

What managers can learn from knowledge intensive technology startups?

Exploring the skillset for developing adaptive organizational learning capabilities of a successful start-up enterprise in management education

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Received: July 25, 2022 • Revised manuscript received: November 3, 2022 • Accepted: November 22, 2022

Published online: December 20, 2022

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ABSTRACT

The study shows what management students could learn from technology startups from an *organizational learning (learning organization)* perspective; and whether or on what level this entrepreneurial mindset is built into management education. First, the organizational learning patterns and adaptive entrepreneurial skillset of startups are identified, based on a review of the recent literature focusing on knowledge-intensive technology startups' organizational learning patterns. Then, qualitative interviews and document analysis are applied to find out whether or on what level the improvement of these skills for developing an adaptive and successful startup are present as 'learning organizations' are integrated in top Central-European higher management education curricula. Based on the literature review, the theoretical framework is introduced, consisting of five pillars of 'start-up learning': *ambidextrous entrepreneurial learning, business model development, failure and experiential learning, benchmarking and learning from others, and agile product development*. The empirical research looks for these pillars in management MSc programs of a top Central-European business school. The most important findings reveal that the analyzed management education programs strongly prepare students with benchmarking skills. However, the study also showed that the culture and experience of failure and the capability of learning from failure are missing from these education programs.

KEYWORDS

startup, entrepreneurial skills, entrepreneurship education, management education, organizational learning, higher education

JEL CLASSIFICATION

L26

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The numbering of the sub-chapters of chapter 5 (Results) was corrected at the time of issue publication.

1. INTRODUCTION

Accelerating *organizational learning* in corporations by building a supportive learning ecosystem, organizational learning capabilities, and an adaptive capacity of resilience, is one of the key factors of business growth.¹ This has become especially important when considering the impact of the COVID-19 pandemic, which put the restructuring and rethinking of organizational identity into the focus of many businesses (De Smet et al. 2021; Orth – Schuldis 2021).

Startups are excellent examples for developing a supportive environment for innovation and organizational learning, therefore developing great adaptive capabilities in this quickly changing business environment. It is not a surprise that the role of entrepreneurial skills and *entrepreneurship education* is an increasingly significant subject in business schools and in higher education (Ganor 2022). There is an increasing need to support this kind of education (Dodgson – Gann 2020) and for building academic partnerships with startups (Saltzman 2019) all around the world. Notable examples can be observed of higher education programs and courses in business schools targeting this need. These can mostly be found in the US, while Central-Europe is lagging a little behind in this trend. However, there is a Hungarian example as well, called the Hungarian Startup University Program, or HSUP (NKFIH 2021). We believe that fostering the start-up skills and mindset of students in higher management education is essential, and that university students, studying management, can learn a lot from startups (Daze 2021).

This paper proposes a framework for studying *the organizational learning patterns and adaptive entrepreneurial skillset of knowledge-intensive technology startups, and investigates whether or on what level the improvement of these skills and capabilities for developing an adaptive and successful startup are present as ‘learning organizations’ are integrated in top Central-European higher management education curricula.*

The theoretical background starts with an overall review of impactful theories of the *learning organization*. Then the paper focuses on highly knowledge-intensive technology startups from an organizational learning perspective, through a systematic literature review of recent empirical papers, investigating different organizational learning patterns of these enterprises. Based on the literature review of existing empirical studies, five pillars of the ‘start-up learning’ framework have been developed and are introduced in the theoretical framework.

In the following, the applied research methodology and results are presented and research questions answered. The results are followed by practical recommendations and conclusions. The exploratory empirical research investigates the presence of these pillars and capabilities in management MSc programs of a top Hungarian business school through in-depth expert interviews with program managers, and brief additional document analysis of program curriculum (course lists, syllabuses, program introductions, program development reports etc). As a result, trends and gaps of management education programs are identified, from the perspective of the necessary skills and knowledge for development of successful startups, organizational learning, and adaptive capabilities. As a practical implication, recommendations are formulated for building the experience of our ‘start-up learning model’ into management education programs.

¹The theory and practice of this flourished in the 1990s, stimulated by Peter M. Senge’s (1990) *The Fifth Discipline*.



2. THEORETICAL BACKGROUND

2.1. Key concepts: the learning organization (LO) concept and organizational learning (OL) theory

The 'learning organization' (LO) concept and organizational learning (OL) theory have long been central topics in the leadership and management literature. The foundation stone of organizational learning theory, the idea that an organization could learn in ways that were independent of the individual was first articulated in [Cyert and March \(1963\)](#). The learning organization concept, though, is a more recent discipline. It is important to understand the key concepts – *organizational learning (OL)* and *the learning organization (LO)* –, used in this paper, by defining each.

These two similar and closely related terms are sometimes used interchangeably, although their meanings differ ([Tsang 1997](#)). The distinction between the terms, *organizational learning*, and *the learning organization*, was clearly articulated by [Tsang \(1997\)](#) to the extent that organizational learning refers to the study and evaluation of the learning processes within organizations – *how organization learns* –, largely from an academic point of view (*descriptive studies*), while *the learning organization* is seen as an ideal type of organization, which has the capacity to learn effectively and hence to prosper (*prescriptive studies*). OL is the process of adaptation (learning) and the level of renewability of an organization, while the LO is the result of this learning process. Based on [Easterby-Smith and Lyles \(2003\)](#), research on both organizational learning and the learning organization studies learning processes, but the former does it from a theoretical point of view, while the latter concentrates on the learning practice. [Tsang \(1997\)](#) adds that prescriptive management theories of *the learning organization* mostly focus on the role of actual behavioral change in organizations, suggesting action-oriented ways of learning that lead to high performance – *how an organization should learn*. These works, according to [Tsang \(1997\)](#), mostly rely on long years of business consulting experience and 'best practices', instead of systematically conducted empirical academic research. On the other hand, research-oriented descriptive studies of *organizational learning* include cultural and cognitive change, and the learning process is not necessarily linked to higher performance.

