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Dynamic Managerial Capabilities in Action: Top Management Team Configuration and Asset Orchestration in High-Tech Start-Up Firms[**]

Abstract – The concept of dynamic managerial capabilities captures the critical role of managers for governing purposeful organizational adaptation processes. How top managers can build such dynamic managerial capabilities remains an unanswered question. Based on qualitative case-study data from two high-tech start-up firms, we analyze in this paper how top management team specialization and managerial decision-making facilitates adaptation and proactive change. Our findings show that diversity in human capital, social capital and cognitions on the level of senior executives yields high absorptive capacity of the top management team. A high level of absorptive capacity, in turn, facilitates the development of managers' mindsets that are attentive towards multiple and diverse organizational and technological challenges. Dynamic managerial capabilities, thus, play a major role in enabling firms to proactively drive change, instead of continuously reacting to environmental pressure.

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1.   Introduction & Conceptual Background

In the last three decades, the resource-based and competence-based views of the firm (RBV & CBV) have become the dominant scientific paradigms in organization and strategic management science (cf. Barney 1991; Sanchez et al. 1996; Teece et al. 1997; Freiling et al. 2008). These perspectives have considerably broadened our understanding of the internal structures of firms as inextricably embedded actors in markets and environments. Empirical findings support the core assumptions of these approaches and show that (core) competences and (dynamic) capabilities are indeed main drivers of competitive advantage (e.g. Armstrong/Shimizu 2007; Newbert 2007). Accordingly, firms that are able to systematically reflect their competence base and to proactively adapt their competences to environmental challenges can drive the markets, while firms that are not able to adapt may perish (cf. e.g. O'Reilly/Tushman 2008). As a consequence, the ability of firms to develop their competences and how they govern learning endeavors that permit them to take an active role in shaping their environments is of pivotal interest.

To explain adaptive behavior, researchers in the tradition of the RBV developed the concept of dynamic capabilities (Teece et al. 1997; Eisenhardt/Martin 2001). The dynamic capabilities view (DCV) focuses on how firms can change their value-creating resources over time to achieve congruence with an evolving environment (for reviews c.f. Wang/Ahmed 2006; Ambrosini/Bowman 2009; Easterby-Smith et al. 2009; Barreto 2010). Broadly defined, dynamic capabilities refer to the "the capacity of an organization to purposefully create, extend or modify its resource base" (Helfat et al. 2007: 4). More specifically, dynamic capabilities facilitate routinized and purposeful change processes with aim of reconfiguring a firm's resource base thus matching or even creating market change (for a detailed analysis of various definitions of the ambiguous term "dynamic capabilities", see DiStefano et al. 2010). Examples of dynamic capabilities are legion; they include R&D and new product development (Danneels 2002; Verona/Ravasi 2003), restructuring (Karim/Mitchell 2000; Galunic/Eisenhardt 2001), corporate venturing and intrapreneurship (Keil 2004; Collinson/Wilson 2006), building strategic alliances (Anand et al. 2010; Heimeriks/Duysters 2007), or post-merger integration (Szulanski 2002) – to name just a few.

Despite its popularity – or, more probably, due to its popularity –, the notion of dynamic capabilities has remained rather fuzzy hitherto (cf. e.g. Schreyögg/Kliesch 2006; Arend/Bromiley 2009; DiStefano et al. 2010; Vogel/Güttel 2012). Research that aims to clarify the dynamic capabilities concept elucidates dynamic capabilities as consisting of two aspects, namely the cognitive (or managerial, or strategic) and the operational aspect (Güttel et al. 2012). Cognitive aspects of dynamic capabilities refer to strategic decision-making with regard to whether, when and how change processes are implemented. They are anchored in managerial cognitions and decision-making heuristics. Opera-

tional aspects of dynamic capabilities, in contrast, refer to those reconfiguration routines that govern concrete change processes.

Hitherto, research on dynamic capabilities has focused mainly on their operational aspects (cf. Teece 2012). In the last decade however there has been an increasing number of researchers who address the cognitive issues behind managing routinized strategic change (e.g. Gavetti 2005; Teece 2007; Helfat/Peteraf 2014) and managerial actions that determine routinized organizational adaptation processes (Sirmon/Hitt 2009; Martin 2011; Beck/Wiersma 2013). Adner and Helfat (2003) coined the term dynamic managerial capabilities to emphasize the critical role of managers in such adaptation processes. Dynamic managerial capabilities comprise managerial human capital (e.g. skills and knowledge), managerial social capital (e.g. social relationships and connections), and managerial cognition (e.g. mental models that underpin strategic decisions). Managerial human capital is shaped by the professional experience and background of managers. Specialization in particular areas of expertise allows managers to accumulate more quickly knowledge and skills in these respective fields (Kor 2003). Managerial social capital refers to social relationships, connection to networks, and grants managers' access to valuable resources and information (Byler/Coff 2003). Managerial cognition, finally, refers to mental models and cognitive maps which managers employ to make decisions (Danneels 2011). Research in this vein has focused particularly on how managerial attention influences firm adaptation. In their case study on Polaroid, Tripsas and Gavetti (2000), for example, show how cognitive rigidity and inattention paved the company's way into a competence trap. Similarly, Gilbert (2006) shows in his analysis of a large US newspaper corporation that integrating competing frames is one of the central managerial tasks in ensuring adaptation in volatile environments. Benner (2007; 2010) analyzes the influence of external institutions, i.e. stock market and securities' analysts, on managerial decisions. Eggers and Kaplan (2009) argue that managerial attention towards new technologies leads to faster entry into new markets and that attention to existing technologies is associated with slower progress.

