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ACTIVATING RADICAL INNOVATION IN SMALL AND MEDIUM ENTERPRISES

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The COVID-19 pandemic made organizations around the globe aware of the urgent need for Digitalization and Digital Transformation. Small and medium enterprises (SMEs) are no exception. Business Model Innovation (BMI) might be a solution to successfully adapt to the new circumstances and cope with the effects of the pandemic, and radical innovation can give organizations a long-term competitive advantage with the potential of making them resilient to future market disruptions. This study describes the design and execution of an intervention program - part of a government funded innovation support program in Austria - to activate SMEs so they can pursue radical innovations by experimenting with reinventing their business models. The purpose of the paper is to evaluate the acceptance and effectiveness of the program. As a research strategy we followed action research to plan interventions and reflect on the observations gained from each of 3 cases in order to optimize the actions for practice. The findings show that the SMEs have difficulties thinking far away from their core business areas. With the help of external stakeholders for idea generation, prototyping and experiment design and execution, SMEs can be activated to pursue radical business model innovations and adopt an open mindset embracing risk, uncertainty and ambidexterity. This study offers important practical insights and contributes to SME strategy development.

Keywords: *Business Model, Digital Transformation, Radical Innovation, SME.*

JEL Classifications: *L20, L21, L25, L29*

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1. Introduction

Digital transformation is a concern to enterprises of all sizes and a large number of transformation projects fail (Bucy et al., 2016; Davenport & Westerman, 2018). The COVID-19 pandemic and the resulting disturbance in global value chains, made it clear that companies need to rethink their dependencies on other actors and partners, explore using digital channels, and quickly adapt to the volatile, uncertain, complex and ambiguous (in short VUCA) environment. Innovation - and especially radical business model innovation, can help companies prepare for future disruptions and make them more resilient (Breier et al., 2021; Clauss et al., 2022).

This paper describes a program for radical business model innovation designed specifically for SMEs in Austria and evaluates it using the Action Research method.

1.1. Rationale/background

The rapid evolution and adoption of digital technologies is creating a competitive pressure on companies to transform digitally and to innovate. While startups are predestined to take risks and create radical innovations as they have easy access to venture capital and have no legacy and reputation to lose,

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and established large companies have the potential resources to experiment with radical innovations internally or with the help of external consultants, startups or venture builders; SMEs are somehow stuck in the middle and struggle with keeping up in the radical innovation race. They are known to have limited financial and time resources to pursue non-core activities or initiatives such as explorative innovations (Clauss et al., 2019; Doppio et al., 2020). SMEs need to transform their business models to stay competitive in the long run, and due to their smallness, they need to collaborate with external partners. In a study about collaboration between SMEs and startups in Switzerland, SMEs emphasized the efforts needed to collaborate, mentioning the fear of losing time and money as reasons for their reduced openness to collaboration (Albats et al., 2021).

Governments spend large amounts of money to fund innovation support programs for SMEs, which are considered as the backbone of each economy, but how can these programs be designed to be effective in reaching their goal and how can they be evaluated and further optimized? This paper describes the design, execution and evaluation of a funded program for radical business model innovation developed specifically for SMEs in Austria using Action Research as a research strategy.

1.2. Scope of research

Several innovation support programs encourage the building of an ecosystem to network firms together, thus facilitating open innovation. SMEs in different regions of the world are embracing open innovation (Albats et al., 2021; Anshari & Almunawar, 2022; Doppio et al., 2020; Hossain & Kauranen, 2016) for digital transformation (e.g. Industry 4.0) or for product, process and business model innovations. In open innovation initiatives companies collaborate with other firms as well as with suppliers, customers and academic and research institutions in the external knowledge sharing process.

Digital Innovation Hub (DIH) is a regionally-focused program of the European Commission, which is part of the regional innovation systems (RIS)-3, with the purpose of facilitating regional digitalization of SMEs in Europe. DIHs in Spain were found to promote multi-actor collaborative platforms to stimulate the transition to Industry 4.0 by promoting place-based collaboration alliances specific to regional and local requirements (Hervas-Oliver et al., 2020). Analyzing Italian SMEs, Crupi et al. (2020) stress on the fact that knowledge is a key factor that supports innovations and finds that DIHs not only act as the intended knowledge brokers (KB), but also as knowledge *sources* that give rise to a digital imprinting process, which is capable of shaping the digital transformation of SMEs.

Our academic institution was a consortium partner in the regional Digital Innovation Hub - Ost (DIH-OST) in Austria focusing on enhancing the innovation capability of regional SMEs. Our ambition was to design a specific program following a *systematic* trial-and-error process to achieve effectiveness in reaching our objective and taking the special needs of the regional SMEs into consideration. We wanted to be more than intermediaries and knowledge brokers, we wanted to actively take the role of knowledge sources (participating in generating ideas and in experimentation) as well as that of *change agents* by closely working with the participants.

2. Theoretical framework

Innovation is assumed to drive firm performance, a phenomenon extensively studied in the context of different industry sectors, company sizes including SMEs, and in different countries (Andersson et al., 2020; Breier et al., 2021; Chen et al., 2017; de Visser & Faems, 2015; Garzella et al., 2021; Hoang et al., 2020; Ibarra et al., 2020; Latifi et al., 2021; Nguyen et al., 2018).