This paper rather deals with the practical implications of *the LO* theory, and many studies on the LO are processed, while the theoretical framework supposes both behavioral and cognitive change when talking about learning. When OL is used in this study, it refers to the patterns of the learning process; when the term LO is used, it refers to an ideal type of organization. The study focuses on effective organizational learning, supposing that higher performance is strongly related to, and expected from learning.

2.2. Practical implications of 'the learning organization' in the management literature

The idea of organizational defensive patterns – single-loop learning and the incapability to engage in double-loop learning – as barriers to learning, was first introduced by [Argyris \(1977, 1994, 2002\)](#) in the 1970s and *were widely cited*. It has become the basis of the prescriptive studies of the LO concept ([Tsang 1997](#)), which flourished in the 1990s, with countless publications and workshops related to Senge's work ([1990, Kofman – Senge 1993](#)) discussing systems dynamics and leadership issues of learning. Their work has inspired an even more practical discussion, as both researchers and large companies have become interested in tools and activities that accelerates OL. Experiential learning ([Kolb 1984](#)) has



become a key factor of the LO, emphasized by, for example, Garvin et al. (2008), who stated that each company must become a LO in order to build the basis for long-term future competitiveness. A more recent behavioral approach is interpreting OL as a result of cultural socialization processes (Schein 1994), that is based on deep self-reflection *communities of practice* (Brown – Duguid 1991). The authors believe that effective OL is even more important these days in a quickly changing international market environment of innovative, knowledge-intensive industries and postmodern organizations such as tech startups and enterprises. The literature discussed above though focuses mainly on well-structured corporate organizations. In the following, two impactful models for the LO concept are described briefly.

Senge's (1990) holistic, systematic approach interprets learning as a continuous, never-ending practice, and OL as the capability of an organization for continuous renewal. The process is more important than the goal itself. Hence, there is no such thing as a LO, but a continuous and dedicated endeavor to become a better version of ourselves and to unleash our creative capabilities, to reach a common vision (Kofman – Senge 1993). To do so, Senge (1990) suggested the five disciplines or *component technologies* that differentiate the LO from other organizations: 1) *personal mastery* (ambition, vision), 2) bringing our *mental models* (thinking logic, beliefs) to surface in cooperation, 3) building a *shared vision*, 4) *team learning (dialogue)*, and 5) *systems thinking* (the '*fifth discipline*', which combines and integrates the other four, meaning that we cannot learn from our experiences in their entirety, due to the prevalence of delayed causal relationships; therefore the world cannot be described by models).

A significant part of the learning literature is focused on experiential learning (Kolb 1984), and emphasizes learning from failure (Cannon – Edmondson 2005; Garvin et al. 2008; Edmondson 2011; Gino – Pisano 2011). However, the fear of failure has already appeared in Argyris' (1977) work, as seen above. According to theory, failure and mistakes are great opportunities to learn from – but one that leaders typically do not take advantage of, often only learning from success. Garvin's (1993, 2008) 'building blocks' of a LO are a more KM-based, practical model that suggests that the structures and systems of the LO can be established by leaders' dedicated work in involving members and creating a medium of trust, which contrasts with Senge's (1990) thoughts described above. He states that knowledge is information-based, can and should be observed and measured. Garvin's (1993) five building blocks are 1) *systematic problem solving*, 2) *experimentation*, 3) *learning from past experiences*, 4) *learning from others (best practice)*, and 5) *transferring knowledge*. The building blocks should be built on the behavioral, values-, skills- and systems-levels.

2.3. Theoretical framework: organizational learning in startups – the 'start-up learning'

This paper proposes a theoretical framework focusing on start-up learning and adaptive capabilities, that can be built into entrepreneurship education research. To determine these capabilities in education programs, this framework is based on the systematic literature review of empirical studies published between 2010 and 2020 discussing innovative, knowledge-intensive technology startups from the perspective of OL theory. The systematic literature review was conducted between 2019 and 2020. The EBSCO database was used to find academic journal articles with the following search terms and conditions: (*SU (startup or start-up or start up or*



startups or start-ups or entrepreneurship or new venture) AND SU (organizational learning or learning organization); Limiters – Full Text, Academic Journals, Published Date: 2010–2020). After reading all the abstracts, the ones relevant to the topic were chosen from approximately 600 records. Based on the review of the chosen studies, five pillars of ‘start-up learning’ were identified which scholars found as important factors for determining startups’ organizational learning patterns: *ambidextrous entrepreneurial learning, business model development, failure and experiential learning, benchmarking and learning from others, agile product development*. Table 1 presents the five identified pillars, the reviewed studies discussing each pillar, the authors’ contribution to the framework (inquired phenomena, used terms, important findings), the authors’ subjective understanding and analysis of the organizational levels touched on by the studies and thus, the levels where each study conducted research and presented results (*behavior, values, skills and systems levels*, as Garvin (1993) suggested). In the following, the detailed results are presented, and the main findings of the literature review are highlighted, to set the theoretical framework for empirical research.