In a recent conceptual paper on dynamic managerial capabilities, Kor and Mesko (2013) emphasize configuration and orchestration as critical senior management-level functions. Configuration refers to how firms integrate top executives' individual competencies to create top management team absorptive capacity. Firms can build such top management team absorptive capacity either by reshuffling the executive team or through continuous learning. The collective ability to recognize the need for revitalization by reshuffling (reconfiguration) or learning is an important precondition of building top management team absorptive capacity. In particular, Kor and Mesko (2013: 237) argue that "managerial alertness, responsiveness, and learning as part of the top management team absorptive capacity shape the firm's reaction to new internal and external information." Orchestration refers to integrating different views within the firm

(Kor/Mesko 2013). Teece (2007) uses the term (asset) orchestration also to capture the strategic managerial function of finding "new value-enhancing combinations inside the enterprise, and between and amongst enterprises, and with supporting institutions external to the enterprise." By doing so, he elucidates the essential role of managers in allocating organizational resources to develop new strategies.

In this paper, we draw on these concepts and we empirically examine dynamic managerial capabilities by analyzing empirical case-study data from two high-tech start-up firms. More specifically, we investigate how top management team (TMT) cognitions, configuration and asset orchestration practices influence TMT absorptive capacity and routinization and, therefore, also influence firm adaptation behavior. During growth periods, such high-tech start-up firms are particularly challenged by extreme dynamics, both internal and external. Our results highlight the importance of dynamic managerial capabilities in facilitating proactive adaptation. Thus, with this study we focus less on testing theory and more on describing a phenomenon in order to generate new theoretical insight.

2.   Methods

We use qualitative research methods to answer our research question. Several scholars emphasize the need for more qualitative research in the field of management (Pratt 2008; Aguinis et al. 2009; Bansal/Corley 2012). Teece (2012: 1400) even argues that dynamic managerial capabilities "can best be analyzed through in-depth qualitative research (…) This empirical literature is still at an early stage and opportunities abound to dig deeper into the linkages between individual or small-group managerial actions, dynamic capabilities, and long-run firm performance". Thus more such exploratory studies could contribute to theory-building within this field (Eisenhardt 1989).

We applied a two-case-study research design because it provides an opportunity to analyze the phenomenon of dynamic managerial capabilities in depth and within its natural context;. we thereby followed the principles of theoretical replication for case selection (Yin 2009). Selecting similar cases regarding industry sector, level of technology (high-tech), educational level of founders, headcount, TMT's size (at time of conducting interviews) and location enabled us to compare and contrast how the TMTs of the two firms we studied put dynamic managerial capabilities into practice.

Research context: We selected two SMEs operating in a highly dynamic, knowledge- and research-intensive sector, to which we give the fictitious names of *Flyspy* and *Sports-Pro*. Both firms won industry-specific prizes for their innovative products and went through an intense growth process in their early years in terms of sales volume and headcount. Due to the rising number of products, customers, human and financial resources both organizations are ideal for

showing how TMTs are challenged to allocate resources throughout the firm, by orchestrating organizational learning, and by reformulating their own role. Although both firms enjoyed a similar start and were successful in their early phase, their subsequent development was very different, especially in terms of firm performance. In 2013, a large European Media Corporation acquired one of the firms (Sports-Pro Ltd.), while the other firm (Flyspy Ltd.) went bankrupt.

	Flyspy Ltd.	**Sports-Pro Ltd.**
Foundation	2006	2009
Number of employees (beginning of 2013)	~30	~90
Top Management	2006: CEO (= founder), 2007-2011: CEO + CTO + CFO, later: CEO + CFO; currently: CEO (= previous CFO)	founding team (CEO, COO, CTO Web, CTO Mobile)
Products	- supplies technology in the field of navigation, motion tracking, and mobile robotics in the air, on the ground, and in the water for public sector and private customers - offers integrations and implementation services of its technology - offers consulting services to prepare for integration - offers testing, simulation and demonstration services	- develops and sells fitness apps (to track distance, time, calorie consumption,… of sports activities such as running, cycling, nordic walking, hiking,…) to end customers and - sells fitness hardware (heart rate monitor, bike accessories, wristbands, watches,…) to end customers - develops various apps for diverse business customers and - runs an online fitness portal to share results of sports activities among members
Interviews	5	9
Interview partners	TMT (CTO) 1 project manager Autopilot 1 project manager Sense&Avoid 1 software developer 1 marketing & sales assistant	TMT (CEO, COO, CTO Web, CTO Mobile) 4 software developers 1 marketing executive

Table 1: A comparison between Flyspy Ltd. and Sports-Pro Ltd.