This paper focuses on a *radical* innovation approach to business model innovation and explores how this radical approach can be activated in SMEs. The literature describes business model innovation (BMI) according to Foss and Saebi (2017) along the two dimensions of novelty and scope and characterizes four types of BMIs, namely evolutionary, adaptive, focused and complex. SMEs usually follow an innovation process close to the core business and fall into the Evolutionary BMI type.

A mixed method study with 213 respectively 16 SMEs in the electronic industry from 15 different countries show that superior performance can be

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achieved when SMEs implement a *radically* new business model, characterized by reconfiguring all three components of the business model (Clauss et al., 2019).

The Disruptive Innovation Paradox by Clayton Christensen (2013) shows the resulting danger for disruptive changes. Nagle and Golden (2009) applied the five principles of innovators dilemma now also to SMEs and especially three of them were basic assumptions of the research team. Principle #1 - the customer focus and dependence of resources on customer requirements; principle #2 - the market analyses are limited to one's own narrow market segment; and principle #4 - the organization's capabilities define its disabilities by focusing the companies' activities in terms of R&D very close to the specific requirements regarding compliance and regulation of the customers.

Furthermore, our initial assumption was that Startups build new business models from scratch and pursue radical explorative innovations, so if we treat SMEs as startups, they should be able to do the same. For this reason, we followed the *lean-startup* method (Ries, 2011, 2017), a best practice approach followed by successful startups to iteratively find a business model which is viable. It is based on five principles: 1) Entrepreneurs are everywhere - and the lean startup approach can be applied to companies of any size and industry, 2) Entrepreneurship is management - meaning that a new kind of management is needed, which can cope with extreme uncertainty, 3) Validated learning - in the startup phase, learning is key and should be validated scientifically by running experiments, 4) Build-Measure-Learn - is the process for validated quick learning, iterating with building small increments of the whole to test key hypotheses and running frequently such feedback loops to decide whether to pivot or persevere, 5) Innovation accounting - a new kind of controlling and accounting focusing of short-term, leading indicators for learning and innovation.

3. Methodology

The research presented in this paper addresses an actual practical problem that can be described by the following research question:

RQ: **How can SMEs be activated to pursue radical business model innovations?**

The research problem does not call for a descriptive analysis, but for actual problem solving. Solving a problem as a part of a research endeavor implies manipulating the research object and its context. Such an approach has been described by Kurt Lewin (1946) as *action research*. Lewin suggests a systematic approach to action research consisting of four steps: (1) Plan, (2) Act, (3) Observe, (4) Reflect. The steps are repeated iteratively, enabling a better understanding of the research context and realizing an improvement in each iteration. While Lewin maintains an objective distance of the research, Kemmis et al. (2014) argue the feasibility of a *participatory action research* that not only allows a more active role for the researcher, but also acknowledges the right of the research participants (formerly "research subjects") to influence and shape the research process. Besides the actual implementation of a suitable action (intervention), the action research process also incorporates a close link to the scientific knowledge base through reflections on existing research (Maestrini et al., 2016) as well as active theory building (Friedman & Rogers, 2009).

Our purpose in this research in view of the research question was multifaceted:

- Develop a better understanding of the situation of SME in relation to radical innovation,
- Identify methods suitable for activating SME,
- Enable SME participants to apply and adapt the methods to their unique context, and
- Evaluate the *acceptance* and *effectiveness* of the designed interventions

The complexity of the research objectives, the fact that as researchers we would be actively involved in shaping the SME, as well the need to allow the SME participants to actively shape the research setting makes participatory action research (Kemmis et al., 2014) a particularly suited approach. The following describes the setup of the research project (compare best-practice suggestions for reporting action research in Smith et al., 2010).

3.1. Project

The project was initiated as a part of a larger research activity initiated by our institution aiming to better connect and support SMEs in Lower Austria. In the first action cycle, a 10-week agile

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online course on Digital Leadership was offered for SME managers (Hage et al., 2021). The course ran for three months in Spring 2021 and provided first insights into the needs of SME employees as well as SMEs themselves. The aim of the course was to provide an agile approach to learning (allowing the participants to design their own learning experience) as well as to take an experiential approach to learning.

After reflecting on the findings of this first round, we concluded that the needs of the SMEs, their manager and employees were both deeper seated and more complex than could be served in a course. The attempt at agility was positively received, but the participants did not have the background knowledge to take an active part in the course design. Furthermore, the experiential approach based on application of analytical methods to the participants' enterprises was not "real" enough. The second iteration, described in this paper, takes a bolder approach, offering individualized experiences and concrete benefits for the participants, but also demanding a greater level of immersion and commitment.

In its second iteration (the subject of this paper), the leadership program was further focused specifically on disruptive technologies and radical innovation using hands-on real-life immersion workshops. We started with a pilot project, which lasted ten months from September 2021 until June 2022 (intervention activities took place between 16. Feb. 2022 and 19. May. 2022).

3.2. Participants

Three types of participants took active part in most activities and reflections.

Program designers and researchers: In the sense of participatory action research, the research and the program design were carried out by the same group, consisting of 2 faculty members of our university and 2 researchers from the same academic institution. This allowed not only for a reflection of the full iteration (as described in this paper), but also for small changes ("tweaks") during the program period.

Trainers/Moderators/Facilitators/Change Agents: Besides the team described above, an external consultant was also a part of the team. While he did not participate in the research, he was not passively executing a teaching script, but also actively took part in designing the program as well as in the reflective activities.