2.3.1. Entrepreneurial learning – the role of founders’ personal learning style in start-up learning. Startup’s OL can be approached from the perspective of the entrepreneur himself. *Entrepreneurial learning* is mostly defined as the capability (and development of the capability) to recognize and react to opportunities, as a social interaction to govern and organize new enterprises, and as a cognitive experiential process that uses the entrepreneur’s knowledge (Krishna 2018). According to Secundo et al. (2017), enterprises need special capacities and a relevant attitude, on both organizational and individual levels (the capability to wisely choose form experimentation or exploitation leadership style, and experiential-contextual, or intuitive-sensing learning styles), in order to develop new ideas, technologies and business models, and to create social and economic value; therefore, continuous learning is the basis for strategic renewal. According to Brockman (2013), in different stages of the startup lifecycle, different learning styles are expedient. Gemmel (2017) also identified different learning styles of knowledge-intensive enterprises that are related to successful entrepreneurial practice, and emphasizes that *active experimentation* leads to key entrepreneurial innovations and higher performance, more significantly than *reflective observation*. Krishna (2018) showed that a *startups’ survival rate* is significantly and positively influenced by an *entrepreneur’s earlier startup experience, explorative knowledge-transformation style, a decision-making style based on causation, and the ability to attract investors*, while *industry experience* has moderate effect on survival.

2.3.2. Business model development as a communication and vision-setting tool. Some studies draw attention to the learning advantages of *framing business models*. Business model frameworks serve process optimization, alignment of vision and business operations. Havemo (2019) states that each business has a business model, even if they do not care, and that researchers mostly deal with these models on a theoretical level, but only a few studies approach them as a practical communication tool. Communicating our business models to market experts and investors, however, not only frames internal value creation along with the search for customer values, but also, has an *identity-creating* role: it helps to formulate a shared vision (as Senge (1990) also suggested), to determine the path to success, and to reflect on identity. Also, a business model framework can serve as a tool for benchmarking and learning from similar,



Table 1. The 'start-up learning' framework

The 'start-up learning' framework: five pillars of startups' important organizational learning patterns based on literature review						
ambidexterity and entrepreneurial learning	Theory background of	ambidexterity and entrepreneurial learning	behavior	values	skills	systems
	Brockman 2013	START-UP STAGE: KWs: vigilant entrepreneurial attention individual, intuitive, double-loop action learning	x	x	x	
		EARLY STAGE: KWs: absorption and transformative capacity, strategic learning, exploration and exploitation balance behavioral learning, routine, grounding practice at a strategic level	x	x	x	
		GROWTH STAGE: KW: careful interactions conscious institutionalization of learning processes	x	x		x
	Secundo et al. 2017	explorative learning style	x	x	x	
		exploitative learning style	x	x	x	
		intuitive and sensing learning style	x	x	x	
	Gemmel 2017 (Kolb 1984)	active experimental learning style	x	x	x	
	Krishna 2018	explorative knowledge transformation style	x	x	x	
		decision-making based on causal relationships	x	x	x	
Zahra et al. 2018	intermediate level of political conflicts and decentralization	x	x		x	
business model development	Theory background of	business model development	behavior	values	skills	systems
	Havemo 2019	tool communicating business strategy	x	x		
		tool communicating shared identity	x	x		
	König et al. 2019	tool framing an iterative learning mindset - LSM (Lean Startup Manifesto)	x	x		

(continued)



Table 1. Continued

experiential learning – learning from failure	Theory background of	experiential learning – failure	behavior	values	skills	systems
	Secundo et al. 2017	experiential and contextual learning style	x			
Krishna 2018	earlier entrepreneurial experience				x	
Zahra et al. 2018	international experiences of entrepreneurs				x	
Bruneel et al. 2010	leadership team's former international experience				x	
	organizational level experiential learning	x				x
Midler & Silberzahn 2008	multi-project management (linear/parallel)	x	x			
Amankwah-Amoah et al. 2018	after failure: drawing lessons and consequences, learning from downfall	x	x			
	funding a new business – heritage institutionalization of experiences in the new venture	x	x			
Rauter et al. 2018	interpreting downfall and negative feedback as a success, a positive, learning opportunity – embracing mistakes	x	x			
	high reflexivity: reflective ability, continuous rethinking of goals and strategies, questioning, critical attitude	x	x	x		
benchmarking – learning from others, outer sources of learning	Theory background of	benchmarking – learning from others, outer sources of learning	behavior	values	skills	systems
	Havemo 2019 König et al. 2019	business model as an iterative benchmarking (market analysis) tool (based on scientific methods)	x			
	Zahra et al. 2018	commitment to strategic relationships and networking	x	x		

(continued)



Table 1. Continued

	Bruneel et al. 2010	learning from key partners (customers, suppliers, investors)	x			
	Marmer et al. 2012	learning from best practices	x	x		
		learning from customer and user feedback and data	x	x		
		attention to feedback and acting accordingly	x			
	Perez et al. 2013	value co-creation with customers	x			
		B2B partnerships: shared decision making, teamwork, openness, institutionalized dedication, professionals	x	x		
	Secundo et al. 2017	(PSNW - Professional Social Networking Websites) knowledge sharing and learning	x			x
		startup contests have a role in strengthening entrepreneurial processes	x	x		
		entrepreneurial practice in education	x			
		start-up eco-systems (e.g., Silicon Valley)	x	x		x
	Jeske - Axtell 2016	international e-internships	x			
agile approach	Theory background of	agile product development	behavior	values	skills	systems
	Anderson et al. 2017 Björk et al. 2013 Olsson et al. 2012 Yaman et al. 2017	agile product development methods	x			x
		agile measurement processes	x	x		
		experimentation	x			x
		real-time feedback	x			

(continued)



