commercial aircraft industry for advancing new products and technologies.

***The Oil Crisis (1979):*** The oil crisis in 1979 was a key event that significantly affected the world economy and, in particular, the commercial aviation industry. In

1979, oil prices increased significantly, decreasing the demand for flight-based trips around the world. Consequently, airlines had to decrease their costs, and so they started looking for more economical aircraft to match their capacity to market demand. As a result, short- to medium-range, 150 seat aircraft and, in general, more fuel-efficient aircraft assumed the center of attention. Airbus' moment had arrived: in fact, the change in demand brought Airbus an enormous advantage over other companies, given their almost one decade of effort developing the most efficient aircraft in the industry. As a result, Airbus announced a new aircraft that was consistent with both its new aircraft growth strategy and the environmental conditions. However, additional technological investments were needed to make the new aircraft more economically efficient than the two previous products.

***The A320 Selection; A Family Approach (1981):*** As Airbus was considering how to achieve a dominant position in the market, from its early moments, it wanted to develop a portfolio of aircraft (taking a family approach) over time. In fact, at the heart of their strategy, they were looking for greater flexibility by providing a wider range of products to their customers in terms of seat capacity and trip length. After introducing the A300 and the A310 (medium-range aircraft), with the A320, Airbus took the next step in their new aircraft development strategy (in terms of seat capacity and length of trip). Additionally, the market demand after the oil crisis made a medium-range single-aisle 130-170 seat aircraft (A320) the most appropriate option for Airbus' growth. Despite the fit between Airbus' growth stage

and environmental demand for the A320, there was pressure from the partners to consider the A330/340, a high-capacity twin, ultra-long-range four-engine aircraft, as another choice for development.

Finally, Airbus chose to develop the A320 because it was aligned with its internal growth stage and it met market demand. Additionally, technological limitations would impose a greater level of risk on the consortium in the case of the A330/340 because, until that moment, Airbus had only worked on small and mid-range aircraft; jumping to large aircraft would involve much more uncertainty and unpredictable complexity. Airbus had been capitalizing and leveraging its technologies and developing new aircraft based on previously developed models (A300 and A310); in each new aircraft, they added new features and technologies. Therefore, choosing a smaller aircraft (A320) with new technological advances would decrease the pressure compared a large four-engine A330/340. As one of the managers describes, "correcting a mistake is much cheaper, and the accumulation of experience is faster with a smaller, short-range aircraft which makes many more flights and is used in larger numbers than the long-range".

***Receiving the initial orders and the incremental achievement of market share***

**(1981):** In June 1981, at the Paris Air Show, Air France announced its intention to buy 25 of the planned A320s, with an option to buy 25 more. However, the A320

was only officially launched in March 1984 due to delays in funding and the complexity of coordinating between the partners. In addition, the number of non-sold built aircraft (called "whitetails") was increasing in Toulouse because customers had cancelled their orders following the economic recession in the early 1980s. Despite these problems, when the A320 was launched, Airbus announced an impressive portfolio of 80 orders from five customers including Air France, Air Inter, Cyprus Airways, Index Adria of Yugoslavia, and subsequently British Caledonian and British Airways. Additionally, an A320 order from Pan Am was an unexpected success, representing the first order from an American airline for the A320 when there was intense competition from American producers in the U.S. market. Eventually, the A320 family became one the best-selling jetliner aircraft families ever in Airbus history.

***Cockpit Technology Advancement (1982):*** In 1982, a new cockpit (a Forward-Facing Crew Cockpit) was designed for the under-development A310, which represented a huge advancement in terms of its human-computer interface. The cockpit is basically the flight deck and includes the set of necessary controls for pilot. In the new cockpit, new digital gauges instead of analogue ones were used, which made it possible to fly the aircraft with only two pilots and without the need of a flight engineer. In fact, the A310 was the initial step in Airbus' *commonality* strategy because the aircraft, to a great extent, was designed based on the A300. Additionally, the A310 was a link between the A300 and A320 in the sequential

development and introduction of new aircraft by Airbus. The A310 brought Airbus' different technological advancements into one aircraft. In addition, the A300 family was subsequently updated according to the A310's advancements, which helped Airbus to maintain homogenous growth in terms of resource accumulation.

***Composites in the Primary Structure (1985):*** In 1985, two years after the first flight of the A310, composites were applied in the primary structure of the new A320, making the primary structure much lighter and significantly improving the fuel efficiency of the aircraft. Airbus, from an early moment, emphasized the value of composite components because their resistance and lower weight improved the efficiency of the aircraft. This progress of using composite was applied to the A300 and A310 in the following years.

***Fly-By-Wire, the Flourish of Airbus' Technological Advancement (1987):*** One of the exceptional innovations of Airbus in this period was "Fly-By-Wire" (FBW), which was introduced in the A320 with its first flight in 1987. In previous aircraft, the A300 and A310, Airbus used an electrical signaling system on the secondary flight control, replacing a web of cables and pulleys that was similar to the traditional industry version. However, in the A320, Airbus aimed to develop this technology one step further into a computer-driven digital "fly-by-wire" in which "the deflections of the flying control surface on the wing and tail are no longer

driven by pilots' controls, but by a computer which calculates exactly which control surface deflections are needed to make the aircraft respond as the pilot wishes". With this new technology, the pilots only needed to work with a simple side-stick control instead of using different control columns. The Airbus version of *FBW* was not just a technology that facilitated flight controls and reduced weight. In fact, it improved the reliability of flights because it prevented pilots from initiating sets of maneuvers outside of the aircraft capacity. The technology was groundbreaking and shaped the development of the commercial aviation industry; in the following years, it became one of the industry standards and one of Airbus' sources of competitive advantage.

#### **4.6 Findings and Discussion**

Here, we try to confront our theoretical model with the analytic story discussed above and trace the model within the growth of Airbus (*See Table 4.1*). Looking at the data, three main cycles of new products were realized sequentially related to the A300, A310, and A320. As can be observed from the data, when Airbus developed a new aircraft or technological advance, this stock would become a base that Airbus could build on in the following stages of its growth in the form of (1) capitalizing



and developing its subsequent new products, (2) improving its current products, and (3) enforcing its position in the market by obtaining further orders.

***First Cycle:*** As was discussed in the story, the first cycle was the period of A300 production. In 1967 (the starting point of the cycle), the parties brought their complementary assets, primarily their technological ones, under the Airbus agreement. For the A300, the partners tried to push the boundaries of technological advances one step forward using the expertise of each of party in the aircraft industry (R&D activities). Each of these partners specialized in the production of one part of the aircraft (see the section on *signing the collaboration memorandum*). Because they were concerned with the economic efficiency of the product, the A300 was designed as a two-engine aircraft in collaboration with Air France and Lufthansa, who would be the final users of the product. Due to external pressures, such as problems obtaining the necessary engines or doubts regarding the viability of the project, the development of an A300 with its initial characteristics was abandoned. Airbus was forced to change the initial design of its product, and the new design and advances resulted in the development of the A300B a two-engine aircraft with 250 seats (1969). However, when the A300 designed was finalized (1969), the product and technological advances around the product proved to be a source of competitive advantage and attracted several orders from Air France and Lufthansa even before the product's introduction to the market in 1973. Additionally, after rolling out the product in 1973, from 1973 to 1976, Airbus

pushed to open its position in the market and obtain new orders through different airshows and direct contact with international airlines (e.g., Indian Airlines, African Airlines).

**Second cycle:** The second cycle of new product development started during 1976/7, when Airbus identified a need in the market for smaller aircraft and started planning its new aircraft, the A310. The A310 would be a mid-range aircraft based on the knowledge built and accumulated around the A300 while, at the same, Airbus would develop new technologies and components, including a new cockpit system and composites in the secondary structure of the plane. Firstly, Airbus leveraged the assets of the A300 into the A310 as part of a strategy that determined that all products should share *a maximum level of commonality*. Second, the A310 should be more efficient than the A300, and therefore, the parties developed a new cockpit system and a lighter and more resistant aircraft. While the A310 was still under design and development, Airbus was able to obtain over 100 orders after its announcement in 1978 until the end of 1979, allowing the A310 project to continue. Additionally, the technological advances developed for the A310 also helped Airbus to homogeneously improve its current products, the A300 family.

During this cycle, Airbus' position stabilized as the number of deliveries exceeded 100 by the end of 1970s. Airbus also had two products in this period. Finally and

more importantly, there was an increasing number of orders for both the A300 and the A310, demonstrating the credibility of Airbus as an aircraft producer.

**Third cycle:** The third cycle started with the oil crisis in 1979 as an external shock in the environment that pushed airlines to search for more economical aircraft while also decreasing their buying ability. This crisis showed the value of Airbus' efforts over the last ten years to build economical aircraft. To respond to the market, Airbus aimed to develop the A320 as the most economical and fuel-efficient aircraft. Similar to the previous cycle, Airbus both (1) leveraged the accumulated resources of its two previous aircraft (A300 and A310) into the A320 and (2) reinforced its R&D activities to develop the groundbreaking technology, Fly-By-Wire. Airbus also developed new composites for the primary structures of the aircraft, making the aircraft lighter, able to carry more cargo, and able to use less fuel. It is worth mentioning that the A320 was selected although there was pressure from the partners to develop a bigger aircraft, the A330/340, but Airbus continued its A320 aircraft. Demonstrating its great success, upon the launch of the A320 in 1984, Airbus had already received over 80 orders from different airlines such as Air France, British Airways, and Air Inter. Following these advances, Airbus updated the rest of its aircraft with the current technology to bring its *maximum commonalities strategy* to the center of its growth. In fact, commonalities became one of Airbus' dominant competitive advantages as it developed its family of aircraft (the A310, the A320, and subsequently the A340).