SME participants. The program was designed for SME managers as well as their employees. These took active part in the program, shaping the program through their interim feedback, but also through the output of the activities.

The target group chosen were SME in Lower Austria with 50-250 employees. We purposely selected three SMEs in different industry sectors and with different business models in order to gain three distinct cases. The unit of analysis was the organization.

In order to recruit the participating SMEs, we promoted the program on a) a dedicated project page on our university's website, which was search engine optimized, b) on the DIH-OST consortium portal and c) in the newsletter of the local Chamber of Commerce of Commerce (WKO). Our selection criteria for the three firms to participate in the pilot were very clear to the applicants and included:

- Company must be located in Lower Austria (a requirement from the funding agency)
- Company Size 50-250 employees (the upper limit of 250 was a requirement from the funding agency, and the lower limit of 50 was intentionally set to increase the odds that the SME has some extra resources for non-core activities)
- Company must be incumbent and founded pre-2002, i.e. having an age >20 years (so that the innovator's dilemma applies to these SMEs (Nagle & Golden, 2009))
- Company must commit to invest the necessary human and time resources for this program over a period of 3-4 months amounting to a total of 8 workshops during 6 whole days
- The 3 firms must be active in different industry sectors (in order to take the fear of rivalry away and to encourage the firms to open up and collaborate during the joint 2 out of 8 workshops)

From four applications we selected three SMEs, who completely satisfied the inclusion criteria set and are summarized in Table 1.

SME1 is a small family-owned business active in the heating and water treatment sector with around 50 employees, located in Lower-Austria. The CEO is in his late 30's and is the son of the

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Table 1: *Participating SMEs*

Company	Industry Sector	No. of employees	Age	BM
SME1	*Heating & Water treatment*	*50*	*26y*	*B2C & B2B*
SME2	*Travel & Tourism*	*70*	*97y*	*B2C*
SME3	*Waste Management*	*125*	*90y*	*B2B*

founder, who is retired, but still has a word to say in strategic decisions. Most employees are below the age of 45. Their customers are households (B2C) as well as companies like hospitals, hotels or building management (B2B). Apart from the CEO, the head of sales and business development, an order management officer and a technical service officer participated in all workshops.

SME2 is a small family-owned business active in the travel and tourism sector with around 70 employees. The CEO is co-owner and the son-in-law of the founder. Their business model is targeting the upper age segment of people who want to travel regionally by bus for vacationing (B2C). The CEO participated in the previously mentioned iteration the authors initiated earlier aiming at enhancing the digital leadership skills and capability of SME managers (Hage et al., 2021). Apart from the CEO, the marketing manager, the operations manager (son of the CEO) and an order management officer participated in all workshops. It is to be noticed that this firm had heavily suffered from the COVID-19 crisis, having to reduce their staff and needing to receive COVID-19 financial government support. This also explains the interest of the CEO to take advantage of this subsidized program, in the hope of creating a temporary new business model (Clauss et al., 2022)

SME3 is a midsized family-owned business in the waste management sector targeting municipalities and other large businesses (B2B). With 125 employees, it was the largest company participating in the program. The CEO did not participate in any of the workshops, but assigned two managers (international sales and business development) to participate in all workshops, and would regularly receive updates on the progress. Additionally, two employees from product development and manufacturing as well as a representative of their external marketing agency participated in the exploration (ideation) and validation workshops.

The overall gender diversity of all SME participants of all 3 firms was roughly 75% male and 25% female (the choice of employees was not influenced by the researchers).

3.3. Process

An overview of the action research process - following the four steps: (1) Plan, (2) Act, (3) Observe, (4) Reflect - is shown in Figure 1.

3.3.1. Plan

In the **planning** step, we first analyzed the problem. It was important to include its practical implications as well as a sound understanding of existing research in this analysis. In order to build our own theory of change, we first conducted a literature review on the state of the research and practice about the antecedents of radical innovation in SMEs - whether enhancers or inhibitors - and then summarized the results qualitatively in an overview force field analysis table (Table 2). Force field analysis is a useful tool for problem-solving and action planning introduced by Kurt Lewin in the early fifties. It allows scholars and practitioners to diagnose a practical problem before devising an action plan in organizational change projects, leveraging on identified driving forces and reducing or mitigating identified restraining forces for maximum effectiveness (Schwering, 2003).

Driving forces

For SMEs to pursue radical innovations, an organizational climate for *psychological safety* needs to be present, meaning that teams should feel safe for interpersonal risk-taking (Andersson et al., 2020). Studies also show that an *intuitive cognitive style of the CEO* (in contrast to an analytic cognitive style) has a positive impact on CEOs' tendency towards exploration and indirectly via the mediating effect of resource allocation, positively affects radical innovation performance of Dutch SMEs (de Visser & Faems, 2015) and *Long-term managerial orientation* was found to be a key factor for the develop-