Table 1. Continued

Ries 2012 Bosch 2012 Fannoun & Kerins 2019 Fagerholm et al. 2017	mistakes, downfalls and failure are a must, learning from mistakes	x	x		
	retrospective	x			x
	systematic problem-solving	x	x		x
	systems supporting double-loop learning				x
	MVP/MVF – Minimum Viable Product/Feature approach		x		x
	MVP testing and data gathering	x	x		
	data-driven decision support	x	x		
	an organizational structure that is supporting explorative culture:	x			x
	Lean Startup approach – BML (build-measure-learn) logic	x			x
	Innovation Experimental Systems (IES) – hypothesis building through business goals, user “pains”, quantitative hypothesis testing	x			x
	SCRUM – transparency, investigation, and adaptation	x			x
	Early-Stage Software Startup Development (ESSSD)	x			x
	RIGHT model	x			x
	Hypothesis Experiment Data-Driven Development (HYPEX) model	x			x
Qualitative/Quantitative Customer-Driven Development (QCD)	x			x	

Source: authors, based on systematic literature review of the studies cited in the Table.



successful business models in the industry (as Garvin (1993) suggested). König et al. (2019) formulate similar consequences, stating that using business model frameworks, such as the *Business Model Canvas* of the *Lean Startup Manifesto*, for transforming ideas to working business models, leads to OL, because one recognizes market needs and analyzes the market environment in a structured, scientific process, and therefore, gains a knowledge-based competitive advantage.

2.3.3. Learning from experiences – the role of failure in startups’ learning. Unsurprisingly, a significant number of studies deal with experiential learning, emphasizing the famous ‘Fail fast!’ principle of the startup world, that of course originates from the bedrocks of OL theory laid by Kolb (1984), Argyris (1977) and Garvin (1993) and others. Midler and Silberzahn (2008) introduce the learning advantages of different multi-project management business models that build on experiential learning from a wide project portfolio. They found that a vertical multi-project management business model (one project after another, continuous iteration leading to sustainability) is one of the most important sources of long-term innovation and renewability. Amankwah-Amoah et al. (2018) emphasize the role of early-stage failure in learning, through the stages of failure. Rauter et al. (2018) observed the relationship between the behavior of learning from setbacks (deviations from desired and expected results) and learning effectiveness, in the context of a startup team-contest; they concluded that setbacks’ effect on team learning effectiveness depends on the team’s reflexivity, emotional reaction to setbacks, and cognitive perception of the setback. The researchers found that positive cognitive perception (interpreting setback as a learning opportunity) leads to better team learning, regardless of reflexivity; whereas, the effect of emotional reactions is moderated by self-reflective capabilities. Continuously questioning and rethinking strategies is a critical attitude leading to better team learning (double-loop learning).

2.3.4. Learning from external sources – the role of benchmarking in start-up learning. In the start-up learning literature, there is a large emphasis on *learning from others* (Garvin’s (1993) 4th building block), but from a wider perspective: sources of learning that are outside the organization. Zahra et al. (2018) states that when an enterprise enters an international market, the exploitability of then learning advantages of newness (LAN) is influenced by social position and social network (besides other factors). Many other studies find that customers, partners, mentors, experts, and other industry actors are important sources of learning from others. The Startup Genome Project showed that startups supported by mentors (experienced leaders), those using effective measurement tools, learning from best practices, and learning from user feedback, receive several times higher investments, while others fail more frequently (Marmer et al. 2012). Perez et al. (2013) researched *B2B alliances* between small tech startups and market leaders, and the *value-creation involving customers*. They state that there are four dimensions of these *learning alliances*: *learning about customers*, the *level of interaction*, *customer-specific investments*, and *common innovations*, developed together with customers, in order to better satisfy consumer needs. In this cooperation, *teamwork*, *common decision-making*, *institutionalization of openness and dedication*, and *experts* involved in communication seem to be the keys of success. Secundo et al. (2017) draw attention to *knowledge sharing through Professional Social Networking Websites (PSNWs)*, *startup contests*, and the positive effect of *entrepreneurial eco-systems* on learning (e.g. Silicon-Valley’s tech start-up culture), recognizing that knowledge-



sharing ‘platforms’ are quite specific to tech startups, compared to the traditional corporate world’s business-secret attitude. [Bruneel et al. \(2010\)](#) showed that in international expenditure, knowledge and capabilities acquired from key partners can balance the lack of experience in the early stage.

2.3.5. Customer-oriented agile product development frameworks – the role of testing and experimentation in start-up learning. Today’s start-up and software-development culture practice is strongly learning-focused, using frameworks that put the user feedback at the center, with continuous experimentation. This mindset is essential, as these enterprises operate in dynamic, uncertain market environments, where customer demands are changing quickly, resulting in high risk, especially related to the market-product fit. This is the challenge that agile product-development frameworks, that have become popular in the last two decades in software development and start-up culture, offer solutions to, building largely on OL theory’s basic concepts: experimentation and the essential learning opportunity of mistakes and failure ([Anderson et al. 2017](#)). Various lean and agile product-development frameworks include *short development periods*, *build-measure-learn* (BML) logic, *immediate user feedback*, *testing ideas and products*, *data gathering*, *scientific data-analysis*, and the MVP/MVF (minimum viable product/feature) approach. [Krishna \(2018\)](#) draws attention to learning motives such as the explorative learning style and seeking causal relationships, also emphasized by [Yaman et al. \(2017\)](#), as a basic mindset of product-development frameworks. Agile motives align with [Garvin’s \(1993\)](#) KM-based building blocks (systematic problem-solving, experiential learning, scientific measurement-methods, learning from others).

Our most important and critical insight from the literature review is that based on the framework, behavioral aspects are overrepresented in the field of startups’ OL research. Many time, values are connected to each pillar, but skills and systems supporting OL capabilities are missing from most of the reviewed studies. Entrepreneurial learning studies are the most skill-oriented, while the agile approach is the one discussing mostly systems. One possible reason is that behaviors must be supported by entrepreneurial skills and organizational systems, but behavior is also the one variable found to be observable by scholars. The empirical findings of this paper will help understand the usability of the framework.