The discussion above supports our cyclical model of Airbus' new aircraft development as the engine of Airbus growth over the first 20 years of its life. The model allows us to move to a higher level of abstraction and trace the underlying pattern of Airbus' sustainable growth over the period of study, identifying how the product development cycle works as an engine of asset accumulation within Airbus.

#### **4.6.1 Underlying Pattern of Airbus Growth**

*Incremental Nature of Growth:* The findings discussed above illustrate *the incremental growth of resource accumulation* as the dominant pattern contributing to the sustainability of Airbus' strategic growth over the period of study. The incremental growth shows itself first to be (1) the piecemeal accumulation of different stocks of assets, primarily in terms of technological advancements and credibility, and second, (2) not taking large jumps in accumulation, as discussed in the following.

**Piecemeal accumulation of resources:** First, from its earliest moments, Airbus managers had the vision of a family of products that would cover a wide range of

distances and different levels of capacity. As the data show, to create this family, each period Airbus focused on one cycle of new aircraft and each cycle offered the chance to gradually accumulate new resources in terms of new designs and technologies. In the first cycle, Airbus *took 6 years*, from 1967 until 1973, to have the A300 ready for flight. In addition, in this period, Airbus also needed and was able to establish its position in the market as a young aircraft producer before further advances. This market position allowed the intense advertisement of the A300 in the market during this period through different air shows, campaigns and direct visits to airlines to obtain the necessary orders (e.g., Indian Airlines in 1974, Thai Airlines in 1977, Eastern Airlines in 1977/8).

In 1978, almost 11 years after the birth of Airbus and when it became stable (in term of the increasing number of orders and number of deliveries), the company started accumulating new technological resources through the announcement of the A310 as a new member of the family. In fact, during these years, the delivery of over 40 A300s gave Airbus the chance to accumulate enough knowledge and technological resources to move to the A310. Their planning was timely in terms of Swiss-Air's and Lufthansa's need for smaller aircraft flying shorter routes. As discussed previously, for the A310, Airbus increased its R&D activities and started accumulating a new stream of technological resources to push the boundaries of technological advance one step forward. It took Airbus 5 years to introduce the A310, from its announcement in 1978 to its first flight and delivery in 1983. During

this period, under the umbrella of the A310, Airbus was able to develop a new cockpit and composites that permanently contributed to the secondary structure of the aircraft.

Finally, the same pattern of incremental asset accumulation can be observed in the case of the A320. When Airbus announced the A320, they had sufficient orders for the A310 (over 100 at that point) and, in addition, there was a clear need for more fuel-efficient aircraft. Similar to the previous cycle, under the umbrella of the A320, Airbus developed additional new technologies (FBW) over almost 4 years (from 1983/4 to 1987). Upon announcement of the A320, Airbus had already received over 80 orders for this planned aircraft, showing Airbus' credibility and stable position. In fact, each cycle of new product development became the basis for the piecemeal accumulation of new technologies under the umbrella of a new aircraft.

**Not taking large jumps in resource accumulation:** Another indicator demonstrating Airbus' incremental approach can be demonstrated by the fact that Airbus did not take very large jumps in its asset accumulation.

The first occasion on which Airbus declined to take a large jump dates back to the initial design of the A300. In fact, the A300 significantly shifted the current norms of aircraft design (300 passenger aircraft with 2 engines) and so faced pressure from

airlines and even partners about its viability, which resulted in the separation of the British from the consortium. The pressure and the lack of a planned engine finally stopped Airbus from further developing the A300 using the initial design and pushed it to modify and pursue the A300 for 250 passengers using engines available within the market. As discussed earlier, these changes were not problematic, they were positive because the demand for large-size aircraft was diminishing and the initial A300 design could have faced problems that would have affected Airbus' growth. In addition, the smaller size of the aircraft lowered the risk of project failure.

The second indicator of this avoidance of large jumps can be observed when Airbus started a new cycle. Airbus did not jump quickly from the A300 to the A310, but maintained the accumulation of resources with their current A300, waiting 9 years to pursue the A310. In the case of the A300, once they developed the A300B, they developed several similar derivatives such as the A300B1, A300B2, and A300B4, which had very minor differences from the A300B but varied according to the specific need of the airlines, for example in the internal design of the aircraft such as the number of seats, their locations, etc.

The third indicator is evident in the selection of each new aircraft. For example, in the selection of the A320 versus the bigger A340, Airbus pursued a smaller aircraft

because it included a lower level of risk and they could accumulate the related resources in a shorter period of time. The A340, as a wide-body aircraft with a carrying capacity of over 380 passengers, would be a very large jump for Airbus, which had been producing aircraft with a maximum of 270 passengers. This jump would change all of the relevant designs, would not allow for technological advancement, and would made it impossible for the firm to fully benefit from its previous assets. Pursuing a smaller aircraft allowed Airbus to develop more new technologies and commonalities that could be applied to the subsequent A340 and smooth its development. As Beteille describes, “correcting a mistake is much cheaper, and the accumulation of experience is faster with a smaller, short-range aircraft which makes many more flights and is used in larger numbers than the long-range”.

To further elaborate the incremental growth of Airbus, we expand our discussion on two assets of Airbus, mainly *credibility and technological advances*.

***Credibility:*** Credibility was one of the assets indicated by our analysis of the data. Credibility, in fact, was one of the primary accumulated stocks contributing to the sustainability of Airbus (competitive advantage) in different stages of its growth. The initial level of Airbus’ credibility came from its partners, who represented the best European players in the aviation industry. However, these players were *not*



known as part of the Airbus collaboration. Airbus started to build and accumulate its credibility more significantly with the initial order from Air France and the subsequent order from Lufthansa. As Dierickx and Cool (1989) state, credibility is a strategic asset that should be built and accumulated over time, and it is not available to the firm in a strategic factor market (Barney, 1986). After the two initial orders, the first flight of the A300, the additional orders, and the unique features of the A300 itself contributed to the credibility of Airbus as an aircraft builder. The first flight of the A300 was an impressive event in front of thousands of guests and was followed by the spontaneous flight of the A300 over Africa, Latin America, and the United States. In fact, the A300 had unique features, most importantly, efficiency. However, given the nature of aircraft and the time needed to acquaint customers with the product, Airbus still needed the time provided by the additional orders received in 1977 and 1978. This credibility contributed to Airbus' stability during the first decade of its life and committed the partners to further R&D activities during the second decade as presented in the story. The return of the British partner with a 50 million pound investment is one of the major events demonstrating the increasing credibility of Airbus as an aircraft producer in the late 1980s. In the second decade, the introduction of new aircraft (A310 & A320) and several ground-breaking technological advances additionally supported Airbus' reputation as a reliable player in the market and allowed Airbus to obtain a significant increase in the number of orders from 1978 to 1979 and 1987 to 1990.

***Technological advances:*** In the first period of Airbus growth (the initial 6 years), the resource stocks of Airbus' partners were used as the basis for the initial technological advancements. During this period, using the R&D capabilities of its partners, Airbus advanced and improved the technological stock of its partners to a higher level to roll out their first aircraft, the A300. In the subsequent stage, once the A310 was selected as the next product, Airbus' R&D capabilities helped to reconfigure and leverage the knowledge accumulated from the A300 to the A310 while simultaneously helping Airbus to develop new technological advances for a more efficient aircraft. These technological advances allowed a more complex and sophisticated aircraft. In fact, the A310 shared a set of characteristics with the A300 while also including a new cockpit system and more composites in its structure. A similar cycle was realized in the case of the A320, when the accumulated knowledge from the A310 was leveraged into the A320 while new additional R&D activities also contributed the groundbreaking Fly-By-Wire. Although technological advances took a central role in all periods of Airbus growth, in the second decade of Airbus life (1978-1987), R&D took a dominant role in that all Airbus asset stocks concentrated around these advancements. After the introduction of the A320, because Airbus relied on a commonality strategy, these stocks became the primary source of Airbus competitive advantage in the following years. In fact, in 2014, FBW is still one of the standards in the commercial aircraft industry. The discussion provided here supports the theoretical model provided in the second part of the study (See Table 4.3).