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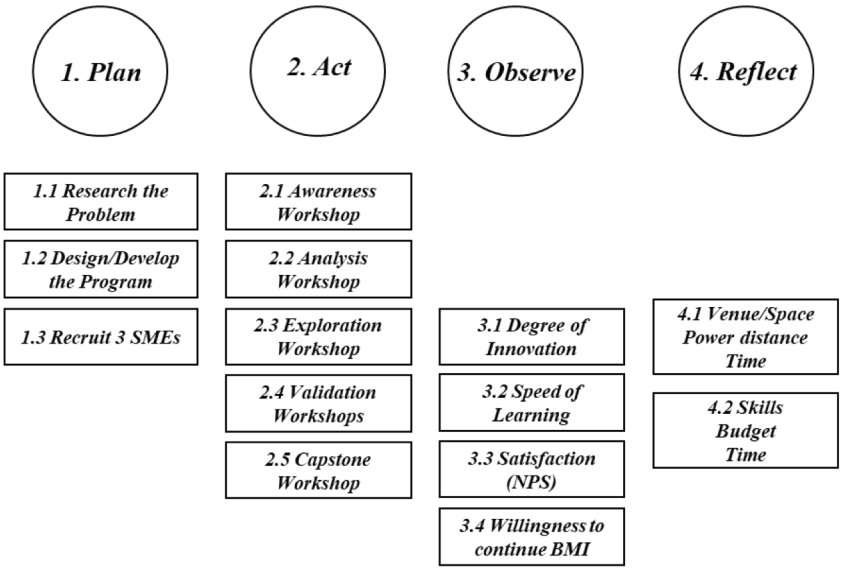

Figure 1: *Action Research Process Outline*

ment of business model innovation (BMI) in Spanish SMEs (Ibarra et al., 2020). The authors also stress that *open innovation* is a clear precondition to business model innovation in SMEs. *Free time resources* due to lower operative utilization as in the case of COVID-19 crisis was found to favor business model innovation in Austrian hospitality firms (Breier et al., 2021). A quantitative study among 132 Chinese SMEs found *government support* to be a strong driving force for high-end disruptive innovation for SMEs (Chen et al., 2017). Finally, according to Chesbrough (2010) managers require the organizational procedures and sufficient power to *carry out experiments*, as well as the capacity to act in response to the findings of those tests.

When establishing a successful BMI, some factors based on the rapidly changing environment must be examined. These include the *behavior of the company's rivals*, the outsourcing of tasks that do not directly impact a firm's success, and the development of risk-taking skills for global expansion. It is important for firms to *develop a strategy* before evolving a business model, as business models do not consider the real competition, and businesses do not exist in a vacuum (Kraus et al., 2020). An urgency to quickly adapt and change is often given by a large pressure such as financial pressure or fierce competition, triggered by an *exogenous crisis* such as COVID-19 (Breier et al., 2021; Clauss et al., 2022; Foss & Saebi, 2017).

Restraining Forces

Limited *financial* and *time resources* and *skills* to perform effective radical innovations are reported in several studies about SMEs (Doppio et al., 2020; Ibarra et al., 2020; Sandberg & Aarikka-Stenroos, 2014; Woschke et al., 2017). Although not focusing specifically on SMEs, several authors identify the *cognitive rigidity* - characterized by narrow-mindedness through excessive specialization, the inability to unlearn obsolete mental models and an intolerance to failures/mistakes - as a key inhibitor to disruptive innovation capability and a key barrier to (radical) business model innovation (Assink, 2006; Chesbrough, 2010; Sandberg & Aarikka-Stenroos, 2014). Companies are often satisfied with the successful dominant logic business (and dominant design) that they don't see any need to radically change and innovate (Assink, 2006). SMEs do not enjoy easy access to venture capital, thus limiting their ability to pursue high-risk, radical innovations (Sandberg & Aarikka-Stenroos, 2014). Chesbrough (2010) and Markides (2006) stress on the fact that a tension, a conflict of interest and a possible cannibalization between the new to the firm innovation

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and the existing business model is a key barrier to radical business model innovations.

Table 2: *Summary of antecedents influencing (radical) BM innovation (in SMEs)*

Driving force (enhancer)	**Restraining force** (inhibitor)
- Climate for psychological safety *- Intuitive cognitive style of the CEO* *- Long-term managerial orientation* *- Open innovation* *- Free time resources* *- Government support*	*- Cognitive rigidity: narrow-mindedness through specialization, inability to unlearn obsolete mental models, intolerance to failures)* *- Complacency: satisfied with successful dominant logic/design and business* *- Limited financial and time resources & skills* *- Internal tension: conflict of interest and possible cannibalization between the new to the firm innovation and the existing business model*

In order for our program (activating SMEs for radical innovation) to create a net force for the intended change in the SMEs, we wanted to strengthen some driving forces and weaken some restraining forces, so we planned the following *guidelines* for our program *activities*:

- Create a climate for psychological safety and shield the explorative activities from SME's core day-to-day business to prevent tension (sandbox approach)
- Create awareness for disruption by new competitors and exogenous crisis (Innovator's Dilemma)
- Develop empirical experimentation skills and tools
- Include the company owner or CEO in the planned activities
- Follow an open innovation approach by including external parties in the innovation activities (program designers, researchers, trainers/moderators, external consultant)
- Offer free-of-charge service and external skills and knowledge support

Based on these guidelines, we developed a logic model as a framework to design the program, which we called "Sandbox for Business Model Innovation" and which is depicted in Figure 2. Logic models are effective tools to assist in program planning, implementation, management, evaluation, and reporting. A logic model is a graphical representation of sequential and interconnected causal effects consisting of *Inputs* or resources, *Activities* or interventions, *Outputs* or deliverables and the *Outcomes* or the desired short-term and long-term impact. It forces program developers to make their assumptions and their causal logic explicit and visible, which makes it easy for themselves and others to identify missing links in the causal chain or gaps in logic or in knowledge and offers clear points of measurements for tracking progress. Developing logic models is a requirement for applying for many grant programs. They are being used by scholars and practitioners to strengthen the robustness of their design concept for interventions (Kaplan & Garrett, 2005; Kim, 2022; Wu et al., 2019).