The case of Flyspy Ltd.: Flyspy was founded in 2006 by a mechatronic graduate who decided to bring together his passion for flying and his professional expertise gained from university projects. Basically, Flyspy started with two core products: an autopilot that enables navigation and a "Sense&Avoid-system" that allows automatic collecting, interpreting and reacting to environmental information (i.e. to sense and avoid obstacles). Building on this technology, Flyspy's products ranged from robotic lawn mowers, automatic braking systems for cars, to aerial drones for military purposes. Additionally, Flyspy offered services such as consulting, integration, demonstration and technology licensing in relation to

the implementation of its technologies in the end product. The firm's operations were based in Europe, where programming, simulations, prototyping, and manufacturing were all integrated at one location with an open-space office for software development. At the beginning of 2013, Flyspy still employed 30 people to supply governments and private customers with navigation, sense-and-avoid technologies for implementation in unmanned vehicles moving in the air, in the water, and on the ground.

The case of Sports-Pro Ltd.: Sports-Pro was founded in 2009. The company develops apps and hardware products and offers services. Its core product is a fitness app for mobile phones that allows tracking distance, time, and calorie consumption of different sports activities such as running, cycling, or Nordic walking. To round out its portfolio, Sports-Pro also started developing fitness hardware, such as heart rate monitors, bike accessories, wristbands and watches. Users can additionally share their training results on an online fitness portal which also offers detailed data analysis and a personal fitness plan. Sports-Pro is not only operating from its headquarters in Europe, but also runs a subsidiary in the US. Sports-Pro's global presence is underscored by employing seven marketing managers who are responsible for Austria, Germany, Swiss, Spain, France, Portugal, Latin America, Canada, Japan and China. At the beginning of 2013, Sports-Pro employed around 90 people of various cultural origins.

Data collection: The data source consists of 14 semi-structured interviews, casual observations and archival data (media reports, company websites). We conducted interviews with the CTO, Product Manager Autopilot, Product Manager Sense&Avoid, 1 software developer and 1 marketing & sales assistant of Flyspy and with the CEO, the COO, 2 CTOs, 4 software developers and 1 marketing executive from Sports-Pro. In addition, we interviewed an expert on entrepreneurship and business formation, who supports university and university of applied sciences start-ups during foundation and in their initial years. As he was involved in the process of the development of both firms, we did not only gain a general understanding of the challenges for founders in the start-up phase but also gained information on the differences between the two firms; we were also able to discuss our preliminary findings with him.

We conducted the interviews partially at the companies' premises and used this opportunity to gain information on their cultures by adding observation notes to our data. During the interviews, we focused on creating an open atmosphere to encourage interviewees to answer in a detailed and free manner. Each interview lasted between 45 and 90 minutes and all interviews (except from Flyspy's CTO, where we were only allowed to take notes) were recorded and transcribed in German; interviewees' quotations presented in this paper were translated afterwards.

Data analysis: In a first step we reconstructed the organizations' histories from interview and archival data (Langley 1999) to deduce the sequence of changes

during the organizational development of both firms and compare them. In a second step, interview data, observation notes and archival data were analyzed following an inductive approach (Miles/Huberman 1994). We followed the procedures outlined by Yin (2009: 40) for quality control in case study research. To triangulate data and improve the quality of our analysis, we extensively drew on archival data from external sources such as media reports to compare them with interviewee statements (Jick 1979). Additionally, the constant comparison with theory (Eisenhardt/Graebner 2007) served as a further means to ensure validity and reliability in compliance with case study research standards (Yin 2009).

3.   Results

Our findings show that whilst focusing on a core product or service leads to success in the phase of foundation, it subsequently becomes detrimental when organizations enter new markets with additional products or services. Then, new and different abilities are required to manage various business fields and to deal with the increasing complexity of administrating the business. Our findings reveal that if the focus is placed on dynamic managerial capabilities, the composition of the TMT regarding human capital (individual skills and experience), social capital (embedded in external networks), and managerial mindsets (cognitive structures) strongly influences how firms are able to manage their assets when internal complexity increases. In particular, we show that top management team absorptive capacity, which is fostered by diversity (in human capital, social capital, and managerial mindsets) serves as a driver of the routinization of internal processes, as attention is distributed between product and organizational development. Routinization, in turn, serves as a means of dealing with complexity because it facilitates asset orchestration within the firm (human resources, communication, knowledge). Finally, dynamic managerial capabilities facilitate proactive change, while firms that lack such capabilities merely react to environmental developments.

First we present the foundations of dynamic managerial capabilities by showing differences and commonalities of Flyspy and Sports-Pro with regard to human capital, social capital, and managerial mindsets. Subsequently, we explain the consequences of different foundations for TMT configuration and asset orchestration (routinization of human resource management, knowledge processing and communication) at both firms. At the end of each section we draw a conclusion based on a cross-case comparison. Finally, we present the implications of dynamic managerial capabilities on adaptation behavior based on diverse attitudes towards change (proactive vs. reactive), which arise from foundational differences.

3.1 Foundations of Dynamic Managerial Capabilities

The selection of members of the TMT is an important factor in developing dynamic managerial capabilities (Adner/Helfat 2003; Kor/Mesko 2013). Diverse skill bases, the continuous synchronization of managerial cognitions, and how well connected senior managers are in multiple external networks all support the development of absorptive capacity at the level of the top management.

Skills, cognitive structures, and high connection with external networks of the top management teams of both firms are antecedents for building dynamic managerial capabilities. Although we found differences between the two firms in terms of skills and cognitive structures, the degree of connection with relevant external networks was similar.