<i>Product</i>	<i>Features</i>	<i>New features</i>
A300	--	Initial design
A310	Derivative of A300	New cockpit New control system Complete use of composites for the secondary structure aircraft New size
A320	Derivative of A310	Use of composites in the primary structure of the Fly-By-Wire New size

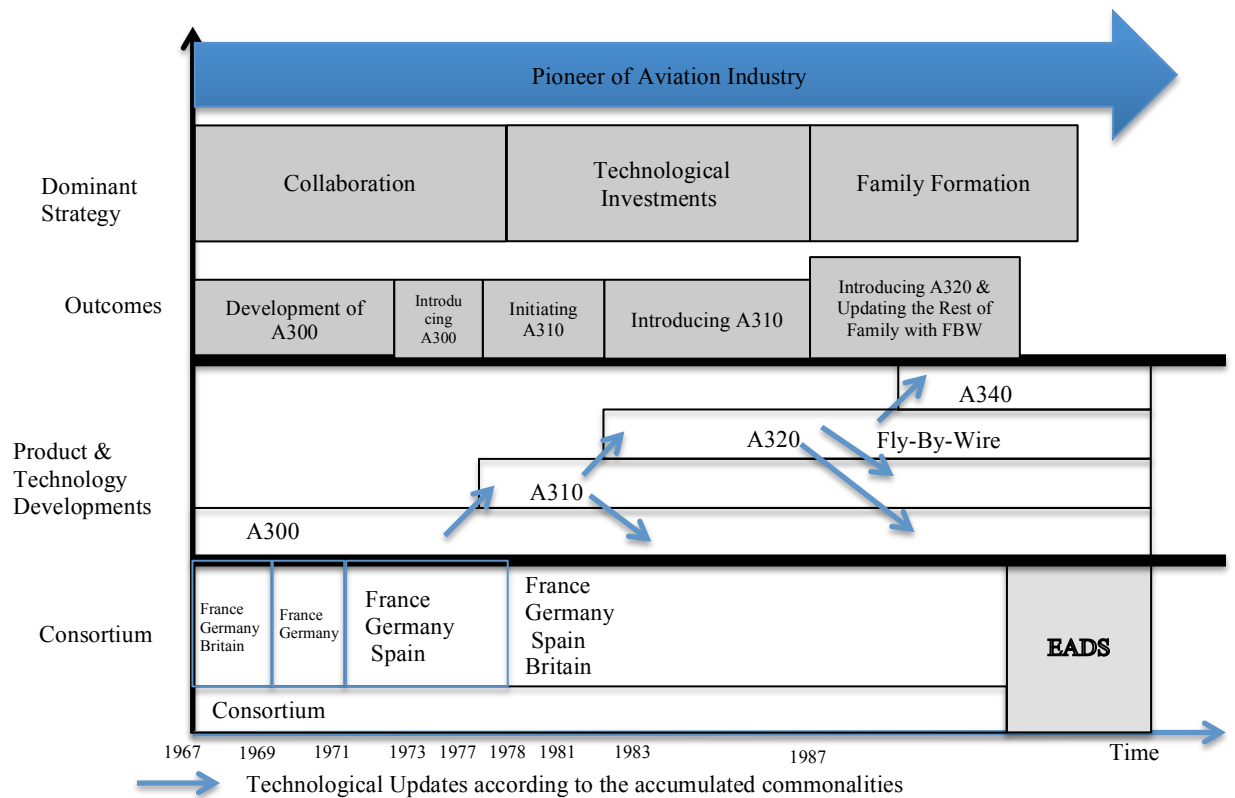
**Table 4.3** Airbus Technological Advances

*Commonalities:* As was discussed above, *maximum commonality* was one the central strategies behind airbus growth. First, in the development of new aircraft, Airbus capitalized on previously developed technologies while simultaneously improving their new technologies. As Table 4.3 shows, each new aircraft provides a point of connection between the previous and the subsequent products. The commonality strategy started with the development of the A310 based on the previous knowledge from the A300 family while also adding new features and innovations to the aircraft. Airbus additionally updated the A300 family with the new A310 technologies, primarily the new cockpit, in 1983. In other words, second,

once Airbus had a significant technological advancement, it updated its existing aircraft with the new technologies. In fact, incremental asset accumulation and commonalities became the cornerstone of Airbus success because all aircraft had the maximum level of commonality. The commonality strategy flourished with Fly-By-Wire at the introduction of the A320. Regardless of the size or weight of the aircraft, fly-by-wire became a central concept in the entire Airbus family (see Figure 4.2).

The *commonality strategy* allowed Airbus to efficiently capitalize on its assets for each new aircraft. First, commonality provided the basis for development and allowed Airbus to benefit from economies of scale. Second, commonality also was helpful to benefit from economies of scope as a basis to expand the Airbus family of aircraft. This foundation accelerated the rhythm for the introduction of new aircraft in the following years. In fact, the concept became one of the primary sources of Airbus competitive advantage, and it was very difficult for other players to imitate Airbus. Third, the commonality strategy was not only helpful to Airbus but was helpful to its customers as well. Large airlines such as Air France and Lufthansa had a broad portfolio of aircrafts. The airlines could plan and utilize their aircraft according to their periodic forecasts of market demand. Because of the commonality between different Airbus aircraft, airlines could jump between these aircraft, particularly in the case of pilots and cabin crew, to respond to changing market demand. This flexibility additionally led to considerable reductions in the

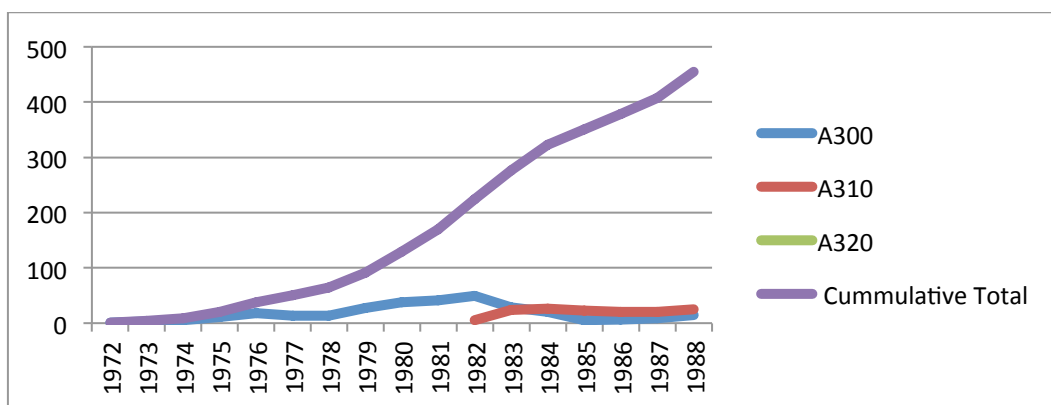
time and costs involved in training pilots and crew, positively contributing to the airlines' cost efficiency and planning.



**Figure 4.2** Airbus Growth Map

**Outcome:** The outcome of Airbus growth, in addition to its technological advancement, can be traced through the number of deliveries over these years. Figure 4.3 shows how the number of Airbus deliveries grew incrementally from 1973 to 1987. Over 20 years (the period of our study), Airbus introduced three new

aircraft (with several different options) plus a significant number of groundbreaking technologies. In the early period, Airbus was not known in the market and only produced one aircraft (A300) [1973-1976]. The intensive market activities of Airbus resulted in a significant number of orders in 1978 and 1979. In the second cycle, when the A310 was added to the family of products, Airbus had two aircraft (A300 and A310) and was providing a wider range of options (Figure 4.3). The total number of Airbus deliveries continued increasing because of their wider range of efficient aircraft, which could help airlines compensate for the oil crisis and the general economic recession. This increase repeated one more time as part of the third cycle, when the A320 was also added to the family of products, providing Airbus with 3 aircraft and a wider range of options. Although the period of our analysis does not cover the third and fourth decade of Airbus' life, in 2003, Airbus passed its primary competitor Boeing in terms of orders and deliveries and became a pioneer of the commercial aircraft industry in terms of market share.



**Figure 4.3** Number of Deliveries

## 4.7 Conclusion

In this study answering the question “how do firms grow sustainably in dynamic technology-intensive industries?” we presented the successful case of the Airbus consortium from its birth until the moment that it became a pioneer in the commercial aircraft industry in terms of technological advances. We proposed a process-based model of sustainable growth and supported it in the context of a dynamic and technology-intensive industry. We found *the incremental and piecemeal accumulation of resources* to be the primary underlying pattern behind the sustainable growth of Airbus over the period of study. In fact, after the introduction of its first aircraft, *cycles of continuous innovation, improvement, and introduction of (new) products, contributed to Airbus’ incremental accumulation of resources over time*. Using the maximum commonalities between their aircraft when developing their technological assets and aircraft, Airbus has been able to improve the efficiency of their growth. Additionally, keeping the family of aircraft updated with the most recent technologies based on the commonality strategy helped Airbus to develop their products in a homogeneous way and benefit from economies of scale and scope over time.

This study contributes to current streams on Asset Accumulation Theory (AAT) (Dierickx and Cool 1989) and Dynamic Capabilities (Eisenhardt and Martin 2000)

in the strategy literature by confronting a theoretical model with empirical data. The study proposes and empirically supports a process-based model of sustainable growth of the firm through the cyclical introduction and improvement of new products. In addition, the study complements the previous studies in the field by addressing a successful case of growth from the firm's birth until the moment that it became a pioneer in its environment. Previous studies have tended to focus on other stages of firm growth such as decline (e.g., Danneels 2002). It is worth mentioning that this study does not allow for generalization because we have relied on only one case, which is a limitation of our study. However, we emphasize that the aim of the study was to provide a better understanding of the underlying processes of firm growth as suggested by previous studies (e.g., Danneels 2002, Danneels 2011). Because at the current moment, the field has an emerging nature, more qualitative studies can uncover the nature of firm sustainable growth in the case of dynamic environments. In addition, our study provides a reliable base for future qualitative and survey-based empirical studies in the field.