Our rationale in choosing *radical* innovation was to clearly demarcate the innovation ambition from the core or incremental innovation (exploitational) and focus instead on transformational radical innovation (explorative), which is known to be highly risky, but also highly rewarding. As a radical innovation type we chose business model innovation (BMI). We use Foss & Saebi's (2017, p. 201) definition of BMI as "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements". They split BMI into two dimensions, *degree of novelty*, i.e. new to the firm vs new to the indus-

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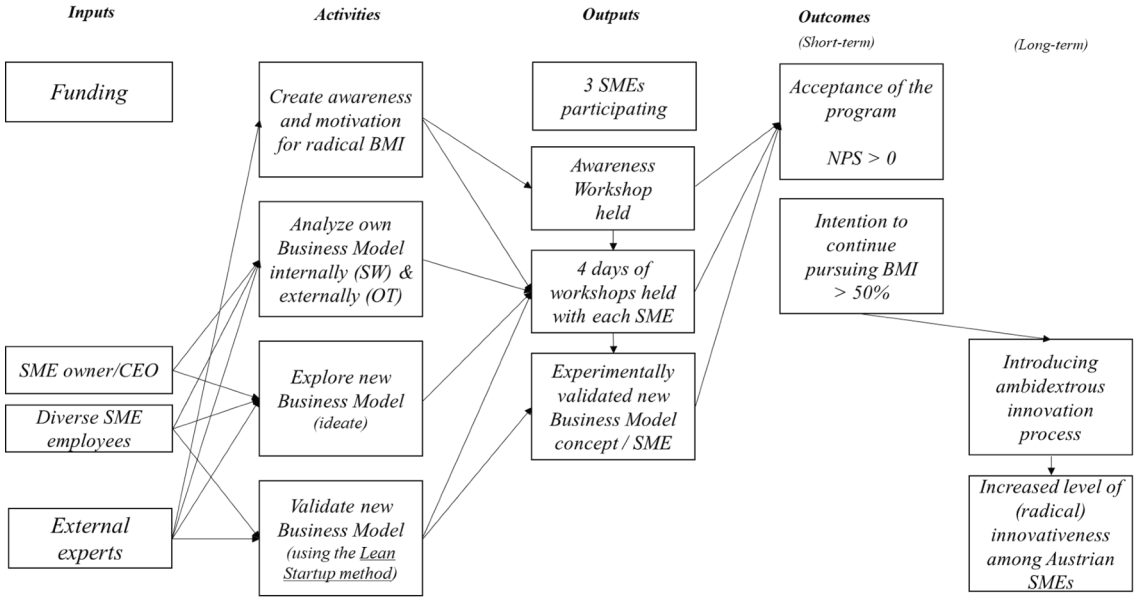

Figure 2: *Logic Model of the "Sandbox for BMI" Program*

try, and *scope* which indicates how many components of the BM are affected by the BMI, i.e. from changing just a few components (modular) to the whole BM (architectural), as depicted in Figure 3. Our ambition was to target the extreme, namely a *Complex BMI* new to the market and implying architectural change, thus affecting the whole business model.

		Scope	
		Modular	*Architectural*
Novelty	*New to firm*	Evolutionary BMI	Adaptive BMI
	New to industry	Focused BMI	Complex BMI

(Foss, Saebi, 2017, p217)

Figure 3: *BMI Typologies*

The need for companies to manage an appropriate mix of *explorative* and *exploitative* innovation activities in order to survive in the long term is stressed by many scholars (de Visser et al., 2015, p359). This organizational and managerial *ambidexterity* is even more difficult to follow in SMEs due to their size and limited resources. In order to explore radical innovations of a business model, and to implant ambidextrous thinking and behaviors in SMEs, we followed a *sandbox* approach, creating a safe and controlled environment, separated from the operational day-to-day core business. In that way SME managers and employees could experientially learn and practice a new way of innovating combining play, fun with maximum creativity, and without the fear of failure, risk or even tension with the existing core business model - such as internal competition, business cannibalization, lower margin promises and later returns (Markides 2016, Chesbrough 2010). At the same time, we wanted to differentiate our innovation support program from the multitude of available creativity, innovation and design thinking seminars and workshops, which do not go the extra mile to systematically validate the key hypotheses emerging from a new idea, concept or business model. In that way we expect that SMEs

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build new behaviors and adopt an *ambidextrous* mindset of simultaneously following explorative innovation in parallel to exploitative innovation, encouraging them to take risks, which are then mitigated and reduced through systematic validation. The objective was *not* to *implement* new business models, but rather to test and validate radical new business model *concepts* as an exercise for future innovation initiatives carried out by the SME autonomously, by building the necessary knowledge, skills, tools and processes.

Our program (Sandbox for BMI) objectives for activating radical innovation in SMEs were:

1. SME managers and employees are *aware* of the need of *ambidextrous* explorative and exploitative innovation activities

2. SME managers and employees feel safe to *experiment* with *radical business model innovations* far away from their core business

3. SME managers and employees are familiar *using* business model innovation and validation *methods*

Based on the logic model, we designed and developed a series of eight workshops as well as two purpose-built tools to be used in the first two workshops: a business model strategy simulation game (BMSS) and a qualitative business model analysis tool (QBMA), which uses an online questionnaire taken by at least two employees of each SME and a visualization and evaluation part based on Microsoft Excel. During the third workshop (Exploration/Ideation) we used commercially available playing cards for developing new business models with 55 patterns, based on the Business Model Navigator book (Gassmann et al., 2014).

