



Impacts of promoting sustainable entrepreneurship in generic business plan competitions

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ABSTRACT

Entrepreneurs and start-ups are key actors in implementing environmental innovation and new approaches in cleaner production. Therefore, the integration of sustainability considerations in early phases of a new venture is important. Insights on how this can be effectively implemented in start-up support systems are scarce and represent a research gap. Business plan competitions (BPCs) constitute an important element in entrepreneurial support systems, and are a powerful force in driving entrepreneurial activity. Up till now, it is unclear whether BPCs can actually influence the sustainability orientation of participating entrepreneurs and the sustainability performance of their ventures. The purpose of this work is to clarify whether the integration of sustainability goals and considerations into generic BPCs has an impact on the business activities of participating entrepreneurs and start-up teams. For our investigation we conducted a survey of the more than 1000 participants in the Business Plan Wettbewerb Berlin Brandenburg, which is the oldest and biggest generic business plan competition in Germany. For the analysis we use a structural equation model and apply the partial-least-squares method. Findings reveal that the promotion of sustainability in generic BPCs have an impact on the integration of sustainability in start-up business activity. Thus, from a sustainability point of view it makes sense to explicitly integrate sustainability into the concrete support offerings of generic BPCs. Our research contributes to cleaner production research by providing new insights on context factors in early (seed and start-up) phases of a new venture.

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1. Introduction

Entrepreneurs and start-ups are key actors in implementing environmental innovation and new approaches in cleaner production (Fichter and Clausen, 2013, p. 278). Therefore, sustainable entrepreneurship and the integration of sustainability considerations in early phases of a new venture are important (Bocken, 2015). Sustainable entrepreneurship is an emerging stream within the entrepreneurship literature (Binder and Belz, 2015;

Muñoz and Cohen, 2018). The discovery, creation, evaluation, and exploitation of opportunities to create innovative goods and services that are consistent with sustainable development goals (United Nations General Assembly, 2015) is relevant to tackling fundamental societal challenges such as climate change and the provision of potable water for a growing world population. It significantly contributes to the concept of cleaner production e.g. by increasing efficiencies in the use of energy, water, resources, and human capital (Gast et al., 2017; Hahn et al., 2018). Research on

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sustainable entrepreneurship suggests that the recognition and implementation of sustainable development opportunities is more complex for the entrepreneur than the recognition of non-sustainable opportunities (Patzelt and Shepherd, 2011). Against this backdrop, it is assumed that entrepreneurs creating, recognizing and taking advantage of sustainable opportunities require specific support in innovating successfully (Evans et al., 2017; Kanda et al., 2014). While the number of journal articles on sustainable entrepreneurship has increased in the last decade (Binder and Belz, 2015, p. 39), there have been only very few publications which deal specifically with context factors in sustainable entrepreneurship such as entrepreneurial ecosystems (Cohen, 2006; Steinz et al., 2016; Volkmann et al., 2019), market imperfections (Cohen and Winn, 2007), market incentives (Pacheco et al., 2010), government action or stakeholder action (Schaltegger et al., 2019; York and Venkataraman, 2010) and, environmental orientation of entrepreneurs (Dickel et al., 2018). Especially context factors that relate to early phases of a new venture (seed and start-up phase) have been a neglected field of research in sustainable entrepreneurship (Terán-Yépez et al., 2020). We address this research gap by investigating specific support activities for sustainable entrepreneurship in the seed and start-up phase.

Within the last three decades, there has been a growing number of public and private support activities for entrepreneurship. Business plan competitions (BPCs) are one established and relevant form of support, in particular for supporting students and first-time entrepreneurs (Dee et al., 2015). While the percentage of specialized BPCs with a focus on specific sectors, technologies or topics has increased in recent years, the majority of today's BPCs are cross-sectoral and open to all kind of venture ideas, and can therefore be characterized as generic.

Empirical studies investigating the effects of BPCs are still scarce, but have been growing in number in recent years (Mu et al., 2014). Findings suggest that participating in BPCs does in fact have an impact on the new ventures' business models (Thomas et al., 2014). While some first insights are available on the general impacts of BPCs, there are as yet no investigations whether the promotion of sustainability in generic BPCs leads to a higher level of sustainability integration in business activity of participating entrepreneurs and start-up teams.