3. RESEARCH QUESTION

The theoretical framework proposed five pillars of organizational learning patterns and adaptive entrepreneurial skillset of knowledge-intensive technology startups. These pillars, therefore should be considered in order to design competitive entrepreneurial higher education programs. By understanding the practical need for strong entrepreneurship education, which the *Danube Cup Conference 2022 Quo vadis entrepreneurship education* ([Vinogradova – Novac 2022](#); [Beke et al. 2022](#); [Deutsch et al. 2022](#); [Halmosi et al. 2022](#); [Dömötör et al. 2022](#)), has also addressed, and by identifying possible research gaps, the following research question (RQ) has been developed.

RQ: *How is the improvement of skills and capabilities needed for developing an adaptive and successful startup by organizational learning – proposed by the ‘start-up learning’ framework – integrated in top Central-European higher management education curricula?*



4. RESEARCH METHODOLOGY

The RQ aims to explore *whether or on what level, improvement of ‘start-up learning’ skills and capabilities for developing an adaptive and successful startup, as ‘learning organizations’ are integrated in top Central-European higher management education curricula*. The theoretical framework consisting of the five pillars of ‘start-up learning’, introduced in Section 2.2, serves also as a pair of lenses, through which one can examine a startup as an LO. We suggest that education should support students in developing these skills and capabilities in order to manage successful enterprises. It was examined whether these skills and capabilities (suggested by each pillar) are transferred to students on different levels of management education: behavior, values, skills, and systems, as Garvin (1993, 2008) suggested, the same way as literature was interpreted. In this way, the empirical research and the results of the literature review contributed consistently to qualitative data gathering techniques (providing the structure of the interview questions) and data analysis (coding) as well. For empirical research, a qualitative approach has been chosen, so that the researchers are able to gain a deeper understanding of how the learning capabilities are integrated in educational programs.

A Hungarian higher education institution, a university was chosen, which we believe plays an important role in Central-European education. Sampling was conducted in one institution, that is listed in the top 100 in Financial Times European Masters in Management ranking (Financial Times 2021), and mentioned among the best in many management areas. Also, the chosen institution participated in startup contests, such as the Danube Cup and Proof of Concept; hackathons; incubation programs, such as the HSUP; and also actively participated in the Danube Cup Conference, which has inspired the research. The university in question, has three different management-related MSc programs, that were included in the study: Leadership and Management MSc, Marketing Management MSc and Entrepreneurship Development MSc, and one executive management MBA program, however the managers of this latter unfortunately declined to be involved in the study.

Five qualitative, semi-structured in-depth expert interviews were conducted, with six professors (one of the interviews was conducted with two interviewees), who are all participants in the university’s start-up eco-system and involved in one of the three MSc programs above. In sampling, it was determined that these professors are experts of the research field in two ways: first, they are in some way connected to startups, theory and practice, and to the university’s start-up eco-system; second, they are concerned about the development of one of the above MSc programs, either from their position in the institutional structure, or from their educational role. We have contacted 12 experts in the chosen institution, six of which have replied positively to the inquiry, with the condition that their anonymity is maintained. Understanding the limits of the interview sample, the perspective of the three MSc programs, as a whole, we have decided to conduct additional document analysis of the MSc programs’ major development reports, program curriculums, and a few courses’ syllabuses (5). Each interview lasted between 50 and 90 min.

It is notable, that the choice of methodological approach fits well with the observed phenomena’s philosophy of experiential learning (that Kolb (1984) and Garvin (1993) suggested), as experts were asked to talk about their experiences, interpret and evaluate them from the perspective of the framework. In the semi-structured interviews, the questions



started with (1) a quick overview of the university's attitude to start-up culture, based on their experience. In the second group of questions, first (2a), the interviewer showed the 5 pillars of the framework, then asked the experts to brainstorm what factors could be important in terms of managing a successful start-up, based on their professional experience. Second (2b), the interviewer showed them the results of the literature review (Table 1), then (2c) asked whether or on what level their program prepares students with the capabilities related to each pillar. Also, they were asked to give a few practical examples of both good and bad practices, based on their experience. Finally (3), they were asked to speak about what they see as development opportunities in their programs and in the institution as a whole. We have transcribed the interviews and analyzed the available documents by coding them through the framework provided by the results of the literature review (theoretical framework).

5. RESULTS

Four main results of the analysis have been identified; correspondingly, these results are introduced in the following chapters.

1. insights of the university's start-up eco-system,
2. experts' practical understanding of the different pillars and also some areas less covered by the previously analyzed articles,
3. the answer to the question of how practically and on what level the improvement of capabilities for developing an adaptive and successful start-up as 'learning organizations' are integrated in top Hungarian higher management education curricula,
4. recommendations for program development.

5.1. Insights of Hungarian start-up eco-system in educational context

In order to check and explore the integration of 'start-up learning' skills and capabilities in entrepreneurship education programs, one should first understand the start-up eco-system of the studied university. Based on the analysis of the interviews, a few interesting insights have been found about the start-up eco-system, in which the research has been conducted. Interviewees were asked to recall situations and examples spontaneously, where start-up culture can be captured related to the university. 'Hard' aspects of start-up management (investment, finance) have become important, supported by university leaders, while educators find it hard to integrate soft aspects of entrepreneurial leadership into their courses. According to one of the experts, "*start-up is rather a trendy topic*". However, start-up values and mindset are indisputably present in the education and in the eco-system of the institution. Many startup contests and conferences are organized by the university. Many educators and students are involved in the university's incubation programs and scholarships related to start-up activity, while surrounded by investors, mentors, and great connections. However, this 'eco-system' is quite fragmented. Start-up and innovation-related departments and actors are operating island-like, without clear process flows and clear information of each other. Money, experts, and entrepreneurial intention are available, but they do not communicate with each other.