**Chapter 5:**  
**Managing the Post-Divorce Crisis of Strategic**  
**Alliances**

## 5.1 Abstract

One very probable result of any alliance is a failure-driven crisis followed by a dissolved alliance. Drawing on both the motion theory of classical physics and the concept of resources, we provide a theoretical approach to a failed party's behavior related to an *unexpectedly* terminated alliance. We discuss two main forces, both of which contribute to the failed party's survival: (1) *moving inertia*; and (2) *new moving forces*. We primarily discuss the fact that resources with moving inertia will help a failed party to keep its business operating at a minimum level while also helping to create new moving forces to overcome the crisis. In addition, we discuss the *change speed of resources* as an underlying factor that helps managers to realize those resources that either: (1) have moving inertia; or (2) can be used to create new moving forces.

## 5.2 Introduction

During the last three decades, strategic alliances have gained a dominant position in firms' strategies (Bruner and Spekman 1998, Gulati and Singh 1998). Such alliances are formed to satisfy different companies' objectives, such as access to complementary resources, risk sharing, and entry into new markets (Eisenhardt and Schoonhoven 1996). Although the rate of alliance formation has drastically increased, alliances are not only inherently difficult but also have a high rate of instability and failure (Gulati et al. 2008, McCutchen et al. 2008). Some studies have reported alliance failure rates up to, and even exceeding, 50 or 60 %, depending on the studied alliances' type and context (e.g. Das and Teng 2000, Gulati et al. 2008, Park and Ungson 2001, Bruner and Spekman 1998). However, despite the high rate of alliance failure and termination, academic studies have neglected the behavior of failed parties after termination (Arino and Doz 2000, Gulati et al. 2008).

Some studies have examined alliance termination under the umbrella of various disciplines—primarily strategy, organizational behavior, and marketing. These studies can be divided into two main streams: (1) studies that examine “why” alliances terminate; and (2) studies that examine “how” alliances terminate. The first stream looks at the causes of alliance termination, failure, and instability,

mostly in the case of (international) joint ventures (e.g. Das and Teng 2000a, Sadowski and Duysters 2008, Yan 1998, Yan and Zeng 1999, Parkhe 1993). The second stream of studies looks at the processes by and/or ways through which an alliance is terminated (e.g. Alajoutsijärvi et al. 2000, Peng and Shenkar 2002, Gulati et al. 2008). Most of the studies have examined alliances before their point of termination (except the studies by (Singh and Mitchell 1996) and (Reuer and Zollo 2005)) because they seek to minimize failure rates through either increasing the stability of an alliance or identifying factors that contribute to the success of an alliance. However, the literature neglects the impact of failure (e.g. crisis) as a very probable condition after the point of termination (Gulati et al. 2008).

To address this gap, we provide a theoretical approach to the post-divorce condition of an alliance when a failed party is in crisis and discuss how a firm might behave to overcome the condition of difficulty. We describe firms' post-divorce behavior and the impact that an *unexpected* divorce has on the failed party. It is worth mentioning that by termination, we refer to an alliance *dissolution* that implies that a failed party is left alone (i.e., it neither merges nor is acquired after the dissolution) and has to manage the crisis alone (e.g., Gulati et al. 2008, Harrison 2004). Drawing on the *motion theory* of physics as a novel perspective, we discuss two main forces—(1) *moving positive inertia*; and (2) *new moving forces*—that help a firm during the crisis. Regarding the first force, a firm's previously positive implemented strategies will act as *moving inertia* and will help the firm to avoid

losing everything at once. Moreover, those strategies will also help to create *new moving forces* through a rapid response after the point of termination.

Thus, this paper aims at contributing to current studies in *failed terminated* alliances. In addition, because failed alliances have been considered to be very frequent (Bruner and Spekman 1998, Das and Teng 2000a, Park and Ungson 2001, Gulati et al. 2008), the provided framework will be of high value for managers and practitioners. In the following sections, we first explain what we mean by resources as the foundation of our theorization. Second, we describe the crisis condition of a firm after a failed terminated alliance. Third, we provide a theoretical framework of helpful forces, which draws on the motion theory of classical physics. Fourth, we discuss the change speed of resources as the underlying factor that helps managers to learn where they can benefit from moving inertia and/or new moving forces. Fifth, we provide a series of propositions about the conditions and ways in which a failed party can overcome the crisis condition after a failed terminated alliance.

### **5.3 Firm Resources**

To open our discussion of the crisis condition of a failed terminated alliance, the bases of our theorization are: (1) resources; and (2) bundles of resources (Penrose 1959). The reason that we selected these concepts is that they will give us enough

degrees of freedom to conceptualize firms (Penrose 1959) and the impact of failed terminated alliances. In addition, these concepts enable us to connect different theoretical perspectives, primarily motion theory and the speed of change. Finally, these concepts maintain a neutral and indifferent position and do not bias our theorization in a specific direction or towards other concepts. For example, the concept of power finds meaning in a relationship between two parties, with one party directing the other party; this is not the case with the concept of resources.

By resources we mean trade contracts, skilled personnel, machinery, efficient procedures, capital, and brand names, and in-house knowledge of (both tangible and intangible) technology tied semi-permanently to a firm (Wernerfelt 1984). Resources are often bundled together (Penrose 1959) to contribute to the value-creating activities of a firm that is responding to market demand. A team, a machine, a department, an alliance, a production line, or a firm culture can be considered as a bundle of resources (Barney 1991). In the end, a firm itself can be considered as a bundle of resources that contributes to its market (Penrose 1959). Using the concept of resources and resource bundles as our starting point, we provide the assumptions of this study in the following section.

## 5.4 Assumptions

In our study, we first assume the existence of an independent, mature firm, with a *strategic* alliance (excluding joint ventures), that is *relatively active in its industry*. By *strategic*, we mean that the alliance plays a *significant* role in the firm's business or its revenue-generating performance (Gulati et al. 2008; Harrison 2004). We use "*relatively active in its industry*" to mean that the firm has a minimum level of managerial capability to conduct the business in a manner that not only ensures the firm's survival but also provides an expected level of satisficing growth (Drnevich and Kriauciunas 2011) as its *normal* growth condition. The condition that we address is one in which an alliance is unexpectedly dissolved in failure and a firm, as the alliance's failed party, is left alone after the dissolution (Gulati et al. 2008; Harrison 2004).

In this regard, Gulati et al. (2008) have provided the example of an independent, active, mature firm engaged in an R&D, trust-based alliance with a larger, powerful partner. The relationship between the two parties is dissolved in failure and the failed party that has invested a large part of its business into the alliance enters into a state of crisis. In addition, the author has reported that a failed, dissolved alliance hugely affects a failed party's other businesses, and none of its ongoing investments made during the alliance period are recoverable following the dissolution. As a

result, the party is pushed to rapidly dissolve all of its other alliances with major clients and then to file for bankruptcy. This story provides our study with its next assumption.

Our second assumption is that due to the crisis of a terminated alliance, a firm is not in bankruptcy and still has the chance to continue its business. To clarify this assumption, it is worthwhile to note that when a strategic alliance terminates in failure, not only is a firm unable to meet objectives, such as having a specific level of revenue, but additional failure costs (losses) also enter into the equation [e.g., revenue (which is missed) – normal costs – failure costs (and losses)]. Due to the failure event, a firm may be affected in a way that makes the continuation of its business no longer satisficing and, as a result, it may be reasonable for the business to file for bankruptcy. How a firm finds itself in this state depends on the importance of the (failed) terminated alliance and the extent to which different bundles of firm resources have been affected due to the termination (Gulati et al. 2008, Harrison 2004).

If a bundle of resources has been hugely affected (either missed or destroyed), or if some bundles have been affected on specific levels (as affected bundles of resources), a firm's dis-satisficing condition may continue and drive the firm into bankruptcy. In this regard, Harrison (2004) has discussed a long-term, vertical,



forward alliance in which a failed party has targeted 90 % of its business, using very specific assets, at its partner, the party's only client. After dissolution, the failed party is greatly affected, resulting in bankruptcy (Harrison 2004).

Our third assumption is that it is possible for a firm to go back to its growth condition by implementing strategies to address its post-termination crisis. Our fourth assumption is that a firm is interested in continuing its business and survival. Our final assumption is that due to resource constraints and limitations, a firm does not have the ability to pursue a radical strategy to completely re-organize its business into a new, non-relevant business within a short period of time after the termination. In the next part of this paper, based on the provided assumptions, we conceptualize the post-divorce behavior of a failed party drawing on the concepts of resources and resource bundles.

## **5.5 A Failed Terminated Alliance**

As discussed above, when an alliance terminates and fails, one very probable result is that the alliance's failed party will experience a crisis condition (e.g., Gulati et al. 2008). By crisis, we mean that in a very short period of time, due to the dissolved alliance, a major, value-creating part of a firm may *unexpectedly* be lost or become

non-beneficial in such a way that the firm has little time to respond (Pearson and Clair 1998); furthermore, the continuation of this condition may result in bankruptcy (Gulati et al. 2008, Harrison 2004). Depending on the severity of the failure, managers must respond rapidly to survive and overcome the crisis condition (Gulati et al. 2008, Harrison 2004). Despite the high failure rate of alliances and the catastrophic impact of a terminated alliance (Das and Teng 2000a), the alliance termination literature has been silent about this condition (Ariño and Doz 2000, Gulati et al. 2008).