Against this backdrop, the objective of this paper is to clarify whether the promotion of sustainability in generic BPCs has an impact on the business activities of participating entrepreneurs and start-up teams. From a sustainability point of view, it is important that sustainability goals and considerations are systematically integrated into business model development (Breuer et al., 2018; Evans et al., 2017). It can be assumed that a business model which places high value on sustainability goals and systematic consideration in all fields of business activity increases the likelihood that a start-up will actually contribute to reaching sustainability goals (Hahn et al., 2018; Lüdeke-Freund, 2020). Against this backdrop, we consider the construct of "integration of sustainability goals and consideration into planned and realized business activity" as a key goal for start-up support in BPCs, and use it as the dependent variable in our empirical investigation.

The paper makes several important contributions to current research: First, we address context factors in early (seed and start-up) phases of a new venture, a field of research in sustainable entrepreneurship which has been neglected and constitutes a research gap. Second, we specifically look at the role of generic BPCs in promoting sustainable entrepreneurship. This is the first study that investigates the impact of BPCs on sustainable entrepreneurship. Third, we connect for the first time the theory of entrepreneurial support systems with theories cognitive and strategic framing. We can show that these theories are helpful in explaining

the effects of entrepreneurial support systems on the orientation of entrepreneurs and the sustainability performance of the ventures.

The paper is organized as follows: First, we lay the theoretical foundation for investigating the potential impacts of BPCs on sustainable entrepreneurship (Section 2). In Section 3, we develop and introduce our guiding research question and elaborate dependent and exploratory variables. In Section 4, we describe the methodology of our empirical investigation. Section 5 evaluates our measurement model and presents results from our structural model. In Section 6, we discuss the results with reference to the hypotheses developed in Section 3 and the state of the art in sustainable entrepreneurship and BPC research. In the final Section 7, we draw conclusions for the support of sustainable entrepreneurship and identify further areas for research.

2. Theoretical background

In this section, we will lay the theoretical foundation for the empirical investigation of the effects of BPCs on the integration of sustainability goals and considerations into business activities. Based on an extensive literature review and the analysis of the state of the art in the respective research fields, we will clarify relevant concepts such as sustainable entrepreneurship, support systems for entrepreneurship and, BPCs.

2.1. Sustainable entrepreneurship

Sustainable entrepreneurship is a new research field that is still developing (Binder and Belz, 2015). With the upturn in research, different terminology and definitions of sustainable entrepreneurship emerged (Muñoz and Cohen, 2018). In this paper, we view sustainable entrepreneurship, in accordance with Pacheco et al. (2010), as the discovery, creation, evaluation, and exploitation of opportunities to create innovative goods and services that are consistent with sustainable development goals (United Nations General Assembly, 2015). Shepherd and Patzelt (2011) state that the recognition of sustainable development opportunities is more complex for the entrepreneur than the recognition of non-sustainable opportunities motivated solely by economic gain. Sustainable entrepreneurs need to balance often competing aims of economic, social and ecological value creation (Parrish, 2010). This leads to increased complexity for sustainable entrepreneurship in comparison with traditional forms of entrepreneurship. In addition to high complexity, sustainable opportunities are characterized by strong uncertainty (cause and effect of the problem), and the difficulties of achieving a complete solution. They have been classified as "wicked problems" (Lans et al., 2014).

When investigating sustainable entrepreneurship, it can be assumed that both individuals and entrepreneurial teams, as well as the context in which venturing is taking place are of great importance (Volkmann et al., 2019). We assume that, on the one hand, some personal attributes of entrepreneurs such as prior knowledge and motivation (Shepherd and Patzelt, 2011), sustainability orientation (Kuckertz and Wagner, 2010; Wagner, 2012) and perpetual reasoning (Parrish, 2010) influence entrepreneurial activities and their outcomes. On the other hand, the market context, policies, and public and private support systems for entrepreneurship also play an important role in achieving sustainable businesses and in boosting environmental innovation (Fichter et al., 2016a, b).

2.2. Support systems for entrepreneurship

Creating, recognizing and taking advantage of sustainable opportunities are complex challenges for entrepreneurs, and it is

assumed that they require specific support in innovating successfully (Evans et al., 2017; Kanda et al., 2014). There is a large body of literature on a range of concepts that explore different types of support and relationships that have an impact on entrepreneurship, such as clusters, entrepreneurial ecosystems, entrepreneurial teams, innovation communities, innovation systems, networks, triple helix and design services. Despite the relevance of the external environment (Hanlon and Saunders, 2007; Volkmann et al., 2019), with its stakeholder support for sustainable entrepreneurship, and an extant body of literature on “Entrepreneurship in Context” (Welter et al., 2019), there is a lack of research examining the contextual factors of sustainable entrepreneurship (Fichter et al., 2016a). Such contextual factors might refer to specific legal, institutional, and regulatory frameworks (Ács et al., 2014), historical, cultural, and socio-economic factors (Welter, 2011) as well as to, the role of support systems for sustainable entrepreneurship (Pankov et al., 2019).