3.1.1 Human Capital

Skills of Flyspy's TMT: As Flyspy's founder was working at a university institute before establishing the company, he had some knowledge on writing proposals for research funding, which was crucial to the survival of the company during the first phase. He was and remained the innovative force at Flyspy. In 2007, inspired by the CEO's fascination for the technology, a CTO entered Flyspy. The CTO was also working at a university institute at the area of mechatronics before joining Flypsy. At that time both members of the top management did not have any education, experience or interest in business administration issues.

Skills of Sports-Pro's TMT: In contrast to Flyspy, Sports-Pro deliberately searched for people with a background in economics and business administration to join the TMT. The basic idea of the foundation of Sports-Pro emerged during a project at a university of applied sciences, where two of the founders developed a device for tracking sailing boats. Both are software engineers with a specialization in mobile computing. Encouraged by their course administrator to join a support program for aspiring founders, they started to further elaborate their tracking program and wrote a business plan. When one of them (CTO Mobile) planned to quit in order to work for a larger company in the Netherlands, the future CTO web asked a friend, who later became the CEO, if he would like to join the project. The CEO supported Sports-Pro by having a background in sales and also invited a friend with whom he was working in an entrepreneurship course. Since this friend knew about how to write business plans and proposals for funding he was later appointed COO. The CEO and the COO developed their interest in founding a business during their university project but did not have an idea for a company, whereas the two CTOs had the idea, but they did not have any knowledge regarding finance and management issues; they also did not want to deal with such issues.

3.1.2 Social Capital

Flyspy's and Sports-Pro's External Networks: In the start-up phase Flyspy's CEO used his industry connections from his previous projects at the university, whereas Sports-Pro had to rely on university "incubators" to provide them access to relevant industry networks. Both companies used their founders' connections to universities for recruitment purposes. Due to their background as students or scientific staff they were able to benefit from a pre-selection mechanism for future employees since in their start-up phase they knew most of their future employees personally and thus also knew whether they would fit in their team. Their close relationship to professors and lecturers who could recommend talented people also helped. Additionally, Flyspy and Sports-Pro both worked and continue to work in close cooperation with doctoral students to keep pace with the latest developments, as the founders no longer possess cutting-edge knowledge due to their managerial and administrative responsibilities. In contrast to Flyspy, Sports-Pro has benefited a lot from informal contacts to other founders and start-ups in terms of knowledge sharing on managerial and administrative issues. The TMT actively uses formal settings, where founders are invited to meet each other and talk about their experiences in order to share knowledge about running a business.

3.1.3 Managerial Cognition

Cognitive Structures of Flyspy's TMT: At Flyspy both members of the top management team have a purely technical background. The attention of the top management therefore was exclusively on technology development. Leadership issues and management skills were subordinated. Both the CEO and the CTO are passionate about finding technical solutions and perceived organizational development, human resource management, finance, and accounting as support functions that receive attention if there is spare time after product development: "We are so flexible in terms of product development that is exemplary. In terms of developing structures, such as communication, it is unbelievable. It works top-down but the other way round: not really. They (the TMT) are both coming from the technical side and not really from the business administration. They lack leadership skills, which they have never learnt and now they treat leadership just like a side effect and not as important" (Software Developer, Flyspy). Flyspy's top management, thus, perceived managing the company as a challenge for continuous technological improvement. We refer to this as "*technology-driven mindset*".

Cognitive Structures of Sports-Pro's TMT: Sports-Pro's TMT perceived both product and organizational development as crucial due to their diverse backgrounds and the CEO, who arbitrates between both worlds. Therefore understanding on the part of TMT of managerial responsibilities and that internal organizational adaption was a prerequisite for innovative product development is quite different to the perception of the Flyspy management. "The workload for

us is even more than at the beginning, but you always have to try to delegate. Now we have more leadership responsibilities and divide work among employees. On the one hand it takes time to explain in the short term but on the other hand it releases you from work in the long term" (CTO Mobile, Sports-Pro). Sports-Pro's top management perceived managing the company as a challenge that involves developing leadership as well as developing technology. We refer to this mindset that involves technological as well as organizational and leadership issues as "*organization-driven mindset*".

3.1.4   Cross-Case Comparison on the Foundations of Dynamic Managerial Capabilities

Our findings show that diverse skill backgrounds were already available at Flyspy and Sports-Pro at the stage of foundation. The motivation for founding Flyspy and Sports-Pro was to advance an idea that the founders were excited about. While Flyspy was founded by a technician, the founding team of Sports-Pro was a mixed team of people with knowledge in the fields of programming, business administration and technology management. Whereas both TMT members are deeply integrated into external networks such as scientific communities to keep pace with latest technology development, Sports-Pro additionally engages in networks whose function is the sharing of experience about organizational development in start-ups.

In sum, we characterize the TMT's mindset at Flyspy as "technology-driven" in contrast to the "organization-driven mindset" of Sports-Pro's TMT. These differences have certain implications with regard to how both firms managed change induced by growth as a result of success in the initial years.

3.2   Putting Top Management Configuration and Asset Orchestration into Practice

Flyspy and Sports-Pro were both extremely successful in their start-up phase. As a consequence of their success, their resource base grew rapidly. Financial resources no longer resulted only from research funding but increasingly from product sales. Fulfilling scientific demands and customer needs at the same time is challenging, as the skills required for writing research proposals are different from those needed for convincing customers. Moreover, sales structures for entering international markets (e.g. the US market which has become one of the most important markets for Flyspy and for Sports-Pro) had to be built and the span of marketing activities amplified. Additionally, allocating resources became increasingly difficult as for both firms, customer projects are short-term oriented with concrete deadlines; however, they should not crowd out the long-term oriented research projects.