After an alliance is terminated in failure, a failed party may experience various types of difficulties (Singh and Mitchell 1996). A review of the alliance termination and alliance failure literature has identified different groups of difficulties, including but not limited to *financial problems* (e.g., debts and other costs of failure) (Harrison 2004, Gulati et al. 2008), *social and psychological problems* (e.g., the stress imposed on firm employees due to the crisis condition) (Ring and Van de Ven 1994), *operational problems* (e.g., losing a distribution line or losing an input for value-creation processes) (Bruner and Spekman 1998), and *reputational problems* (e.g., the negative impact of being known as a failed party in a long-term strategic relationship) (Yu et al. 2008, Jensen and Roy 2008). To clarify these concepts, we divide an alliance's post-termination challenges into two main categories: **missed** and **destroyed** forms of resources.

The term **missed resources** refers to those groups of resources lost due to a failed terminated alliance. For example, specific assets or technologies devoted to either a horizontal, joint, R&D alliance (Bruner and Spekman 1998, Gulati et al. 2008) or a long-term, forward alliance (Harrison, 2004) may no longer be usable and can be considered to be missed resources. In addition, we divide these missed resources into *highly specific* and *less specific* categories (*similar to Williamson 1979*). *Highly specific* missed resources are those resources that are very specific to the ex-relationship, such as highly partner-specific assets that can no longer be used for current or future opportunities (i.e., they are absolutely missed). *Less specific* missed resources are those that might still have the chance to be used (partly) either for current situations or future opportunities. For example, such resources can be reassigned elsewhere within the firm.

The term **destroyed resources** means that a specific bundle of resources becomes negative and not only loses its benefits but also may take a position against a firm. For example, when a firm terminates a strategic forward relationship with a strategic buyer, its reputation may be destroyed and result in the termination of relationships with other customers due to the concerns of those customers about the reasons for the failed terminated alliance (Jensen and Roy 2008). This is especially true when security analysts continuously review firm behaviors and issue reports that can affect a firm's share value (Jensen and Roy 2008).

With respect to the issues set forth above, after the failed terminated alliance, we can see a whole firm as a bundle of two groups of resources: (1) *non- (or low-) affected resources*; and (2) *highly-affected resources*. By ***non- (or low-) affected*** resources, we mean those resources with value-creating roles that are aligned and compatible with the whole, stable, *normal* condition of a firm (Harrigan 1982). By *normal* condition of a firm, we mean the *potential expected* growth condition (relative to its industry) that a firm would undergo if *the termination event had not* occurred (see section 5.4). In return, ***highly-affected*** resources are highly misaligned with the rest of a firm's resources and *result in a* reduction in different aspects of firm performance, such as financial performance.

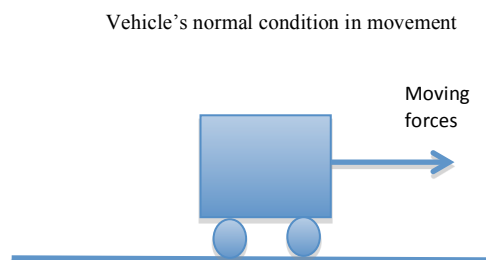
In the following section, we model the post-divorce behavior of a failed party drawing on the motion theory of physics.

## **5.6 Modeling a Firm's Post-Failure Behavior**

To discuss the ways in which a firm can address the problems that arise from a specific failed terminated alliance, we draw on the motion theory of classical physics. To justify our approach, it is worth mentioning that organizational scholars have drawn on natural science laws and theories (e.g., Dooley and Van de Ven

1999) and that these conceptualizations and metaphors have been a great help in understanding complex organizational and social phenomena (Mintzberg 1977). Drawing on the motion theory of physics, we try to develop a series of responses that a failed party could consider to help it overcome post-failure crisis.

Motion theory addresses how objects move and what forces affect that movement. For the purposes of our study, we assess a case in which a vehicle moves, similar to a *firm* conducting its business (See Figure 5.1). In a *normal* condition, a vehicle moves due to moving forces produced by its engine. Similarly, a firm does its business based on its value-creating resources. The question is what will happen when a firm terminates a strategic alliance in failure.



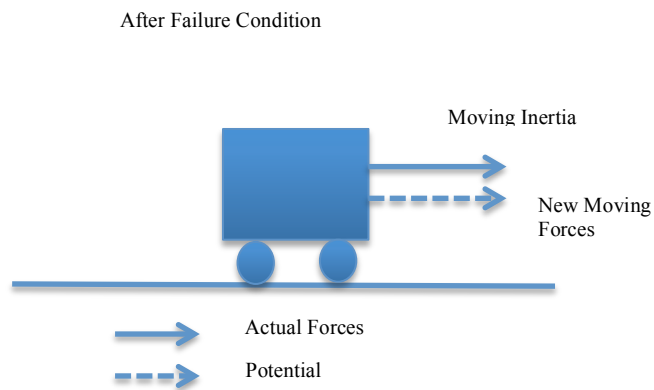
**Figure 5.1** A Moving Vehicle (the normal, stable growth condition of a firm)

For the case of failure, we can think about a specific case in which a vehicle, due to an event such as an accident, partly loses its engine power and fails to continue in

the same condition as before. The vehicle loses the force that pushes it forward; additionally, due to the accident, the vehicle may become deformed and lose its aerodynamic state. Similarly, in a firm's post-failure situation, depending on the importance of the failed strategic relationship, a part of the firm's resources is affected (similar to a vehicle losing its engine's moving force and having its body deformed). For example, either R&D-in-progress projects (shared with an ex-party) for already-accepted contracts or production lines dependent on a backward relationship could stop working, thus leading a firm into a crisis situation (e.g. Gulati et al. 2008).

However, the basic question is: how can a firm address the problem in such a condition? In the case of the vehicle, we can see that after the problem, the vehicle does not stop quickly because it still has some *moving inertia* (due to the vehicle's previous state of motion) (see Figure 5.2). This movement inertia, *as a positive force*, still gives the vehicle a chance to continue; the driver will have a chance to turn on the engine (if it has stopped) and create (new) moving forces. Similarly, in the case of alliance termination, once a firm fails in its alliance, it does not quickly go into bankruptcy and exit the business (assuming that termination does not completely cripple the firm). However, due to current working resources (e.g., non-affected, working, and still usable resources), the firm, as the beneficiary of moving inertia, could have an opportunity to continue its activities and create moving forces to address the problem and overcome the crisis. As a result, there are two forms of

forces that can help a firm to address post-failure problems: (1) moving inertia; and (2) creating (new) moving forces.



**Figure 5.2** After-Failure Vehicle Condition

Considering a firm's survival and growth as our dependent variables, and moving inertia and new moving forces as our independent variables, the following equation can be proposed in relation to a firm's crisis condition:

$$\text{Firm Growth Condition and Survival} = f(\text{Moving inertia} + (\text{new}) \text{ Moving forces})$$

Regarding the discussion set forth here, the basic question is how managers can look for these types of resources. In the next section, we explain that the level of dynamism and stasis of different resource bundles within a firm can be considered

as both a basis and a helpful guide in creating maneuvering space for the two forces.

## **5.7 Maneuvering Space and Dynamism of Resources**

According to our identified factors based on motion theory, after termination managers need to quickly identify where they can find these two main forces (moving inertia and possible (new) moving forces). Moving inertia implies that managers *do not* need to change a bundle of resources but that they can benefit from those “still value creating” and *non-or low-affected resources* resulting from previously implemented strategies (Boeker 1989). However, in the case of moving forces, managers *do need to* change bundles of resources to be able to create (new) moving forces. Considering *a quick and reasonable response* as the critical factor in a crisis (Yu et al. 2008, Weick 1993, Pearson and Clair 1998) and pointing out that the effect of managers’ responses is subject to changes in firm resources, *the change speed of the resources bundles* becomes the center of attention.

We draw on strategic flexibility studies in the strategic management literature to discuss the change speed of resource bundles (Harrigan 1985, Volberda 1996, Lee and Makhija 2009, Volberda et al. 2001, Reuer and Leiblein 2000). Strategic



flexibility has been defined as the ability to respond quickly to risks and uncertainties within a firm and its environment (Volberda et al. 2001, Grewal and Tansuhaj 2001, Lee and Makhija 2009). It helps a firm to change rapidly by modifying its current condition to meet the new emergent needs (Wright and Snell 1998, Miller and Shamsie 1996). The literature has discussed the fact that firms can use different strategies to create an appropriate level of flexibility, including organization design (Volberda 1996), formation of alliances (Goodstein et al. 1996), and formation of subsidiaries (Lee and Makhija 2009). In this research line, speed has been considered to be one of the critical aspects of flexibility (Volberda 1996) where quick responses are necessary due to unexpected events.

To open up the discussion of the change speed of resource bundles, we distinguish between *a bundle of resources* itself and its *level of specificity*, which are discussed below.

Regarding the resource bundle itself, we point to different types of resource bundles. For example, interorganizational relationships (IORs) as bundles of resources can be classified as market transactions, alliances, or mergers and acquisitions (Williamson 1979). Similarly, structure can be classified into two forms: mechanistic (e.g., hierarchical) or organic (e.g., hybrid). Culture can be classified as open versus conservative; and technology can be classified as specific

or general (Volberda 1996). Due to their inherent flexibility (e.g., structural flexibility) (Volberda 1997), some bundles can be *(re)mobilized* (Volberda et al. 2001) faster than others from one type to another. For example, due to their hybrid structure, alliances are easier to form and dissolved than are mergers or acquisitions (Williamson 1979) and give a firm speedier change. As another example, a hybrid organization structure, as different parts are loosely coupled with each other, can be *(re)mobilized* into a new type faster than a hierarchical structure, *ceteris paribus* (Volberda 1996).