While the term “support system” is used generically in the academic literature on entrepreneurship, a specific conceptual construct of “support systems for entrepreneurship” has been developed by Fichter et al. (2013a, b). Based on the model of “innovation systems” and a range of related concepts in both innovation theory and entrepreneurship theory, these authors broadly define “support systems” as “a support system [that] comprises all actors, institutional settings and resources that help entrepreneurs in innovating successfully.” (Fichter et al., 2016a, b, p. 4). They also relate support systems to the entrepreneurial process or entrepreneurial life cycle, from opportunity identification to market entry and growth, and study and analyze how public, intermediary and private support systems for entrepreneurship are currently being provided and have to be redesigned to effectively support the generation and recommendations of environmental innovations. Public and private supports systems comprise actors such as business development organizations, financial institutions, incubators, universities etc., as well as specific support activities such as cluster initiatives and BPCs (Kanda et al., 2018). Supporting entrepreneurs can be perceived as an activity of cognitive and strategic framing (Cornelissen and Werner, 2014). Framing theories help to explain how individuals and groups construct and negotiate meaning in interactions. Support systems for entrepreneurship in general and business plan competitions in particular can provide interactional co-constructions (Dewulf et al., 2009) and can influence the “dominant logic” (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986) of entrepreneurs, e.g. in regard to the venturing idea or the business model (Cincera et al., 2018).

2.3. Business plan competitions (BPCs)

Start-up competitions have gained global prominence since the 1980's (Kraus and Schwarz, 2007; Ross and Byrd, 2011). Today, they are an accepted part of national and regional entrepreneurship ecosystems and a prominent model of start-up support programs (Dee et al., 2015). Around the world, they have been established to stimulate new venture creation and to capture the ideas, talents and potentials in the community (Thomas et al., 2014, p. 35). These competitions involve individuals or teams submitting venture ideas which are then judged on their merits, with “the best” ideas being rewarded by way of an award. “Start-up competitions can be deemed an umbrella term, which includes business model competitions, pitching competitions, prototype, and demo and showcasing competitions, crowd funding competitions, accelerator competitions, and start-up awards as well as the ubiquitous business plan competitions.” (Watson and McGowan, 2016, p. 3, p. 3).

A BPC can be defined “as a structured competition in which individuals compete in developing a feasible and practical business

idea. The evaluation of these ideas is based on set criteria developed and adapted according to international standards by business practitioners and industry specialists” (Cant, 2016, p. 99). They have proven to be a powerful force in driving entrepreneurial activity, particularly for students and first-time entrepreneurs (Cornell, 2014).

Even though different types of BPC emphasize different tasks, overall six key functions of BPCs can be identified: (1) to provide experimental learning, (2) to motivate people to come forward with their ideas, (3) to build entrepreneurial and commercial skills, (4) to attract venture capital, (5) to identify and make contacts with service providers (such as mentors, business angels, patent attorneys, accountants etc.) and, (6) to develop the business model (Cant, 2016; Laud et al., 2012; Thomas et al., 2014; Watson et al., 2015).

Empirical studies investigating the effects of BPCs are still scarce, but have been growing in number in recent years. Mu et al. (2014) found support for the assumption that participation in BPCs mediates a positive effect on entrepreneurial intentions. The findings of a study by Thomas et al. (2014) suggest that participating in BPCs does have an impact on the new ventures' business model. Most studies have studied the effects of BPCs in general. Despite the increasing popularity of social entrepreneurship competitions (and social enterprise tracks within general BPCs), there is little peer-reviewed literature about their impact (Huster et al., 2016). There is also a small but growing number of competitions that focus specifically on sustainability or specific fields of sustainability, such as renewable energies or circular economy (Für Gründer GmbH, 2018). Some generic BPCs have also started to integrate sustainability goals and considerations into their competition, such as by integrating sustainability related question and criteria into their start-up manuals and guidelines, by offering special sustainability webinars and workshops or by offerings special awards for green or social entrepreneurship. Until now, there have been no investigations about the impacts of sustainable entrepreneurship competitions or the impacts of the integration of sustainability-related support activities in generic or specific BPCs. We address this flaw on literature with our investigation as described in the next section.