5.2. Adding a practical layer to the theoretical framework

First, the interviewed practical experts' interpretations of the theoretical framework's five pillars were collected. We believe that this practical aspect is adding value to theory, by bringing theoretical principles into life. Table 2 shows that the practical experience is more pragmatic. The terms used are slightly different from academic phrases found in the reviewed studies. Compared to the theoretical framework, in terms of *ambidextrous entrepreneurial learning*, general entrepreneurial skills were emphasized. As for *business models*, the ability to change business models and critical thinking towards models were mentioned. Experts' interpretations of *failure culture and experiential learning* fitted well into the theoretical model. In terms of *benchmarking and learning from others*, openness to learning was more emphasized in the answers than outer sources of learning, the later having been researched by many studies. Based

Table 2. Summary of the 'start-up learning' pillars' integration in management MSc programs (based on answers to interview question 2c and document analysis)

	University's start-up eco-system	Leadership and Management MSc	Marketing MSc	Entrepreneurship Development MSc
ambidextrous entrepreneurial learning	moderate support of students in acquiring entrepreneurial learning skills	moderate support of students in acquiring entrepreneurial learning skills	moderate support of students in acquiring entrepreneurial learning skills	moderate support of students in acquiring entrepreneurial learning skills
business model development	moderate support of students in business model development	moderate support of students in business model development	weak support of students in business model development	moderate support of students in business model development
experiential learning – learning from failure	weak support of students in experiential learning and learning from failure	weak support of students in experiential learning and learning from failure	weak support of students in experiential learning and learning from failure	weak support of students in experiential learning and learning from failure
learning from others, benchmarking, outer sources of learning	moderate support of students in acquiring entrepreneurial learning skills	strong support of students in acquiring entrepreneurial learning skills	strong support of students in acquiring entrepreneurial learning skills	moderate support of students in acquiring entrepreneurial learning skills
agile approach	moderate support of students in acquiring an agile mindset	moderate support of students in acquiring an agile mindset	moderate support of students in acquiring an agile mindset	weak support of students in acquiring an agile mindset

Source: author, based on expert interviews and curricula.



on the findings, experts and educators have a very different understanding of agility and agile product development frameworks.

5.3. Start-up learning capabilities in higher management education programs

The third output of the empirical research is the findings that answer the research question, based on the analysis of expert interview transcripts and documents of MSc programs. These findings are presented by going through the five pillars of the ‘start-up learning’ framework that was used for coding textual data, while the three MSc programs examined were evaluated and compared. A fourth category was added: findings of the whole university as a context of education. This analytical logic is followed by Table 2, that presents a summary of the most important findings in a matrix, evaluating the five pillars’ integration (rows) in the different programs (*Leadership and Management – LM*, *Marketing – MM*, *Entrepreneurial Development – ED*) and the university’s educational context as a whole (columns). Inside the matrix, the level of integration is indicated: how strongly the different MSc programs support students in acquiring the learning capabilities of successful entrepreneurship, suggested by the framework, evaluated on three levels, *strong*, *moderate* or *weak* support.

5.3.1. Entrepreneurial learning and ambidexterity

As for the university as a whole, experts have experienced, students develop stronger presentation skills than in other universities, self-confidence, language skills; furthermore, students learn business ethics during their studies and engage in extra-curricular and work activities with startup-related knowledge. On the other hand, the lack of process- and systems thinking is a weakness, validation processes, and up-to-date frameworks are not taught, and entrepreneurship-related legal knowledge is missing. Knowledge is rather scattered in the curriculum, and in different course activities, but not linked in students’ thinking, which makes developing entrepreneurial learning capabilities difficult.

For the LM and MM programs, which position themselves as education programs preparing exclusively corporate leaders and managers, start-up learning is a value that corporations can gain from start-up culture. Educators have accepted that students should be prepared with an ambidextrous entrepreneurial learning and decision-making style and mindset, regardless of future career. ‘*Critical thinking, self-confidence, self-reflective attitude, great problem-solving skills, causal decision-making and teamwork are great strengths of the program on all modules (specializations) of the LM program*’ (interviewee). These capabilities are explicitly integrated in educational materials, like projects and case studies, and in learning outcomes specified in the skill-based major development report. The MM program has become strongly market oriented in the last few years. Students can implement pragmatism and attention to the market, and many projects encourage creative thinking (outside the box). The LM and MM programs’ weakness, from an entrepreneurial learning perspective, is that negotiation techniques, digital skills, SME examples, and English language courses are not emphasized. Intuitive, situational awareness, encouragement of identity, creativity and intuition, expression of emotions etc. are missing from the programs’ mindset, unlike in start-ups’ mindsets.

‘*The Entrepreneurship Development Institute has pinned startups to its mast in the last half year*’ (interviewee). The ED program is the one that should support entrepreneurial learning,



preparing entrepreneurs. Hard skills, like finance and investment are strongly supported by the curriculum, educational materials and tasks. Students are prepared well with business planning, financial planning, analytical skills, and complex, detailed thinking. Innovation management, strategic approach, and design thinking are present in student activities. Educational materials are globally focused and market-oriented, and students study project management from this perspective. However, practical market research skills and validation practice knowledge are not strong, but rather passive. Although digital entrepreneurship development has been trending for some time, the program lacks practical digital innovation skills and tools.