However, the specificity level of a bundle refers to the variety of contexts in which it can be applied (Volberda 1996). For example, consider a multi-skilled versus a single-skilled employee. The former type of employee can be assigned to a variety of positions within a firm (Volberda 1996). However, in the case of the single-skilled employee, the firm may not be able to *(re)assign* her if the tasks required in the new position are not similar to her previous tasks (Evans 1991, Volberda 1997). In this case, there is no change in the type of bundle (i.e., the employee does not change), but depending on its specificity level, the bundle can be *(re)assigned* in other conditions and directions. It is worth mentioning that we consider the level of specificity as the indicator of change speed in crisis (e.g., the multi-skilled employees discussed above) and keep *constant* the effect of available *opportunities*, post-termination, within which the bundles can be applied.

As a result, in our study *(re)mobilization* refers to a change in a bundle of resources itself that may be followed by a change in its specificity level, whereas *(re)assignment* refers to a change to which an *already existing* bundle of resources is applied. Regarding the above explanations of bundles of resources and their levels of specificity, we divide different bundles of resources into *static* and *dynamic* categories, which are discussed below.

By *static* resources, we mean those resources that have both: (1) a lower speed of change *relative to* the change speed of the environment due to their lower level of flexibility; **and** (2) a high level of specificity. Due to these two specifications, during a crisis decision-makers are subject to the static nature of these resources, which push those decision-makers to use them only in a condition very similar to the original situation (Evans 1991, Volberda 1997). For example, structures formed through mergers and acquisitions, hierarchical organization structures, and mass production lines designed for economies of scale cannot be changed rapidly (Volberda 1996, Gulati et al. 2008) after the termination point. As a result, in a crisis it is not possible to quickly change these resources, which remain relatively static.

In return, dynamic resources are those that can be *(re)mobilized* **and/or** have a low level of specificity to be *(re)assigned* *quickly* to manage the post-termination

condition. For example, strategic alliances (Williamson 1979) or hybrid forms of organizational structures (Volberda 1996, Volberda et al. 2001), multi-skilled employees or general technologies (Volberda 1996), and dynamic capabilities (Eisenhardt and Martin 2000, Volberda 1996) after the point of termination can be quickly (re)mobilized or (re)assigned, depending on the response implemented by managers. These resources provide the necessary degrees of freedom for the failed party to change (Das and Elango 1995) in a crisis. We emphasize that the concepts of dynamism and stasis are relative and depending on the environment of the firm (e.g., whether it is in a high- or low-velocity industry), different bundles of resources can be considered as static or dynamic (e.g., Pavitt 1984).

Based on the above discussion, in Table 5.1 we identify the maneuvering space of managers during crisis. The Table 5.1 shows whether there is a need for change and whether it is possible for a firm's resources to change. In the case of moving inertia, there is no need for change. Therefore, both types of resources (dynamic and static) can be used because both have moving inertia. However, in the case of new moving forces, there is a need for change, whereas only dynamic resources have the possibility of change. In this condition, managers have to consider the amount of these dynamic resources that must be kept in their previous state and how the amount that must be changed to create new moving forces. This discussion directs us to the following propositions:

**Proposition 1:** At a failed terminated alliance, when a failed party is in crisis, the moving inertia of both static and dynamic resources can help the party to survive and maintain its growth condition.

**Proposition 2:** After a failed terminated alliance, when a failed party is in crisis, dynamic resources can be (re)mobilized to create new moving forces to survive and maintain its growth condition.

	<b>Static:</b> <i>Cannot</i> be changed	<b>Dynamic:</b> <i>Can</i> be changed
<b>Moving Inertia:</b> <i>No need</i> for change	<b>Feasible Response Space</b>	<b>Feasible Response Space</b>
<b>New Moving Forces:</b> <i>Need for change</i>	<b>Infeasible</b>	

**Table 5.1** Maneuvering Space of Response during Crisis

In the following section, we provide further propositions related to crisis management.

## 5.8 The Affectedness/Dynamism Taxonomy of Resources

In this section, we provide a taxonomy of the affectedness/dynamism of resources that is applied under the umbrella of classical motion theory. By resources we mean a firm's *strategic resources*, i.e., those resources that can significantly affect the firm's performance during a crisis. Eisenhardt (1989) has referred to strategic resources as those that "(1) involve strategic positioning, (2) have high stakes, and (3) involve as many functions of the firm as possible". For example, a firm's reputation, strategy, culture, and technology all can be considered as strategic resources, depending on the context within which the firm is active.

Furthermore, it is worth mentioning that we are not limiting ourselves to resources that can create competitive advantage, i.e., those that are *only* valuable, inimitable, rare, or un-substitutable (Barney 1991, Peteraf 1993). In a crisis condition, however, we look for every type of resource that can play a major role in dealing with post-terminated alliance difficulties and in overcoming the condition of crisis. Based on the classifications (Affectedness/Dynamism) discussed earlier, we identify four quadrants: (1) static-healthy; (2) dynamic-healthy; (3) static-unhealthy; and (4) dynamic-unhealthy (Table 5.2). In the following section, we discuss the mechanisms that a firm's healthy resources can contribute to alleviate post-termination difficulties.

Firm's Resources	Static Resources	Dynamic Resources
Not- (Low-) Affected Resources (Healthy Resources)	1	2
Highly-Affected Resources (Unhealthy Resources)	3	4

Table 5.2 Affectedness/Dynamism Taxonomy

### 5.8.1 Static-Healthy Resources

The first group of resources, are those (1) with low speed of change and (2) a high level of specificity (defined as static before) that have not been affected due to the failed terminated alliance. In addition, because these resources are strategic, they can play a significant role in addressing a failed party's post-termination difficulties. For example, assuming a low-velocity industry with a low rate of technological change, a firm's valuable technology can be considered as a bundle of static-healthy resources that still can contribute to profit-making during a crisis. As discussed earlier, these static-positive resources can create *a beneficial moving inertia* in maintaining a firm's growth in the crisis period (Boeker 1989). The resources provide a firm with the ability, in a short-time crisis condition, to not lose everything at once and to formulate a "reasoned response" (Klarner and Raisch

2013) despite its need for rapid change (Haleblian et al. 2006, Boeker 1989) after an alliance is terminated.

If a firm's culture has a beneficial effect at the time of crisis, that culture can be considered a static-healthy resource (Volberda 1997). In this regard, Aupperle (1996) has referred to organizational culture as a type of static variable where there is a need for rapid changes. In his metaphorical analysis, the author refers to the culture of Greek soldiers as having three main unique characteristics: integration, differentiation, and ambiguity. Aupperle (1996) has argued that these positive characteristics helped the soldiers to repeatedly reorganize themselves to escape from Persian lands under a condition of crisis. As a similar condition after a failed terminated alliance, an organization's culture can help employees to remain unified, absorb the need for rapid changes, and be more supportive (Aupperle 1996) to overcome a post-termination crisis. For example, employees can continue with lower level of wages and extra hours during the crisis, especially if their firm experiences financial problems due to a failed terminated alliance.

Technologies and firm assets with a low speed of change that are applied within a firm (Volberda 1996), while still valuable, can be considered as another group of static resources that contribute to positive inertia during a crisis. These types of resources often require high initial investments (Harrigan 1981, Harrigan 1982)



and/or are large in size (Kim and Kuilman 2013), which make them relatively static to change. For example, available distribution channels, resources with large sizes and high value, or a current mass production line with an up-to-date technology, while still serving previous customers, can help a firm to achieve a minimum level of profit and thus overcome a crisis. As mentioned earlier, due to the static nature and high level of these bundles of resources, they cannot be changed quickly and must be used either in their previous locations or in very similar locations (Das and Elango 1995).

Finally, static-healthy resources can also be used as a basis for (re)mobilizing (Volberda et al. 2001) other, dynamic-healthy resources. For example, in the case of a failure in a forward strategic alliance, current products, distribution channels, and technologies (as static-healthy resources) can be used to find new customers. In other words, these are *static-healthy resources* (e.g., low-speed, attractive firm technologies) that can guarantee a firm's performance in creating new alliances. It is important for us to stress that these static-healthy resources are the main basis on which some dynamic-healthy resources such as *new alliance formation capabilities* are (re)mobilized (meaning that the dynamic-healthy resources are not being mobilized on their own, which is the case in the next section). As a result, we expect:

**Proposition 3:** After a failed terminated alliance, when a failed party is in crisis, the moving inertia of *static-healthy resources* can help the firm to survive and maintain its growth condition.

**Proposition 4:** After a failed terminated alliance, when a failed party is in crisis, firm static-healthy resources can become a basis for (re)mobilizing and reassigning dynamic-healthy resources.

### **5.8.2 Dynamic-Healthy Resources**

New moving forces are another group of forces that can help a firm after the termination of an alliance. Dynamic-healthy resources are those that can contribute to the creation of these new forces. When a firm descends into crisis condition, its dynamic resources, on their own, can become the basis for dealing with post-termination difficulties. We divide these dynamic resources into two groups: (1) naturally dynamic resources and (2) dynamic capabilities (Rindova and Kotha 2001, Eisenhardt and Martin 2000, Teece et al. 1997).