3. Research question, constructs and hypotheses development

3.1. Research question

As explained in Section 2.1, it can be assumed when investigating sustainable entrepreneurship that the context in which venturing is taking place are of great importance. In this investigation, we focus on the specific context of BPCs. They constitute an important element in entrepreneurial support systems, and are a powerful force in driving entrepreneurial activity, particularly for students and first-time entrepreneurs (Cornell, 2014). For tackling fundamental societal challenges such as climate change, resource efficiency, and the development of sustainable production and consumption patterns, BPCs should strive for framing the entrepreneurial activity in a way that sustainability challenges and contributions are addressed. Up till now, it is unclear whether support systems such as BPCs can actually influence sustainability orientation of entrepreneurs and how generic BPCs should be designed in order to increase the sustainability performance of new ventures. Since very little is known about how BPCs can strategically frame (Cornelissen and Werner, 2014) and affect sustainable entrepreneurship, and given the fact that until now no studies are available that analyze the impact of the integration of sustainability-related support activities in BPCs (see Section 2.3), we investigate the following research question:

Does the promotion of sustainability in generic business plan competitions lead to a higher level of sustainability integration in the business activity of participating entrepreneurs and start-up teams, and if so which approaches are most effective?

3.2. Dependent variable: sustainability integration in business activity

With regard to our understanding of sustainable entrepreneurship as the discovery, creation, evaluation, and exploitation of opportunities to create innovative goods and services that are consistent with sustainable development goals (Pacheco et al., 2010; UN, 2015), it is crucial that environmental and social goals and considerations are integrated into the business model of a start-up. We view business models as “a system of interdependent activities that transcends the focal firm and spans its boundaries” (Zott and Amit, 2010, p. 216). With regard to start-ups, it is important to differentiate between planned business activity systems and implemented business activity systems. Entrepreneurs and start-up teams participating in BPCs are mostly in an early stage of the venturing process, with a focus on planning future business activity. From a sustainability point of view, it is important that sustainability goals and considerations are systematically integrated into business model development (Breuer et al., 2018; Evans et al., 2017). It can be assumed that a planned business activity system which places high value on sustainability goals and systematic consideration in all fields of business activity increases the likelihood that a start-up will actually contribute to reaching sustainability goals. The integration of sustainability goals and considerations into business activity comprises the explicit inclusion of sustainable development goals (UN, 2015) in the vision and mission of a start-up as well as the systematic consideration of sustainability requirements such as the reduction of greenhouse gas emissions in technology and product development and different elements of a business model (Breuer et al., 2018). The systematic consideration of sustainability in the business model for example reflects to what extent the value proposition is related to economic and social value creation (Bocken et al., 2013) and whether the products or services of a start-up have a positive or negative impact on the natural environment or public health (Tiemann and Fichter, 2016). Against this backdrop, we consider the construct of “integration of sustainability goals and consideration into planned and realized business activity” as a key goal for start-up support in BPCs, and use it as the dependent variable in our empirical investigation. In the following, we will also use a shortened description of the construct and label it as “sustainability integration in business activity”. The construct comprises three important aspects that reflect the extent to which entrepreneurs or venturing teams consider sustainability in their business activities. The first aspect relates to the written business concept, such as a business plan or business canvas, and the question of the extent to which environmental and social sustainability are explicitly considered in it. The second aspect relates to everyday decision making and the extent to which environmental or social sustainability are relevant criteria and are explicitly taken into account alongside criteria of economic sustainability. Finally, the third aspect relates to future entrepreneurial activities and the intention to explicitly value and consider the requirements of environmental and social sustainability.

3.3. Sustainability in BPCs as contextual factor

In regard to contextual factors influencing the integration of sustainability into business activity, we focus on the role of generic BPCs as an important and widespread element of entrepreneurial

support systems. As elaborated in Section 2.3, BPCs can be designed in very different ways. We focus on generic BPCs for three reasons: First, given the significant number of entrepreneurs and venturing teams, they constitute the majority of today's BPCs. Second, there are only very few specific sustainable entrepreneurship competitions at present (Für Gründer GmbH, 2018; Mahdjoubi and Gibson, 2015). The third reason for focusing on generic BPCs is that they involve entrepreneurs with different backgrounds and entrepreneurial intentions. There is no self-selection bias in regard to sustainability, unlike specialized business competitions specifically focusing on sustainability issues such as clean technologies, the circular economy or social entrepreneurship. Consequently, we argue that generic BPCs provide a better empirical field for investigating how contextual factors such as the integration of sustainability into the design and activities of BPCs affect the business activity of participating entrepreneurs and start-up teams. Given the broad spectrum of possible ways of integrating sustainability in BPCs (see Section 2.3), we differentiate among three basic approaches to integration:

- (1) *Sustainability in objectives and communication of generic BPCs:* Given the visibility of BPCs in the entrepreneurial community and the intensive public information and marketing activities to attract participants, the integration of sustainability as an explicit goal or value of the competition seems especially important. In order to motivate people to come forward with their ideas (Thomas et al., 2014) and in order to have an impact on participants and the planning of their business activities, it seems necessary to communicate sustainability as an explicit goal or value of the competition through means such as the competition website, manuals and flyers for participants. We therefore assume that “sustainability as an objective and as part of the communication of the BPC” can have an impact on participants and business model development, and use this construct as an explanatory variable.

Motivated by the findings and research results introduced in Section 2.3 and the considerations described above, we developed the following hypotheses in regard to influence of the context of a generic BPC on sustainable entrepreneurship. Because our survey was scheduled to take place at the end of a three-stage BPC (see Section 4.2), we relate the hypotheses to planned or realized business activity at the end of the BPC:

- H1a.** The higher participants rate the relevance of **sustainability in the objectives and communication** of the business plan competition (BPC), the higher the integration of sustainability goals and considerations into planned and realized **business activity**.
- H1b.** The higher participants rate the relevance of **sustainability in the objectives and communication** of the BPC, the more they will deal with sustainability goals and considerations in **business model development**.

- (2) *Sustainability in awards of the BPC:* Awards are a key element of BPCs. They are an important incentive for first-time entrepreneurs to participate, and are an important means for winners to attract publicity and venture capital. Consequently, most BPCs emphasize effective award ceremonies and attractive prize money or in-kind services. Sustainability can be integrated into award schemes in different ways. Some BPCs award special prizes for sustainability in specific fields or topics such as climate change, clean energy or electric mobility. Others have started to make sustainability a criterion in the evaluation of business plans or concepts.

Since awards have high visibility within the competition schemes and in public, we assume that the integration of sustainability into the award scheme, either as a special prize or as an integrated criterion, can have an impact on the business activities of participants. We therefore use the construct “sustainability in awards of the BPC” as an explanatory variable in our investigation and developed the following hypotheses:

H2a. Participants who know about the **special sustainability award** of the BPC will integrate sustainability goals and considerations more into planned or realized **business activity** than participants who do not know about the special award.

H2b. Participants who know about the **special sustainability award** of the BPC will deal with sustainability goals and considerations in **business model development** more than participants who do not know about the special award.

(3) *Sustainability-related offerings of the BPC:* There are various possibilities for BPCs to integrate or consider sustainability in their offerings for participants. Many BPCs offer manuals or guidelines for business model development. Sustainability-related questions and aspects can be integrated into these. Webinars on sustainability or workshops for sustainability-oriented business model development (Breuer et al., 2018) are also options for the support portfolio. Some competitions also offer specific counseling by sustainability experts or networking activities. Since most of these offerings are voluntary, it is likely that students especially or entrepreneurs who are interested in sustainability or who are even sustainability-driven (mission-driven) will use these offerings. It also seems likely that using these sustainability-specific offerings has an impact on business model development and on business activity. That is why we take the construct of “sustainability-related offerings of BPC” as an explanatory variable in our investigation and developed the following hypotheses:

H3a. The more participants have used **sustainability-related offerings** of the BPC, the higher the integration of sustainability goals and considerations into planned and realized **business activity**.

H3b. The more participants have used **sustainability-related offerings** of the BPC, the more they will deal with sustainability goals and considerations in **business model development**.

In addition to the three basic approaches to integrating sustainability into a BPC introduced above, it seems crucial that the participating entrepreneurs and venturing teams actually consider sustainability in working out the business model. Consequently, we use a construct labelled “sustainability in business model development”, which aims at measuring the degree to which aspects and requirements of environmental and social sustainability are taken into account when working out the business model during the BPC. We regard this construct as a dependent and at the same time explanatory variable. It is a dependent variable because we assume that the three explanatory variables introduced above determine the extent to which sustainability is taken into account in the process of working out the business model. At the same time, we assume that the degree to which sustainability is taken into account in business model development has an influence on the dependent variable “sustainability integration in business activity”. In this regard, the construct is explanatory in nature. Motivated by the findings and research results introduced in Section 2.3 and the

considerations described above, we developed the following hypothesis:

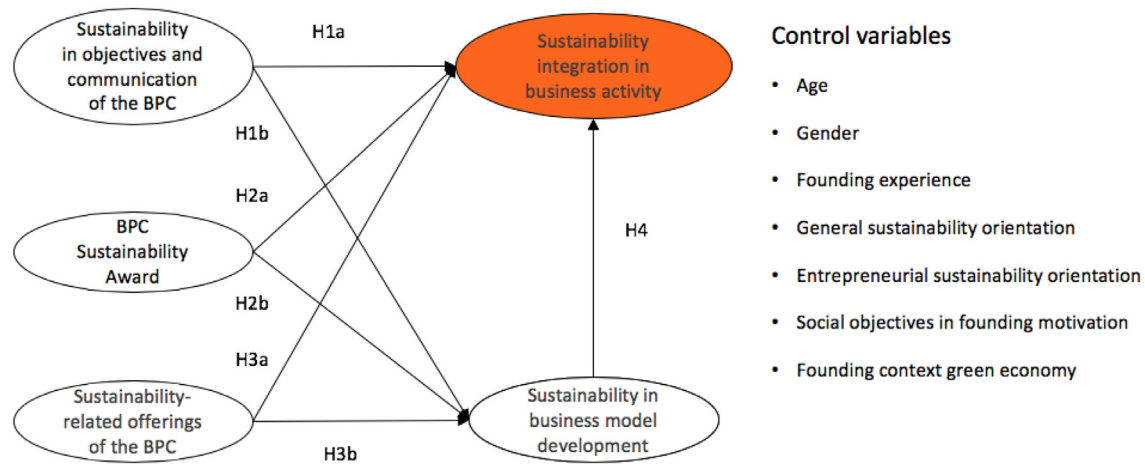
H4. The more participants have dealt with sustainability goals and considerations in **business model development**, the higher the integration of sustainability goals and considerations into planned and realized **business activity**.

Fig. 1 displays the constructs that we have introduced above, and indicates the assumed influence of explanatory variables on the dependent variable „sustainability integration in business activity.” The hypotheses are indicated by number.

3.4. Control variables

Based on the large stream of research that has focused on factors that facilitate the creation of entrepreneurial intentions in general (Ajzen, 1991; Fayolle and Liñán, 2014; Kolvereid and Isaksen, 2006; Souitaris et al., 2007) and sustainable entrepreneurial intentions in particular (Avasilcăi and Hutju, 2010; Kuckertz and Wagner, 2010; Liñán and Fayolle, 2015), we assume that some personal attributes of entrepreneurs such as their prior knowledge and motivation (Shepherd and Patzelt, 2011), sustainability orientation (Koe et al., 2014; Kuckertz and Wagner, 2010; Wagner, 2012) and perpetual reasoning (Parrish, 2010) influence entrepreneurial activities and their outcomes. Based on findings by Kuckertz and Wagner (2010), we propose that an individual's sustainability orientation is a predictor of actual behavior and entrepreneurial activity, and must be controlled in the model. Recent studies suggest that three different levels of sustainability orientation can be distinguished:

- (1) *General sustainability orientation:* Attitudes in regard to the relevance and valuation of sustainability and sustainability goals in general are located at this most abstract level. Here, sustainability is related to nature and society as a whole. Koe et al. (2014) found empirical evidence that a favorable attitude towards sustainability in general correlates positively with a high propensity for becoming a sustainable entrepreneur. This confirmed earlier findings in regard to female entrepreneurs and the environment (Braun, 2010). Against this backdrop, we assume that general sustainability orientation influences the level of sustainability integration in business activity, and treat this construct as a control variable.
- (2) *Entrepreneurial sustainability orientation:* In an extensive literature review on entrepreneurial intention, Liñán and Fayolle (2015) identified sustainable entrepreneurship intention as a new research area that seems to be gaining momentum. Empirical findings on personal values as the explanation of the sustainable entrepreneurship intention (Avasilcăi and Hutju, 2010) and the influence of a sustainable orientation on entrepreneurial intention (Kuckertz and Wagner, 2010) suggest that there is a link between sustainability orientation and entrepreneurial orientation. The results of a large-scale survey by Kuckertz and Wagner (2010) revealed that sustainability-oriented individuals are not only more likely to recognize a higher number of sustainability-related entrepreneurial opportunities, but have also been found to be more ambitious in acting upon the opportunities identified. Here, sustainable orientation is conceptualized more concretely and is specifically related to the role of companies and entrepreneurship in contributing to and achieving sustainability goals. We therefore label this construct “entrepreneurial sustainability orientation”, and use it as a control variable.