3.3.2. Action

As an intervention (**action**) - or activity as defined in the logic model - a series of eight workshops was conducted with each of the participating SMEs. The purpose of the workshops was to raise the *awareness* of the problems and dilemmas inherently connected to innovation and afterwards *guide* the participants on their exploratory journey towards innovation in their own companies. While the main structure and methods for the workshops were set out during the planning, the implementation was directly linked to the participants' needs and input, thus allowing an active participation for the SME representatives.

The eight intervention workshops held were designed as follows:

Day 1 - Awareness Workshop:

This was a full-day joint kick-off workshop for all participating SMEs and was held in a neutral open space in an incubator. It included presentations covering the threat of disruption, the innovator's dilemma (Christensen, 2013) and the need for ambidextrous explore and exploit innovation activities, as well as a presentation introducing the concept of business models and business model innovation accompanied with hands-on exercises and a business model strategy wargame based on the BMSS simulation tool in order to sensitize the participants to the fact that a business model can be easily disrupted by newcomers and that new business models need to take the possible actions of competitors into account (Kraus et al., 2020).

Day 2 - Business Model Analysis Workshop:

This full-day workshop was held individually at the premises of the respective SME in their board room. Here the existing business model was described using a business model canvas (Osterwalder & Pigneur, 2010) and analyzed using the qualitative business model analysis tool (QBMA) and an external environmental analysis (PEST and Porter's five forces) was then performed in order to identify threats to the existing business model, which cannot be mitigated in the long-term by pure exploitative, incremental innovation. The intention was to create a clear awareness for the urgency of the need for explorative radical innovation.

Day 3 - Exploration Workshop:

This was a full-day workshop held individually with each SME outside their premises (at a remote seminar hotel) and was moderated in a play environment in order to create a climate for psychological safety (Andersson et al., 2020). In order to escape the cognitive rigidity, a fun creativity warmup exercise was held prior to ideation and the moderator and the researchers were motivated to actively participate in the ideation process (Assink, 2006; Chesbrough, 2010; Sandberg & Aarikka-Stenroos, 2014). In order to escape the tension between the existing business model and the to be invented rad-

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ical new business model, we created a context and story plot putting the participants in the fictive role of ex-employees of their firm, who founded a spin-off, a new venture or startup, which is encouraged to partner with the existing SME or even allowed to compete with it (Chesbrough, 2010; Markides, 2006). The workshop was following the Design Thinking framework (Brown, 2008) and used the Business Model Canvas (Osterwalder & Pigneur, 2010) as well as the playing cards based on the Business Model Navigator (Gassmann et al., 2014).

Days 4, 5, 6, 7 - Validation Workshops:

These were four half-day workshops, held individually with each SME either at their premises or virtually using MS Teams and were spaced in 1-2 weeks intervals to give SME participants and researchers enough time to run real empirical validation experiments between the workshops. The tools used and the skills conveyed were based on Testing Business Ideas (Bland & Osterwalder, 2019). These experiments varied based on the different new business models the SMEs came up with and included face-to-face interviews, quick prototyping of flyers and landing pages, Facebook advertisements and quantitative online surveys. Here the SME participants learned - with the help of external experts and researchers - how to set key hypotheses and how to empirically test them in order to validate and de-risk the new business model concept.

Day 8 - Capstone Workshop:

This joint final workshop was held on our university's campus and included a short recap of the program, keynote speeches from representatives of the DIH-OST consortium and the local Chamber of Commerce as well as innovation consultants who would show the participants how they can continue in their innovation endeavors by taking advantage of further funding and subsidies. The highlight of the workshop was for the participating SMEs to present their innovation outcomes and give public feedback to the effectiveness and acceptance of the pilot program. A joint late lunch rounded up the day allowing the SMEs to build networks with each other and with the invited institutional representatives. Prior to the final workshop all participants were asked to fill-in an online survey, the results of which were publicly presented in the plenum.

3.3.3. Observe

In order to judge the acceptance and effectiveness of the activities, a number of points were **observed** and evaluated collectively by the researchers and the participants, such as the degree of innovation after the Exploration Workshop, the speed of learning, which was measured by the researchers after the four Validation Workshops, the acceptance of the interventions using the net promoter score and the willingness to continue with business model innovation activities in future. Qualitative face-to-face interviews with the participants after each workshop and informal exchanges furthermore took place throughout, providing opportunities for serendipitous observation.

3.3.4. Reflect

After each workshop, all participants were invited to **reflect** on the effectiveness of the intervention of the respective workshop and feedback was collected using open-ended questions. Data was collected by two researchers as written notes. These notes were then compared, analyzed, contrasted and condensed using inductive reasoning and thematic analysis and are summarized in Section 4. The findings are meant to fuel the next iterative action cycle planned for 2023.

4. Results and discussion

Given the exploratory nature of this research, it was not possible to rely on existing surveys or questionnaires, requiring new data collection instruments to be developed. In order to enhance the robustness of the findings, we used data triangulation, by using different observation angles at different points of the logic model and in-line with our main objectives.