### **5.8.2.1 Naturally Dynamic Resources**

We refer to this group as naturally dynamic resources due to the dynamism inherent in their nature, which provides a firm with the ability to (re)mobilize or (re)assign these resources quickly after the point of termination. This group of resources has either a high speed of change or a low level of specificity. A firm's internal structure can be considered as an example of this group of resources. For example, a hybrid form of organization structure can be considered as a dynamic bundle of resources where it allows for quick reconfiguration and reorganization (Volberda 1997). In this case, because different sections within a firm are loosely coupled, a hybrid organizational structure can give the firm an opportunity to rapidly (re)mobilize itself in response to necessary changes (Volberda et al. 2001). In fact, the flexibility inherent in this structure gives the firm the possibility of rapidly transforming itself (Volberda 1996) and absorbing the difficulties of a terminated alliance.

Regarding dynamism due to the level of specificity, multi-skilled employees and general technologies or assets active within a firm can be considered as some examples of this group of resources. Due to their broader level of abilities, multi-skilled employees can be (re)assigned, if necessary, more easily and quickly (Volberda 1996). Similarly, general technologies and assets applied within a firm

due to their lower level of specificity, which provide a broader range of applications, can be more quickly (re)assigned to new or current activities (Volberda 1996). In fact, through a broader level of usages these resources give a firm the required level of flexibility to perform necessary reassignments (Evans 1991) and overcome difficulties after termination. In the following section, we clarify the last group of dynamic resources: dynamic capabilities.

### **5.8.2.2 Dynamic Capabilities**

The second group of dynamic resources is composed of resources that give a firm the ability to reorganize and reorient all of the other forms of static and naturally dynamic resources to create new moving forces (Eisenhardt and Martin 2000, Teece et al. 1997, Volberda 1996). Volberda (1996) and Volberda et al. (2001) has referred to managerial capabilities in this regard and has noted that these dynamic resources provide a firm with the ability to reorient and transform itself to respond rapidly to changes in its environment. Similarly, Sanchez (1995) has addressed the abilities that help a firm to redefine its (product) strategies and reorganize itself by resynthesizing its resources. This second group of resources primarily helps firms to generate methods of reorganization that take their short- and long-term performance into consideration (Eisenhardt and Martin, 2000).

The second role of dynamic resources is to help firms to address *less-specific affected* resources. By *less-specific affected resources*, we mean those resources *freed due to the termination of an alliance* that still have the opportunity to be reassigned into current or new situations. In this regard, dynamic (Eisenhardt and Martin 2000) and managerial capabilities (Volberda 1996) help firms to plan for resources to meet their *short- and long-term* conditions. For example, in considering its situation, a failed party may decide to either start a new product or reinforce its current products. In this case, required resources can be partly reassigned from unhealthy resources to advance a firm in a crisis condition. Morrow Jr. et al. (2007), addressing the condition of a declining firm with an unsatisfactory performance, has found that its *valuable and difficult-to-imitate* actions, through recombining existing resource bundles to develop new products, can meet investors' short-term expectations.

These explanations direct us to formulate the following propositions:

**Proposition 5:** After a failed terminated alliance, when a failed party is in crisis, its dynamic-healthy resources can be (re)mobilized to create new moving forces to support the firm' survival and growth condition.

**Proposition 6:** After a failed terminated alliance, when a failed party is in crisis, its dynamic-healthy resources support it in reassigning unhealthy resources.

### 5.8.3 Unhealthy Resources

It is interesting to consider how the change speed of *less-affected resources* can play a positive role for a firm in times of crisis. In this section, we primarily focus on the speed of (re)assigning affected resources in new or current places within a firm. For example, if current assets within an affected project (due to a failed terminated alliance) are no longer useful, they can be (re)assigned to other current or new projects. However, not all assets can be reassigned with the same speed because they may be either dynamic or static. In addition, not all of these resources can provide the same level of value when they are reassigned; some may have a higher level of value than the others. Finally, it may be impossible to use all of these resources because during a crisis, the locations to which they can be reassigned may be limited. As a result, to survive a crisis and obtain higher levels of efficiency and effectiveness, a failed party needs to consider the *trade-off* between *the value* and *the speed* of (re)assigning these affected resources (Speed \* Value = Effectiveness and Efficiency).

This discussion directs us to the following proposition:

**Proposition 7:** After a failed terminated alliance, when a firm experiences crisis, it needs to consider the *trade-off* between the speed and the value of (re)assigning *affected resources* to overcome the condition of crisis.

## **5.9 Discussion and Conclusion**

The literature has identified strategic alliances as one of the dominant strategies of the previous three decades (Bruner and Spekman 1998, Gulati and Singh 1998). Such alliances are set up for different objectives, such as risk-sharing or access to complementary resources (Eisenhardt and Schoonhoven 1996). Meanwhile, currently competitive markets have pushed companies to form and manage a portfolio of alliances to access a broader range of resources (Wassmer 2010, Wassmer and Dussauge 2011). Although alliances are highly popular, they are double-edged swords and their rate of failure is quite high. Some studies report that up to 50-60 % of alliances terminate in failure (e.g., Das and Teng 2000a; Gulati et al. 2008). Despite this high rate of failure and the possibly destructive impact of a dissolved alliance, the alliance-termination literature has been remarkably silent about the post-divorce condition of failed parties (Gulati et al. 2008).

In this study, drawing on the motion theory of physics and looking at the *change speed of firms' resources*, we provide a theoretical framework related to the possible behavior of a failed party after termination. We primarily discuss two main types of forces that help a failed party to overcome the difficulties of a failed dissolved alliance: moving inertia and new moving forces. Moving inertia is the positive result of previously implemented strategies that still push the firm forward during a crisis. It enables a failed party to continue its activities (at a minimum level) while giving it space to create new moving forces. In managing these two forces, we have discussed *the change speed of resources* as an underlying factor that helps to both distinguish resources that have moving inertia and specify and prioritize those resources that can be used to create new moving forces.

In fact, the change speed of resources helps firms to identify “where the firm has the possibility of change” by identifying those resources that can be changed quickly during a crisis. This is where managers must identify how much moving inertia is available and should be used, while at the same time they must identify the amount of new moving force that is possible and should be created to overcome the crisis. It is worth mentioning that our theory mainly contributes to the management of failed/dissolved alliances in the strategic alliance literature by describing the condition of failed parties and the ways that their managers can overcome the resulting crises. In addition, we have introduced motion theory into management studies as a very novel approach from classical physics.



Our study also has some managerial implications. First, it emphasizes that a crisis following the dissolution of an alliance, which is a very likely situation, must be addressed by managers (even) at the time of alliance formation (Gulati et al. 2008). Second, it notes different forms of difficulties that a failed party may experience due to a failed dissolved alliance and the way that these difficulties can be addressed using firm resources. Third, it advises managers to have a broader perspective and formulate their strategies to both cover adverse *unexpected* extreme cases (e.g., a failed/dissolved strategic alliance) and be able to benefit from the positive impact of their previous strategies. This approach helps managers not to lose control of everything at once and to be able to respond more reasonably (Klarner and Raisch 2013) during a crisis. Fourth, our study addresses *the change speed of resources* as a way in which managers can identify and manage the speed of changes under a crisis condition in which a rapid response is highly valued.

In conclusion, we note that this study can be considered as an initial theoretical framework for future theoretical and empirical studies in the area of failed/terminated alliances. Moreover, our very novel perspective from classical physics provides the chance to connect two streams of *natural* and *social sciences* together which opens the door for further contributions from theories in natural sciences.

## **Chapter 6:**

## **Discussion**

## 6.1 Discussion

In this thesis, as one of the central debates in strategic management literature, we approached the firm growth and responded to the following question ‘how do firms grow sustainably in dynamic environments?’. The inquiry on the firm’s growth has been at center of attention in strategy studies since firms not only are interested in making rent once, they also want to keep the stream of rent as the base of their sustainable growth over time (Crook et al. 2008, Barney 1991). Several schools of thought in the strategy literature, to the date, have contributed to this inquiry specially those focusing on the firm or industry attributes (Conner 1991).

Resource-based school of thought has been one of the main streams of studies focusing on the firm attributes (Barney 1991, Penrose 1959, Wernerfelt 1984, Peteraf 1993). It basically brings the role of firm internal resources at the center of attention (Barney 1991, Penrose 1959) and points out those resources that could be the source of sustainable competitive advantage. Central to the RBV, Barney (1991), defining resources as processes, capabilities, knowledge, physical assets, etc. proposes that those resources that are Valuable, Rare, Inimitable, and Non-substitutable (VRIN) can help the firm to make rent sustainably.

The stated resources guarantee the possibility of value and rent making by providing the firm with a better level of efficiency and effectiveness. They also help the firm to sustainably keep its rent by being rare, inimitable, and non-substitutable (Barney 1991). Inimitability delivers that it will be difficult for other firms to imitate these resources (Dierickx and Cool 1989), rareness addresses that not many firms have such resources; and finally, not the resources of other firms can substitute the firm resources over time (Barney 1991).

Over the years, dozen of studies have been conducted on RBV and the results have supported the central debate by Barney (1991) that those firms with VRIN resources have shown a better performance relative to other firms (Newbert 2007, Crook et al. 2008). Looking at these results, Barney et al. (2011) discuss the RBV has got to a level of maturity and it can be revitalized into new directions and area. For that, the authors point out the need for further research and suggest the possibility of combining RBV with other theories or exploring new phenomena as possible ways of expanding the theory.