In order to handle the rising sales volume, both companies raised their head-counts. This increase was continuous and gradual at Flyspy, whereas Sports-Pro's growth happened more radically. Accounting, human resource management, and organizational development in terms of structuring the way of collaboration all became more important. In the following section, we show how Flyspy and Sports-Pro engaged in TMT member selection and asset orchestration to manage the challenges of organizing growth and the rising workload.

3.2.1 TMT Configuration

Variety of the skill base within the TMT can only utilize full potential if responsibilities are divided accordingly. Our cases demonstrate differences in profiting from their resource bases.

TMT configuration at Flyspy: At Flyspy, the CEO held 80% of the company and there was a strict hierarchy within the top management team (CEO first, then CTO). Although the CEO, responsible for sales and creating external networks, spent little time at the firm, he was still involved in the project staffing and he also had his own projects. In the medium term, the long absence of the CEO from the company resulted in an erosion of trust between the CEO and his employees and, as a consequence, in the installment of control mechanisms. The CEO introduced an attendance recorder without any upfront information for employees. Employees who had been with Flyspy since its foundation were particularly insulted because they felt that this measure was against the corporate culture of Flyspy. The CEO was also so passionate about the product that he could not step aside from working operationally; yet, managing sales and technology at the same time led to an immense work overload. "Our CEO is an all-rounder, let's put it like that. He does the sales, technical details, research proposals. He is involved in everything and that has just changed slightly from the beginning" (Product Manager Autopilot, Flyspy). The CEO was a micromanager who was not able to delegate and could not cope with the fact that employees soon possessed more cutting-edge knowledge than him, as he had to take over more tasks in relation to company management and finance. Internally Flyspy's CEO was responsible for sales and for the external representation of the company, whereas the CTO's job was to manage the projects internally by allocating, based on demand, human resources to projects. However, in the end, the CTO continued working operationally on projects and served as "labor slave" who collaborated closely with product managers and software developers and helped them to "lighten their workload" (Software Developer, Flyspy). Additionally, the CTO took on a balancing role by being on-site, by talking to employees and by being available if problems in the daily work appeared. Taking this measure was necessary for employees' motivation and commitment and prevented Flyspy from falling into a chaotic state during the first years of growth.

TMT configuration at Sports-Pro: Although all founding members internally appear as CEOs, the areas of responsibilities were clearly divided between them: "We have a total sales person, I am the bridge between sales and technics, and we have two truly spirited technicians," (COO, Sports-Pro). In order to comply with external expectations, Sports-Pro specified the roles and responsibilities of the CEOs in its organizational chart. The CEO serves as external representative of the company and is responsible for sales and marketing activities. The COO is responsible for finance and funding, human resources, organizational development, and cooperations. CTO Mobile (mobile tracking) and CTO Web (server infrastructure) are in charge of product development. Although responsibilities are clearly defined, there is no hierarchy within the TMT, as ownership is equally divided. Moreover, all of them share a passion for the product; the CEO also learnt extremely fast about the technical background through discussions and internet-based investigations on competitors.

3.2.2   Asset Orchestration

Flexibility is one of the major sources of competitive advantage in start-ups, because it allows fast reactions to market demand. Routinization of organizational activity therefore seems to be a counterintuitive approach. However, a growing resource base carries the threat of internal chaos if it is not managed appropriately. The comparison of cases reveals differences in the approach towards routinizing of the orchestration of the firm's assets.

Routinizing Human Resource Management/Managing Human Capital at Flyspy: Also, at Flyspy, product managers always take on the roles of project leaders for projects that concern their technologies, i.e. Autopilot or Sense&Avoid. The duties and responsibilities of project leaders, however, are neither fully clear to the TMT nor to the project leaders themselves. The product manager of Sense&Avoid does not even like his role as project leader. He perceives the additional administrative work as something that interrupts him and prevents him from doing research: "By taking over, no, they gave it to me, the project management, if you like to call it like that, we do not really label it, but we talk more and more about project responsibility, since then there is a lot more administrative work for me," (Product Manager Sense&Avoid, Flyspy). According to the CTO, different degrees of freedom and autonomy would be necessary to fully exploit the competencies of the two product managers. However, he did not address this issue in his conversations with the CEO. Although the TMT established the function of product managers, they themselves assigned employees to projects just for some time to keep an eye on the allocation of time and human resources, in order to be flexible enough to react to short-term demands. Long-term strategic planning is hampered, because the strategic focus often shifts between projects that build on different technologies: "We have to share employees, my colleague and I. It depends on which project is more important at the

moment and resources are divided accordingly," (Product Manager Sense&Avoid, Flyspy).