4.1. Acceptance

Reichheld's (2003) net promoter score (NPS), a metric normally used by practitioners to measure customer satisfaction in service-based industries, was used as a proxy to measure the overall acceptance of the program and was administered via an online survey and answered by all three SMEs (n=8). It answers the question "How likely are you to recommend this program to a colleague or a friend?" using an 11-point scale ranging from 0… not likely at all to 10… extremely likely, and is calculated as the percentage of promoters (those answering with 9

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or 10) minus the percentage of detractors (those answering with 0 to 6). The passives (those answering with 7 or 8) do not contribute to the score. Scores range from -100 (everyone is a detractor) to +100 (everyone is a promoter). In industry, a positive score is well regarded, and scores over 50 are thought to highlight good performance. Our target was to reach a positive NPS representing a successful acceptance. We measured an NPS of +50 (4 promoters, 4 passives, 0 detractors), which was surprising for a pilot project and much encouraging to continue another iteration loop.

4.2. Effectiveness

In order to evaluate the effectiveness of the intervention program, we used several measures based on our objectives and assumptions and summarized them in Table 3.

the *degree of innovation* after the Exploration Workshop using the BMI typology model (Foss & Saebi, 2017) by means of collective reflection on the new business model outcome after the workshop, which was supposed to be radical (Complex BMI). The agreement on which typology to assign the outcome was reached by consensus. Only one firm (SME3) achieved an extreme radical outcome (Complex BMI), the other two firms achieved Focused BMI and Modular BMI typologies.

Further, we evaluated the suitability of the *lean startup method* for established SMEs by measuring the *learning speed*, which we calculated as the time needed for one Build-Measure-Learn loop to test a single BM-hypothesis. It was objectively assessed by the researchers at the end of all validation workshops.

Table 3: *Measurements from the observation phase*

	Source	**SME1**	**SME2**	**SME3**
Net Promoter Score	*Survey (n=8)*	+50		
Degree of Innovation	*Collective reflection*	Focused BMI	Modular BMI	Complex BMI
Learning speed	*Calculated by researchers*	3 weeks	4.5 weeks	n/a
Willingness to continue with BMI	*Presentation*	Given	Given	Uncertain
Feedback (excerpt)	*Online survey & Collective reflection*	*"We definitely need external help to run the validation experiments" "Virtual sessions should be held in presence to be more effective"*	*"We would have needed more time for exploration / ideation than one day" "We would be open for the other companies to join the exploration workshop"*	*"We should have setup an internal project and budget to get commitment for such a BMI program" "It would be great if the ideas and BMI we generated are taken up by students or startups for validation and development, as this is not our strength"*

One of our main objectives was to activate *radical* innovation in SMEs using BMI, for that we measured

To measure the overall *awareness* for the need of *ambidextrous* explorative and exploitative innova-

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tion activities we asked each SME to answer the question whether they intend to continue pursuing BMI after the end of the program in their final presentation and justify their answer. We recorded their answers, which we also discussed during a final collective reflection session. Surprisingly the largest participating firm (SME3) was not sure to continue with BMI activities, and due to lack of time and commitment, they did not complete all validation loops (build-measure-learn) and hence no speed of learning was calculated. This might be explained by the fact that this was the only firm, where the CEO did not participate, but delegated responsibility to two of his managers.

4.3. Hypotheses

Finally we tested our own hypotheses regarding the intervention program by administering a short survey prior to the final capstone workshop. This online survey was answered by all three SMEs (n=8) and included the following items (each one representing an ex ante assumption about the program) and measured on a 5-point Likert scale (ranging from "1… does not apply at all" to "5… fully applies") their agreement to the following statements (Table 4):

goal to activate SMEs for radical innovation, was very well received by the participants. This is also shown by a measured net promoter score of 50. The objective of running a pilot was to test the theories about radical innovation in SMEs as well as our own assumptions about such an intervention using collective reflective learning in order to improve the intervention program. For that we followed the participatory Action Research approach.

One of the three participating firms was able to generate a "Complex BMI" concept idea, which we chose as a measure for radicality, yielding a success rate of 33.3% and none of the participating SMEs generated a non-radical "Evolutionary BMI", which we assumed that SMEs are capable of achieving without external help. Two of three SMEs (or 66.7%) firmly indicated that they are willing to continue with BMI after the end of the program. For the firms who ran several validations, the learning speed, which represents the time needed for one Build-Measure-Learn loop to test a single BM-hypothesis was between 3 and 4.5 weeks, which probably was influenced by the time boxing of the four successive validation workshops.

The participating companies corresponded to the

Table 4: *Program hypothesis testing*

Hypothesis (item)	Score	Decision
SMEs are interested in business model innovation and see a serious need for action	*4.3*	*Strengthened*
SMEs are open to external advice & guidance to invent a new business model	*4.3*	*Strengthened*
SMEs dare to detach themselves mentally from the core business (startup mentality)	*3.6*	*Weakened*
SMEs can spend the necessary time (8 days in 3-4 months) for business model innovation	*4.0*	*Strengthened*
SMEs can manage validation experiments mainly themselves (with some external help)	*3.3*	*Weakened*

A mean target score ≥ 4 was defined as strengthening a hypothesis. Although this approach does not follow the statistical testing rigor to accept or reject a hypotheses, it represents rather a reflection necessary to inform the planning of the next iteration.