5.3.2. Business model development

Student members of the observed start-up eco-system *‘[...] are good with business models and one-pagers, good in selling themselves but we still experience that outdated models and frameworks appear in the vast majority of diploma theses’* (interviewee). The LM program’s process-management module (specialization) explicitly discusses business model frameworks; but more robust and practical models can be found in educational literature. In the MM program and in the curriculum of all LM modules there are project courses (e.g., with innovation HUB), where students can gain practical experience of different business models being interpreted more loosely than theory suggests. LM students gain a strong capability of adapting business models with criticism; and business modelling is a strong learning outcome of the program. The interpretation and meaning of business models, in the MM MSc, is different than an entrepreneurial mindset: *‘for a large company’s marketing leader, the business model is a values system, a given context, that one has to function in, one has to bring the marketing mindset to, solve problems with the tools of marketing, but one doesn’t formulate it, doesn’t change it’* (interviewee). The program’s strength is that students can work on sustainability projects and learn about different business models and logic: sustainable equilibrium is a value. In the LM program, well-known modelling frameworks are present in courses, some analytic activities are conducted on business models, but rather from a theoretical perspective than from a practical one. LM students do not have the opportunity to gain experience in building practical, working business models.

5.3.3. Experiential learning and learning from failure

At the observed university and from what MSc program experts have experienced, it is recognized that the whole performance evaluation system and the culture are strongly success oriented, preventing students from experimenting freely. *‘We always talk about successful startups, which is not lifelike – we invite guest lecturers, but there are no examples, stories of failure and downfalls, no one would tell these’* (interviewee). Although students work with educational case studies, *‘there are only a few case studies discussing failures, some emphasizing the role of downfalls behind success stories, but only a few’* (interviewee). The reasons for that probably lay deep in the national-cultural roots of the Hungarian education and entrepreneurial mindset. However, educators express the strong need for a different mindset in experiential learning in education: *‘We never discuss a company’s failure. But it would be great. [...] Many times, we try to say: do not feel it as a failure, but a downfall that you can learn from!’*(interviewee). According to the mentor expert interviewees, student entrepreneurs in the start-up eco-system typically lack time and persistence.



Despite the weaknesses in teaching students to fail, some great examples of encouraging experiential learning in the LM and MM MSc programs have been found. One strong pillar of these programs are project courses. Students work together with corporate leaders, SMEs or social enterprises from different industries on projects where ‘students have to wear the entrepreneur’s shoes’ (interviewee), while gaining practical experience from a business context. These projects help students to develop other soft skills as well. *‘Self-reflection tasks in project works support reflexivity very well’* (interviewee). The Organizational Development module of LM program, for example, is quite strong in developing a self-reflective attitude with team- and individual reflection tasks and project-closing discussions that, as shown in section 2.2.3, have a positive effect on the effectiveness of learning from failure and on performance. A few courses of the MM MSc encourage out-of-the-comfort-zone situations that form values and attitude strongly, and improve creativity, e. g. non-defined outputs, instead of well framed tasks. In these projects *‘students can experience mini-failures, leading to success in the end’* (interviewee). Experts influenced by the LD program, however, emphasized students’ fear of failure and belief that there is no possibility to make mistakes or fail during their education. Based on document analysis, there is no explicit project course in the curriculum of this program where students could try making modest mistakes.

5.3.4. Learning from others and benchmarking

A variety of opportunities are available for students to learn from different experts, mentors and business practitioners, through guest lectures in courses, case studies, scholarships, fintech cooperation, networking events, case-solving contests, extracurricular activities etc. It is found that a benchmarking mindset and analytical tools needed for that are great learning outcomes of all three MSc programs, built into the system in many aspects. It is not only true for the education itself; for example, the LM major development process itself was based on international benchmarking, and research among alumni and recruiting companies.

In preparing students for benchmarking in practice, the LM and MM MSc programs are found to be stronger than the LD program. The LM program also provides analytical tools and mindset. *‘Management is all about benchmarking! Benchmarking is crucial and evident in problem-solving (no need to name it), benchmarking tasks on courses, benchmarking logic etc... It is evident for students seeking for patterns. In management it is a very important practice and mindset in formulating processes’* (interviewee). Interactive forms of education support practical knowledge-sharing (between academia, practicing experts, and students typically with work experience) and learning from each other. The MM program provides even broader opportunities by organizing occasional interdisciplinary, inter-major, inter-institutional projects (with an applied arts university, for example) for students. Learning from outside the organization is also a value. Co-creation and participation topics are strongly and explicitly present in educational curricula and materials of marketing and communication. By discussing these topics, educators would like to show the advantages of an organization’s openness to the market, by which, learning from others, is encouraged. *‘It’s actually always about benchmarking! We should instead look in ourselves and into our systems sometimes, to see what strengths there are, which ability startups have’, according to one interviewee.*

Openness to sectoral, regional, international, and European values, attention to context, market and environmental changes are some of the ED program’s strong learning outcomes as



well. However, educators find it difficult to build the quickly changing benchmarks into the educational materials: *'Formalization of benchmarking practices is hard in education. The latest trends cannot be taught in education because they change quicker than education can adapt them (e.g. crypto) – education does not follow the trends'* (interviewee).