BPC = Business plan competition, H = Hypothesis.

Fig. 1. Variables of the proposed research model (items are listed in Annex 1)
BPC = Business plan competition, H = Hypothesis.

(3) *Sustainability objectives in founding motivation*: Even more closely connected with start-up activities and the creation of new firms is the sustainability orientation at the third level. Here sustainability is an important element in founding motivation, and can even constitute the key mission or driving force of entrepreneurial activity (Freimann et al., 2010). Sustainability-driven entrepreneurs are seen as having the potential to create more radical innovation, as these entrepreneurs often wish to challenge the legitimacy of conventional business (York and Venkataraman, 2010). According to Bergset and Fichter (2015), sustainability-related motivation can range from high to low, depending on the type of green start-up. Against this backdrop, we assume that sustainability objectives in founding motivation can significantly influence sustainability integration in business activity, and use this construct as a control variable.

Motivated by the findings and research results described above, we developed the following personal attributes of start-up team members to control our model: general sustainability orientation, entrepreneurial sustainability orientation, and sustainability objectives in the founding motivation. As further control variables we used “age”, “gender”, “foundation experience” and “context of green economy” (for details see 4.4).

4. Methodology

4.1. Selection of the BPC

In order to investigate our guiding research question, we decided to choose a single BPC. Because there are only very few specific sustainable entrepreneurship competitions at present (Für Gründer GmbH, 2018; Mahdjoubi and Gibson, 2015), we focus in our investigation on generic BPCs, which are open for all types of entrepreneurship, technologies and sectors, and focus on those generic competitions that have started to integrate sustainability goals and considerations into their programs. By choosing a generic BPC, we avoid a potential selection bias towards entrepreneurs that are specifically interested in sustainable entrepreneurship. As elaborated in Section 2.3, BPCs can be designed in very different

ways. Since we are specifically interested in the context variables, we think that choosing one single BPC makes control of the business venturing context setting possible. Basically, all participants in a BPC are going through the same process and developing their business activities in the same competitive context.

Against this backdrop, we selected the Businessplan Wettbewerb Berlin Brandenburg (BPW BB), which is the oldest and largest generic BPC in Germany. The BPW BB is a three-stage BPC with a total duration of nine months. It starts in October and ends in June of the following year. The BPW BB was carried out for the first time in 1996. At the time of the present investigation (2015), it was being carried out for the twentieth time. A total of 1550 students, first-time entrepreneurs and serial entrepreneurs from the Berlin Brandenburg region registered for the BPW BB 2015, of whom 1019 actually participated actively in one or several of the 146 events (Businessplan-Wettbewerb Berlin Brandenburg, 2015, p. 6). As a result, 451 business concepts were developed, either in the form of a written business plan (247), an elaborated business model canvas (70), both of them (22) or a specific version for students called “BPW study” (134).

As a regional start-up initiative, the BPW BB encourages people to come forward with their ideas and supports founders of a new business with a broad portfolio of different support activities: The BPW BB provides entrepreneurial knowledge through seminars, forum events and webinars, tools for business model development such as a start-up manual and templates for business plan and canvas, individual coaching and feedback on business concepts, as well as extensive networking events. For each of the three stages of the competition there are different awards (business plan, canvas, special awards) and prize money.

When the BPW BB started to integrate sustainability aspects into its goals, program and tools in 2011, it was the first generic BPC to do so. This was done in four ways: (1) by highlighting sustainability in the goals and communications of the competition, (2) by integrating sustainability aspects and questions systematically into all parts of the business plan template and guidelines (Businessplan-Wettbewerb Berlin-Brandenburg, 2014), (3) through special seminars and webinars on sustainability, and (4) by providing a special sustainability award with prize money of €2.000 at the end of the third stage.

4.2. Data collection and descriptive statistics

The data for the study was collected as part of an online survey of participants in the Businessplan Wettbewerb Berlin Brandenburg (BPW BB). The main purpose of the survey was to evaluate the BPW BB in general. Thus, the interest of the organizers of the BPW BB was not limited to sustainability issues. The questionnaire was comprised of 29 questions. Only eight questions were specifically related to sustainability issues. This meant, the survey was announced as a general evaluation exercise and offered participants the opportunity to share how they experienced the BPW BB in an anonymous way. As a general survey, it was possible to avoid a bias toward participants specifically interested in or oriented towards sustainability.