Routinizing Human Resource Management/Managing Human Capital at Sports Pro: At Sports-Pro the top management team defined strategic goals and milestones. How these goals were achieved was a result of autonomous decisions of the programmers. As a software developer puts it: "It all worked out without predefined processes. We just started programming. It was the same in every project." Yet, the top management quickly discovered that ignoring the market and competitors soon proved to be disadvantageous. Therefore, a roadmap serves as guideline for what projects to conduct. Highly exploratory projects are accomplished by interns or transferred to diploma or doctoral students. "As a company you somehow lose proximity to latest technologies. Students have their fingers on the pulse of time and deliver great input on innovation" (CTO Mobile, Sports-Pro). The timing of launching a feature is also crucial, as competition in that sector is high and for customers, switching from one app to another is easy and almost without costs. For that reason, Sports-Pro developed a routine of feature planning with predefined deadlines in order to avoid an exponential time-to-market. The process of developing new features starts with a brainstorming session in a team setting. A team of three people usually performs the concrete product planning and development. The time for software development is tracked via an IT-based project management tool in order to refine internal planning for features and to better calculate development projects for external customers. In the end, the estimated time for different tasks in the development process can be compared to the time actually needed. This tool allows better calculation, but also an overview of employees' time capacities and performance. Project team members are stable and responsibilities within a project are clearly specified from the beginning.

Routinizing Communication/Managing Social Capital at Flyspy: In the early stage after foundation, communication in both firms was informal. With an increasing headcount and multiple parallel projects, employees were no longer able to communicate directly and the rising number of projects made it difficult for the individual to be informed about everything. In order to ensure informal communication employees of Flyspy spend their time together when going for a walk together at lunch break or have lunch together. "Before the amount of people doubled it was easy to talk to each other over the desks, for example, if you couldn't find anything. That was no problem at all," (Marketing and Sales Assistant, Flyspy). Although informal communication became increasingly difficult, Flyspy's management did not realize the need for installing more formal communication channels. The TMT wanted people to be informed, yet it did not engage in active communication. The technology-driven mindset of the founder resulted in the situation that information about new products was given to each employee very regularly, but the entry of a new employee, for example, was not communicated at all. Product managers were supposed to eliminate this prob-

lem; however, their role within the firm was not clearly defined. The TMT perceived them as spokesmen for the employees, but it also communicated directly to employees without informing the product managers. A clear role definition regarding communication was missing: "We realized that it is not good if the CEO directly speaks to a project member instead of communicating with us the product managers. Because then they know something that I don't know, that I need in order to make decisions. Communication does not work that way," (Product Manager, Autopilot, Flyspy).

Routinizing Communication/Managing Social Capital at Sports-Pro: At Sports-Pro the organization-driven mindset contributes to establishing multiple channels and clear communication structures. For day-to-day issues employees often use Skype in order to not disturb the others in the open-space office. Additionally, Sports-Pro installed a meeting room where project team meetings are held. As informal communication is still very important, people working in the same area sit next to each other. Information can easily flow in project team meetings or informally as project teams are stable. Although projects are assigned via the project management tool, the CTOs join the teams to discuss and be available for clarification. The TMT regularly (once or twice a year) holds informational briefing sessions to inform all employees about relevant company data, news, future challenges, and success stories. The formal mode of communication via emails conveying information on the firm's recent successes and topics that are relevant to everybody is daily routine. Within the TMT, regular meetings are held to bring together and discuss newly acquired information. The TMT have also institutionalized strategy workshops once a year where they make strategic decisions on a consensual basis. Moreover, mutual trust creates the understanding that employees understand that they do not need to know everything, but that the TMT will give them all information needed. "I do not have, and I even do not want to know, everything about strategic decisions. That's the management's business. But I want to be informed about decisions and this is the case," (Software Developer 1, Sports-Pro). Also, the TMT trusts employees to autonomously decide which information they need to share with the whole team. "It is in their own autonomy and responsibility, which information they feel to share with the whole team. We have active and engaged employees and they know what is relevant," (CTO Mobile, Sports-Pro).

Routinizing Knowledge Processing at Flyspy: At Flyspy, a wiki-based system was introduced, but as there were no rules regarding its use, it was not used at all. The TMT did not take any actions to change this situation. Therefore the firm was dependent on some key employees and could easily get in trouble if any of these employees left the firm. For this reason, the CEO tried to support knowledge storage via an IT-based project management tool. To introduce this system was the task of the marketing & sales assistant: "We need IT systems to save information, so that it is written somewhere. Talking over desks becomes more difficult the more people we are, but IT should help," (Marketing & Sales

Assistant, Flyspy). However, using this IT tool is dependent on individual judgments regarding how much documentation is necessary. Since not even the TMT uses it to assign tasks and employees to projects, there was no motivation to use the system on the level of the employees.

Routinizing Knowledge Processing at Sports-Pro: Exploratory learning is a large part of the employees' daily work, because Sports-Pro does not hire employees as experts, but they have to learn, for example, the programming language at Sports-Pro in-house. Therefore, the employees have a strong internal interest on their own behalf in documenting their learning experience. Facilitating learning, also for new team members and employees, is an expression of the organization-driven mindset at Sports-Pro. Additionally, Sports-Pro implemented a wiki-tool in order to store information. Although managing this tool is time consuming, most employees remember how wiki has helped them in making progress. So they actively use this tool and thus facilitate internal information processing.