5. Conclusions

The funded pilot program "Sandbox for Business Model Innovation", which had the main typical characteristics for SMEs described in the literature with regard to the preference for incremental innovation steps. The characteristics for the innovation dilemmas also applied (Nagle & Golden, 2009). All the more clearly, the present results and positive feedback from the firms show the practical need for models to activate radical innovation.

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5.1. Lessons learned

The following is a summary of findings that also form a foundation for improving the design of the program for the next iteration:

(1) Interest but uncertainty about innovation. The experiences from the first iteration as well as from this one show that SME have an existing though somewhat latent interest in innovation. They are aware of the need for innovation, but there is a high level of uncertainty as to the management of innovation.

(2) Commitment is needed. An intervention program requires intensive participation to generate benefits. Affirming interest is not sufficient. To ensure the necessary level of commitment, it should be a precondition that the SMEs actively plan for the participation. As a precondition to participate, the SME should setup an internal project and budget to secure the resources and give the project legitimacy and support if the CEO is not always participating

(3) Keep it face-to-face. The virtual sessions (some of the validation workshops were held using MS teams) were not positively received and should be held on-site if possible

(4) Allow time for exploration. The Exploration workshop (the only workshop which took place in a remote seminar hotel) motivated and activated the participants most and was evaluated as the most interesting of all 8 workshops by most participants. The exploration experience should be given enough time and depth. Besides offering more time (in our program, even more than one full day), further activities should be included, such as opening up of the workshop to other SMEs to participate in co-creation and strengthen the networking

(5) Create a distance between core business area and innovation activities. It is difficult to create a startup mentality and have the SME participants thinking radically and independently from their core business area. Only one SME came up with a Complex BMI, which is new to the industry and involves architectural change of the whole business model. Probably the presence of the CEO/owner - not having an intuitive cognitive style - plays a role in discouraging the other employees of provocative thinking which might threaten the existing business, but which is needed to radically think out-of-the-box. So, we recommend holding the initial ideation session without the CEO present

(6) Encourage participants to link their new business model to the old one as a balancing act to bridge the split between the two. All new and existing business models were found to be explicitly linked together. All 3 SMEs had their current firm (existing core business model) as a "Key Partner" in their new business model canvas. This diminishes the SME concerns of tension and conflict mentioned earlier, but also shows the realistic efforts undertaken by the participants to capitalize on synergistic effects of key resources, activities, partners, customers and revenues of their firm in order to create a competitive advantage for the new business model.

(7) Provide professional support for validation experiments. SMEs have difficulties running and evaluating validation experiments, which is not considered as a core competence needed to run the day-to-day business. We therefore recommend a) including professional UX Design and Marketing agencies, b) university students or c) startups as active participants in future iterations who can effectively and efficiently take over these tasks

5.2. Limitations and recommendation for future research

Whereas action research does not allow for generalization, our findings shall be understood as ideas that provide reasonable expectations of similar findings in other similar contexts that can be validated or falsified by future quantitative research, or tested for validity in different contexts (other countries than Austria).

5.3. Policy implications and recommendation for business managers

The findings of this study, could help not only SME management to develop a future-proof innovation strategy by following the theoretical findings, the design elements and the learnings of this program, but could also guide policy makers and intermediaries to plan effective innovation support programs, specifically aimed at SMEs.◆

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Summary

Đại dịch COVID-19 đã khiến cho các tổ chức trên toàn cầu nhận thức được nhu cầu cấp thiết của Số hóa và Chuyển đổi số. Doanh nghiệp nhỏ và vừa (DNNVV) cũng không ngoại lệ. Đổi mới Mô hình Kinh doanh (BMI) có thể là một giải pháp để thích ứng thành công với hoàn cảnh mới và ứng phó với những tác động của đại dịch và đổi mới toàn diện có thể mang lại cho các tổ chức lợi thế cạnh tranh dài hạn với tiềm năng giúp họ có khả năng chống chọi với sự gián đoạn thị trường trong tương lai. Nghiên cứu này mô tả hoạt động thiết kế và thực hiện một chương trình can thiệp - một phần của chương trình hỗ trợ đổi mới do chính phủ tài trợ ở Áo - nhằm khuyến khích các doanh nghiệp nhỏ và vừa để họ có thể theo đuổi những đổi mới toàn diện bằng cách thử nghiệm đổi mới mô hình kinh doanh của họ. Mục đích của bài báo là đánh giá mức độ chấp nhận và hiệu quả của chương trình. Là một chiến lược nghiên cứu, chúng tôi thực hiện nghiên cứu hành động để lập kế hoạch can thiệp và đánh giá những quan sát thu được từ mỗi trường hợp trong số ba trường hợp nhằm tối ưu hóa các hành động thực tế. Kết quả cho thấy các doanh nghiệp nhỏ và vừa gặp khó khăn khi xa rời lĩnh vực kinh doanh cốt lõi của họ. Với sự trợ giúp của các bên liên quan bên ngoài trong việc tạo ra ý tưởng, thiết kế và thực hiện thử nghiệm, các doanh nghiệp nhỏ và vừa có thể được khuyến khích để theo đuổi các hoạt động đổi mới toàn diện mô hình kinh doanh và áp dụng tư duy cởi mở chấp nhận rủi ro, bất ổn và sự mâu thuẫn trong tổ chức. Nghiên cứu này cung cấp những hiểu biết thực tế quan trọng và đóng góp cho việc phát triển chiến lược DNNVV.