In line with Barney et al. (2011), two more critiques to the RBV could be addressed: firstly, while the RBV supports the role of VRIN resources on the firm sustained competitive advantage and growth (Barney 1991), it rather stays silent in dynamic environments characterized with rapid technological changes and shorter

product life cycles (Teece et al. 1997, Eisenhardt and Martin 2000, Wang and Ahmed 2007). Due to these rapid changes, resources lose their value and cannot be held as a source of sustained competitive advantage. Secondly, while the studies in the literature focus on VRIN resources that result in the firm's higher performance, the question on how resources grow has been less valued to the present (Barney et al. 2011, Ambrosini et al. 2009).

The note by Barney et al. (2011) and the critics addressed above directed us to develop a thesis based on three studies and point out various aspects of the firm growth. The aim of thesis was to respond to the following question: 'how do firms grow sustainably in dynamic environments?'. Our thesis provides a strong base on the growth of the firm by addressing firstly how a firm grows sustainably through providing a theoretical base and describing the growth characteristics (first study). Then, we supported the theory in a real setting (second study). Finally, we addressed a condition of divorce interrupting the firm growth and discussed how the firm could go back to its normal condition (third study).

In the first study (chapter 4), as addressed by Barney et al. (2011) regarding the possibility of combining the RBV with other perspectives, we provided a new theoretical approach on the growth of the firm and dealt with some of problematic aspects of the RBV. Through reviewing a large number of relevant studies, we

contributed to the literature by bringing an open-system theory into the RBV. Drawing on the theory, we considered the firm as a bundle of continuously moving resources as a part of a bigger environment of moving resources. Then, we described how the firm resources grow over time accumulatively and through its interaction with its external environment. We discussed the characteristics that resources show over their growth and provided a review of representative studies from the literature. We ended our first inquiry by commenting on the heterogeneity of firm resources.

Our theory introduced some new aspects. First, the settlement of the RBV in the body of the open-system perspective can be considered as one of the most unique contributions of the thesis in the literature as a new theoretical approach (Barney et al. 2011). It explained how a firm, as a bundle of resources, grows through internal resource accumulation and interaction with its external environment. We discussed growth has an unknown nature and commented on the pace of firm growth. In addition, our theory gave a dynamic nature to the RBV and brought capabilities at the heart of the theory (Wang and Ahmed 2006).

Furthermore, our first study showed how the firm has to continuously change its resources. For that, we proposed a framework of new product development to address the changing needs of the environment. Our theory opened up a way to

have a more elaborate approach to the RBV and capabilities, as noted by Barney et al. (2011). Overall, considering that research on the RBV and capabilities are still ongoing, our first study (chapter 3) advanced the field by providing a new formulation of the theory based on an open system theory, as the main theoretical basis of this thesis.

In accordance with the first study (chapter 3) that provided a new perspective on how firms grow, the second study (chapter 4) addressed the lack of empirical inquiries in this area (Barney et al. 2011, Danneels 2011, Ambrosini and Bowman 2009). It supported and extended our base theory in the case of the commercial aircraft sector. This was a relevant contribution to the literature since growth had remained to some extent unexplored as previous studies had focused on the firm's decline (e.g., Danneels 2011, Narayanan et al. 2009). As a result, we conducted a case study to empirically investigate the growth of Airbus consortium over 20 years (from 1967 to 1987).

This study extended the literature regarding the fact that prior studies had asked how the accumulation of resources could contribute to the firm sustained growth (Danneels 2011). Accordingly, the results of our study showed that the piecemeal and incremental accumulation of resources contributed to the sustainable growth of Airbus consortium from when it was formed as a consortium between its partners

since 1967 to when it became a pioneer in the commercial aviation sector in 1987. Our findings extended the literature by showing the role that three cycles of new product development had in the accumulation process. The results additionally supported how the commonality strategy helped and improved the performance of Airbus during this period.

Finally, our results yielded two primary periods of growth for Airbus: (1) spark and establishment and (2) technological advancements. Firstly, the paper showed how Airbus after almost 10 years became a strong player from a vulnerable partnership, through the development and settlement of its first aircraft. In addition, it showed how Airbus brought additional technological advances became the base of its competitive advantage in the second decade and afterwards.

The two studies directed us to the last study. As our third study, we contributed to the literature through addressing the post-divorce crisis of a strategic alliance. The condition was important since an unexpected divorce could interrupt the firm growth regarding the concern of thesis on the firm sustained growth. In addition, it was a new phenomenon that has not been addressed to the present (Barney et al. 2011). While prior studies in the literature had addressed various aspects of alliances such as formation (e.g. Das and Teng 2000) or how these alliances are



terminated (e.g., Harrison 2004, Gulati et al. 2008), both the RBV and alliance literatures were silent on the post-divorce crisis of strategic alliances.

In the third study, through a thorough review of studies in the area, we filled the gap by addressing the following items: firstly we described the post-divorce crisis of a failed party and discussed how the divorce would affect the party's resources. Then, we advanced the literature by discussing the forces that could help the firm in the crisis drawing on classic physics as a novel approach and contribution to the literature. Finally, we discussed how the party, according to the characteristics of its resources, could manage the crisis and go back to its previous growth condition. Our study was relevant since a post-divorce crisis is a very probable condition that could happen to any party entering into an alliance (Singh and Mitchel 1996). For example, the literature shows that more than 50 percent of alliances end in failure (Das and Teng 2000b) and the divorce crisis could interrupt the firm growth and direct the firm outside its business (Gulati et al. 2008, Harrison 2004). Our study was the first study in the literature addressing such condition which had neglected to the present (Gulati et al. 2008).

**Chapter 7:**  
**Conclusions, Limitations, and Future Lines of**  
**Research**

## **7.1 Conclusions, Limitations, and Future Lines of Research**

Responding to the question ‘how do firms grow sustainably in dynamic environments?’, in this thesis through three concrete studies we elaborated different aspects of the firm growth. We approached the question of our inquiry from the resource-based school of thought that considers the firm internal resources as the source of firm sustainable competitive advantage (Barney 1991, Peteraf 1993). The RBV basically considers Valuable, Rare, Inimitable, and Non-substitutable (VRIN) resources as the source of firm sustainable rent making and discuss those firms holding these resources show a better performance relative to other firms (Barney 1991). Valuable resources are the base of firm rent making while at the same time being rare, inimitable, and non-substitutable support the sustainability of these resources.

Over the last two decades, empirical studies in the literature supported the higher performance of firms with VRIN resources as central debate by Barney (1991) (Crook et al. 2008). In this line, Barney et al. (2011), looking at these studies, discuss RBV has got to a level of maturity and suggest to revitalize RBV through combining it with other perspectives or explaining new phenomena. In addition, while the studies in RBV mainly discuss the resources that contribute to the firm sustained competitive advantage, the question on how resources grow particularly

in the case of dynamic environments have remained rather unexplored (Wang and Ahmed 2006). As a result, we developed three studies to respond ‘how do firms grow sustainably in dynamic environments?’ and contributed to the literature as follows:

Our first study contributed to the literature by bringing open system theory into the conversation of the RBV through a discussion on how firms grow sustainably in dynamic environments. Looking at the firm from a resource perspective and open system theory, we considered the firm as a bundle of moving resources as a part of a bigger environment of moving resources. We addressed how resources grow in the setting of open-system theory by addressing several aspects, mainly the accumulation of resources, the interaction of the firm with its external environment, its unknown nature, and finally the pace of the firm’s growth. In addition, we described the characteristics that resources show during their growth and finally commented on firms’ heterogeneity. The study provided a base for further empirical studies in the literature and contributed to improve various aspects of the RBV.

Our second study, in line with the previous study, filled the gap related to the lack of empirical studies in the strategy literature. It supported the idea of sustainable growth of the firm in the commercial aircraft sector through presenting how Airbus had been able to manage the accumulation of its resources to be able to experience

a sustainable growth over the period of the study. Our results show how the piecemeal and incremental accumulation of resources helped Airbus to experience a sustainable growth through developing new aircrafts and technologies. The approach helped Airbus to benefit from economies of scale and scope over its growth and in addition to that to be able to meet the requirements of its market.

While our study on Airbus yielded fruitful results on how firms accumulate resources contributing to their sustained growth, it had one limitation. We used only one case that might limit the generalization of our results. However, it is worth mentioning that our primary aim was to explore and provide a better picture of the processes contributing to the sustainable growth of Airbus. In fact, the study gave us the chance to deeply evaluate different aspects of Airbus growth and provide reliable explanations on processes contributing to the growth over the period of study. In addition, while the study covers the commercial aircraft sector, there is the possibility of conducting further studies in other industries as a possible way of contributing to the literature.

Finally, our third study contributed to resource-based literature through clarifying an unexpected terminated alliance where the alliance party gets into crisis and as a result it needs to respond quickly to the crisis. We discussed how an appropriate management of resources, based on the change speed of resources, could help the

firm to go outside the condition of crisis. In the study, we firstly discussed what the difficulties of a terminated alliance would be, and then provided the related processes explaining how the firm would have the chance to face the crisis. The study emphasized that as an important issue, managers should consider about the termination of their alliances, even before their formation. Finally, the study was timely and provided a theoretical base for further empirical studies in the literature for the firms that have got into crisis after their divorce. These studies can further support and enrich our discussions in further empirical settings.

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