3.2.3 Cross-Case Comparison on Dynamic Managerial Capabilities in Practice

Managing the business in the first years is relatively simple. Therefore the founder can manage it by being deeply involved in operations and having close contact with employees during the daily work. When the business grows, strategic decision-making and subsequent development of organizational structures and processes, as well as various management issues, gain importance. Dividing responsibilities within the TMT based on the background of different members becomes a major advantage at that stage, as it provides time for strategic considerations. Strategically thinking about growth is a necessary precondition for proactively orchestrating organizational assets. The members of TMT at Sports-Pro agreed on a growth strategy, if market conditions allow for it, at the beginning and were consequently able to structure their ways of collaboration. In contrast, Flyspy's CEO and CTO could not agree on whether the firm should grow or remain small and serve a niche. The CEO wanted to grow, whereas the CTO considered staying small as the preferable option. As a result of this conflict, flexibility and spontaneity turned into confusion, insecurity and inefficiency. Our results show that the different mindsets in Flyspy and Sports-Pro shaped the organizational culture and the way in which assets are orchestrated throughout the two firms. Whereas Flyspy could only react to difficulties that emerged from lacking strategic direction and subsequent lacking organizational design, Sports-Pro proactively divided responsibilities within the TMT and created organizational processes to manage change. Our findings show that the top management absorptive capacity and the organizational mindset influenced the routinization of human resource management, communication and knowledge processing in the firm and, therefore, affected firm adaptation behavior.

3.3 Implications of Dynamic Managerial Capabilities

Our data show that even though the starting conditions and the early phase of growth of Flyspy and Sports-Pro were very similar, differences in cognitions of strategic decision-makers at both firms and in top management team absorptive capacity resulted in different adaptation behavior. 2013 was an extremely successful year for Sports-Pro. A European media corporation bought 50.1% of Sports-Pro to enlarge its appearance in electronic media. Sports-Pro now is one step closer to realizing its vision of becoming an internationally known and successful fitness brand. This cooperation should support the expansion of the product portfolio and the customer base. The founders remain in their position as top management. At Flyspy, the exclusive focus on technology hampered the TMT's willingness to accept organizational challenges. The company went bankrupt in 2013.

By drawing on examples from well-known firms, Teece (2007) argues that competitive advantage derives not only from product innovation, but that product innovation always has to be complemented by organizational and managerial innovation. This is of vital importance for managing start-ups and small firms during growth periods, as there are often no formal roles dedicated to these areas. In the case of Flyspy, strategic decisions were rather a result of ad-hoc problem-solving by the CEO, than decisions based on thoughtful structuring and routinization. Although Flyspy's CEO realized the need to broaden the skill and experience base, and thus absorptive capacity, at the TMT level, the CTO could not fulfill his potential. The decision to recruit a person with similar skills is based on the CEO's one-sided focus on technology. Even after a further manager, the CFO who had no impact at all and was not even mentioned by any of the interview partners, joined the TMT, diversity in skills and cognitive frames was not fostered and the CEO's technology-driven mindset remained dominant.

Workflow at Flyspy was characterized by inefficiency, as project team members had to switch projects very often. When working at programming software, it takes some time to immerse oneself in the previous work done in the source code of a program before you can start working again (i.e. getting into "the flow"). The lack of routinization of product development processes at Flyspy led to frequent work interruptions and decreasing efficiency and motivation. Additionally, the lack of routinization in communication and knowledge transfer and frequent ad-hoc decision-making resulted in discontent among employees. Therefore fluctuation increased, which was problematic, as knowledge was not codified at Flyspy and finding specialized people proved to be difficult. Moreover, Flyspy's reputation as an employer deteriorated rapidly. Due to high fluctuation, especially of key employees, and the lack of a clear business strategy, Flyspy's success waned.

In contrast to Flyspy, the TMT of Sports-Pro proactively worked on the ideal combination of technical and business administrations skills, as well as generic

competencies, instead of reactively adding employees that do not get involved in strategic decision-making. As the TMT of Sports-Pro agreed on a growth and internationalization strategy from the beginning, each founder could work on fulfilling the strategy in his own area. The CEO was responsible for sensing market opportunities and developing marketing and sales structures, the COO adapted organizational processes according to new markets and rising sales volume, and the CTOs gave input on technical feasibility. The organization-driven mindset enhanced autonomy and personal responsibility of employees and feature planning helped them prioritize their tasks. The TMT of Sports-Pro also took responsibility by developing human resources and by leaving project responsibility to project leaders with decision-making autonomy. As a consequence, employees display a high level of commitment to the firm and they grant Sports-Pro the flexibility to react quickly to moves of competitors.

4.　Discussion & Conclusion

The DCV has emerged as the dominant approach to explaining routinized and purposeful adaptation processes (Ambrosini/Bowman 2009; Barreto 2010). Dynamic capabilities comprise operational aspects, with a focus on the performance of concrete adaptation processes, and cognitive aspects, with a focus on managerial decision-making (Güttel et al. 2012). The concept of dynamic managerial capabilities captures this cognitive aspect (Adner/Helfat 2003). However, despite the pivotal role of managerial cognition and leadership for firm adaptation (cf. e.g. Teece 2007; Hodgkinson/Healey 2011), research on dynamic managerial capabilities has hitherto remained rather scarce (cf. Sirmon/Hitt 2009; Danneels 2011; Martin 2011; Kor/Mesko 2013). Thus in this paper we have analyzed empirically dynamic managerial capabilities in practice. Based on our sample of two start-up firms in the high-tech industry, we compare how top managers use their dynamic managerial capabilities to drive innovation and how they tackle the challenges of TMT configuration and asset orchestration (Teece 2007; Kor/Mesko 2013). Our findings show how dynamic managerial capabilities facilitate the creation of top management absorptive capacity and asset orchestration and, thus, support adaptation and change. Our study contributes to the discourse on dynamic managerial capabilities in two ways.