5.3.5. Agile approach

Agility is understood differently by experts of different institutes within the institution. *'[In the LM program], agility as a topic is reaching students from many aspects. We are trying to find out what it means and how it changes organizations' lives. Critical mindset is very important in all courses, and students take up this approach quite quickly. Organizational theory and behavior courses play a key role in this: questioning the given, knowing that different opinions, opposing solutions can be good from different perspectives'* (interviewee). The LM program takes agility strongly into consideration, in course materials and in educational processes as well. Students are exposed to many examples from IT sector agile product development, in the form of case studies that guest lecturers bring in. However, there are fewer agile examples from non-IT companies. A great example of this mindset is that of a customer-demand based, market-oriented major development process that was finished in the last few years with the flexibility to adapt consciously and change models. One of the MM program's strengths is that open and closed problem-solving situations are both present in student activities. Objectivization, immediate and value-based feedbacks and reflection on mistakes, retrospective discussions and 360° feedbacks are also used in class. *'In our university, agility, agile operation can appear in small groups' project level works, but it is hard to broaden it up to the whole system's level. We believe that we are agile but in marketing this expression is not strongly present. But on the Marketing Institute's level, there is some experimentation with courses that strengthen the agile mindset of students (e.g., identity planning and design communication courses: developing something from zero, all conflicts handled by students, self-reflection needed, building their own operating systems)'* (interviewee). As for the ED MSc program, analytic entrepreneurial behavior and innovation processes appear in the curriculum from time to time, that bring in a new, agile mindset (market analysis, customer-focus, digitalization), but this is still a great challenge for the program. Despite the good examples found, other important aspects of agility, namely, learning from failure and continuous testing is not supported by these three management programs, and BML logic is not given enough emphasis.

5.4. Space for improvement in educational practice

Based on the analysis, our conclusion is that many aspects of the initially presented learning pillars are integrated in the observed management education programs, but on different levels. One can see that these *values* are strongly proposed by educators, as they appear as *skills* (learning outcomes) gained through the program, and occasionally they are supported by *behavioral* activities as well. But educational institutional *systems* only moderately support students in acquiring capabilities needed for successful entrepreneurship. Based on the findings and experts' suggestions, our recommendations that are presented could enhance learning-based improvement of educational programs of the institution. First, and most importantly, we suggest embracing mistakes, and giving the opportunity to experiment freely, learning from failure in the education programs by providing more entrepreneurial project works where students can



experience and discuss mini-failures, and improve their creativity and self-reflection capabilities. Writing case studies and inviting guest lecturers who discuss downfalls would also provide opportunity for improvement. These changes assume a switch in educators' global mindset from 'teaching about entrepreneurship', to an *action learning* mindset of 'teaching with entrepreneurship'. Second, we recommend encouraging entrepreneurship activity within the curriculum, because we've found that extra-curricular activities don't have that much effect and the attention they get is not enough. A progressive idea that came from the LM program, suggests that a portfolio-based credit-system, or a thesis procedure could be implemented, where entrepreneurial activity counts in the performance of students. This assumes a switch in the performance evaluation system. Third, MSc programs are quite closed, so opening up on a systems level for better learning outcomes would be needed, by strengthening international, inter-disciplinary, inter-major and inter-module cooperation. Fourth, more focus on the ED MSc program development would be expedient, because, unlike corporate-focused management programs, ED has the space and capability for further development that would align to the international standards and quality of start-up and entrepreneurship education. Finally, we suggest strengthening the information flow and connection between members of the entrepreneurial eco-system of the institution, by linking all start-up related organizations, groups and actors around the institution, with a single point of contact or common platform.

6. CONCLUSIONS AND FURTHER RESEARCH

After understanding the practical need for strong entrepreneurship education in Central-Europe, and by identifying possible research gaps, an RQ targeting the organizational learning patterns of knowledge-intensive startups, and the integration of these patterns into management MSc education were developed. The paper introduced the 'start-up learning' framework, consisting of successful start-up learning practices introduced as the five pillars of 'start-up learning'. Empirical research investigated the presence of these pillars and capabilities in management MSc programs of a top Hungarian business school through in-depth expert interviews with program managers, and brief additional document analysis of programs. As a result, trends, strengths and gaps of the management education programs were identified, from the perspective of improving the necessary skills and knowledge for the development of successful startups, OL, and adaptive capabilities. This paper's most important finding is that the studied management education programs strongly prepare students with benchmarking skills, but on the other hand, the culture and experience of failure and the capability of learning from failure are missing from these programs. Surprisingly, the study found that corporate-focused management MSc programs perform better in some aspects of 'start-up learning' capabilities identified in the theoretical framework, than the Entrepreneurial Development MSc program. This conclusion proves the relevance of the need for stronger cooperation between the affected institutes and educators. As a practical implication, the study was closed with recommendations for improving entrepreneurship education programs and the supporting start-up eco-system. Our key message is the idea of *teaching with entrepreneurship*' instead of *teaching about entrepreneurship*'.

We believe that this paper contributes to academic discussion by proposing a theoretical framework – the 'start-up learning' framework –, that provides values, behavioral patterns and



systems-level aspects, which can be used for question formulation in data gathering, or coding in data analysis, both in empirical research of startups as learning organizations, and research of entrepreneurial education from a learning-based perspective.

As seen in section 5.2, the pillars of the theoretical framework should be interpreted slightly differently in practical and educational contexts. As a practical implication, the framework helped us identify the possible gaps and spaces for improvement in the management MSc programs of the observed institution. The phenomena explored, related to the framework's suggestions, showed practical implications that should be given a greater emphasis in entrepreneurship education.

The findings provide guidelines and benchmarks for researchers, entrepreneurship scholars and educators, entrepreneurship students, policymakers, and practitioners to enhance entrepreneurship education development. However, further research would need to be conducted to determine the broader relevance of our findings. Furthermore, a comparison between different higher education institutions and between different national contexts of education would be purposeful, for answering the research question comprehensively. Extending the research sample with students who took part in education, as customers, would provide further value and knowledge in the field. With this study, we would like to encourage a discussion of future entrepreneurship education between scholars, students, educators, policymakers, practitioners and other actors affected by Central-Europe's entrepreneurial community.

ACKNOWLEDGEMENTS

The authors would like to thank the expert interviewees and research participants for sharing their experiences. We are also thankful for the organizers and participants of the Danube Cup Conference 2022, for inspiration and academic discussion.

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