First, our findings empirically highlight the pivotal role of dynamic managerial capabilities, especially for start-up firms. New organizations often foster technological innovation in industries (Tushman/Anderson 1986). However, to do so, such firms need dynamic managerial capabilities – that are embedded in managerial skills, social relationships, and cognitions – to manage the acquisition of firm-external resources, as well as the allocation of firm-internal resources (Adner/Helfat 2003). Our case study data show that TMT configuration has an impact on top management absorptive capacity. Absorptive capacity, in turn, facilitates the development of managerial cognitions and mindsets that are attentive to

multiple and diverse managerial challenges. Such mindsets involve alertness and responsiveness (Kor/Mesko 2013) and enable firms to shape their environments. Therefore, our findings connect to Tripsas and Gavetti (2000) by showing that cognitive rigidity is not only a problem for incumbent firms in the face of technological change, but also for start-up firms during growth periods. Such firms may not only fail because of resource scarcity, which has been identified as a chief reason for start-up failure (Romanelli 1989), but also because of narrow mindsets and managerial cognition. Our results also connect to Edmondson et al. (2001), who showed that leaders who framed change as an organizational challenge outperformed leaders who perceived it as a purely technological challenge. The purely technology-driven mindset of the TMT at Flyspy resulted in ignoring organizational challenges; the organization-driven mindset at Sports-Pro, on the other hand, accounted for technological and organizational issues and, thus, facilitated adaptation.

Moreover, our data show that dynamic managerial capabilities are by no means a substitute for creating organizational routines in start-ups, but that they are necessary in order to guide the creation of routines (e.g. for managing human resources, communication, or knowledge). Teece (2012: 1397) already elucidated the fact that dynamic capabilities "involve good strategizing as well as good execution". Thus, cognitive and operational aspects of dynamic capabilities are closely intertwined. The top management at Sports-Pro made a deliberate decision to routinize organizational activity quickly. This approach allowed them to focus more on the strategic challenges of running their business and to withdraw from the operational day-to-day-business, while the managers at Flyspy were caught up in the wheel of ad-hoc decision-making. Future research will have to focus in greater detail on the interlinkages between "strategizing" (which involves managerial cognition) and "execution" (which involves organizational routines).

Second, our findings show that dynamic managerial capabilities facilitate proactive change. Eisenhardt and Martin (2000: 1107) already highlighted the function of dynamic capabilities to "match or even create market change." Systematic opportunity recognition (Baron/Ensley 2006), market sensing (Teece 2007), or strong vision and strategic intent (O'Reilly/Tushman 2008) serve as the prerequisites for facilitating proactive change via dynamic capabilities. All of those activities require strong dynamic managerial capabilities and cognitive frames that are open and attentive to new market opportunities. In her studies of start-up strategies, Romanelli (1989) shows that founders may overcome the hazards of start-up business by tailoring strategies to environmental conditions and that specialist strategies are preferable in most settings, while in a situation of increasing industry sales, generalists fare better. Our results connect to Romanelli's (1989) findings by elucidating how the coupling of specialists and generalists within a firm's top management contributes to broadening cognitive managerial frames. Thus dynamic managerial capabilities are particularly relevant for

firms which not only aim at reacting to environmental change, but which want to stimulate such change.

5.   Implications & Outlook

This paper examines the mechanisms behind dynamic managerial capabilities in start-up firms. Our findings imply that dynamic managerial capabilities for TMT configuration, i.e. the capability to configure (and continuously re-configure) the member selection of the top management team, have an influence on firm growth and performance. Managing such reconfiguration processes proactively enables firms to stimulate internal development and learning, while reactive adaptations that focus on rigidifying existing cognitions and mindsets impede learning. This is especially relevant for start-up firms, because simultaneously managing growth and sustaining congruence between their capability-base and their external environment is one of their major challenges. Human capital (e.g. a broad skill base and experience in the field), social capital (e.g. good social relationships to stakeholders), and managerial cognition (e.g. attention towards new internal and external developments and trends) contribute to tackling this challenge. Adapting managerial mindsets to match changing circumstances becomes more and more important the more the pace of internal or external change increases. Fast-growing start-up firms in high-tech industries regularly have to cope with such internal and external change. Under such conditions, proactively adapting firm structures and managing attention become crucial drivers of success. Therefore, managers should ensure that they divide their attention between activities that aim to develop the internal capability-base of the firm, activities that aim to detect market opportunities, and activities that aim to develop technology and for managing people and advancing the organization.

No empirical study is without its limitations. By selecting two start-up firms in the high-tech industry as sample organizations, we follow with our approach the logic of theoretical replication (Yin 2009). Although our findings do not allow statistical generalization, they still facilitate theory building via analytical generalization. However, more exploratory as well as quantitative studies are needed to further investigate the importance of dynamic managerial capabilities for firms in various industries. Additionally, our study focuses on dynamic managerial capabilities at a very early stage of a firm's development. Investigating how such capabilities evolve and change over a longer period of time could thus be another promising avenue of further research. Finally, our study focuses on a more successful and not-so-successful firm in order to analyze in a rather simplistic manner the performance implications of dynamic managerial capabilities. Future research could examine quantitatively and in greater detail how dynamic managerial capabilities impact various parameters of firm performance.

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