In order to be able to measure possible effects of contextual factors of the BPC on the integration of sustainability goals and considerations in planned or realized business activity, we decided to do the survey at the end of the three-stage competition. The participants were contacted by the organizer of the competition via e-mail after the deadline for the third stage (May 2015) and invited to participate in the online survey. The survey was conducted in the period April through June 2015 (including pre-test, invitation and double reminder phases). All 1019 entrepreneurs and students who participated actively in the BPC were invited to complete the survey. There were 228 participants who responded to the invitation, of whom 182 ultimately completed the survey. Referring to all active participants in the competition, the response rate was 17.8%. Sample characteristics: The gender distribution of the overall sample shows that 62% are male respondents. The average age of the respondents is 36 years. Most respondents have a university degree (64%).

4.3. Sample representativeness and method bias tests

As a result of choosing an unrepresentative sample, different biases can occur. The present study attempts a representative sample by taking into account all participants of the competition. The response rate of 17.8% already provides a first indication of sample quality. However, the representativeness of the results is limited, if systematic differences between responding and non-responding participants exist (non-response bias). The exclusion of participants due to non- or incomplete replies might potentially threaten the generalizability of the present findings. Two post-hoc analyses examined the potential threat of non-response bias, and tested for differences between early and late respondents (Armstrong and Overton, 1977; Li and Calantone, 1998), and participants who completed the survey and participants who abandoned it. In our study we compared the early and late respondents group by dividing the sample into two equal halves according to the reply dates. Both groups were compared using the Mann-Whitney *U* test. We found no significant differences between the groups at the 5% significance level, and only two indicators showed differences at the 10% significance level. Thus, in the present study non-response bias seems to have played no substantial role.

To reduce the potential risk of common method bias, which might derive from the use of self-report data, this study ensured anonymity and placed dependent and explanatory variables in different sections of the questionnaire (Podsakoff et al., 2003). Nevertheless, to test whether common method bias still represented a potential threat to the present findings, the study conducted one of the most widely used methods, Harman's one-factor test (Chang et al., 2010; Tehseen et al., 2017). We loaded all of the variables in our study into an exploratory factor analysis and examined the unrotated factor solution to determine the number of factors required to account for the variance of the variables. If only a

single factor is extracted or when a factor explains a high proportion of the covariance among the variables, then there is a common method bias. In our study, several factors with eigenvalues greater than 1.00 were extracted, and the variance explained by the first factor was <50%. Based on this result, it can be assumed that common method bias was not a threat in this study.

4.4. Measures and control variables

In our investigation, we used one dependent variable (sustainability integration in business activity), one dependent and at the same time explanatory variable (sustainability in business model development) as well as several explanatory variables and control variables (see Fig. 1). The proposed research model was comprised of the following measures (see Appendix 1):

The study introduces "sustainability integration in business activity" as a new construct, measured by three items. The first item measures the extent to which environmental and social sustainability are explicitly considered in the written business concept, either in the form of a business plan or a business canvas. The second item relates to everyday decision making and measures the extent environmental or social sustainability are relevant criteria and are explicitly taken into account alongside the criterion of economic sustainability. Finally, the third item relates to future entrepreneurial activities and measures the intention to explicitly value and consider the requirements of environmental and social sustainability in future business activities.

We could not find suitable items for measuring the contextual influence of the BPC in earlier investigations of BPCs. Consequently, we had to develop new items for all four variables (see Appendix 1). We measured the variable "sustainability in objectives and communication of the BPC" and "BPC Sustainability Award" with one item each and the variable "Sustainability in business model development" with a two-item construct. This construct measures the consideration of sustainability-specific aspects according to BPW BB guidelines for business model development, using the methods business plan or canvas. For the variable "Sustainability in offerings of BPC", we used a five-item construct. This involved different kinds of support offering (see Appendix 1).

As control variables, we used "age", "gender", "foundation experience" and "context of Green Economy", "general sustainability orientation", entrepreneurial sustainability orientation" and "social objectives founding motivation". The variable "context green economy" refers to whether a start-up team pursues a product or service idea that can clearly be attributed to a green market economy such as renewable energies, energy efficiency, electric mobility, recycling, etc. To measure "general sustainability orientation", we used a three-item construct adapted from Kuckertz and Rheingans-Heintze (2006). We also used a three-item construct adapted from Kuckertz and Wagner (2010) to measure "entrepreneurial sustainability orientation." The variable "social objectives founding motivation" was measured by a newly developed item. Most items were measured using a 6-point Likert scale. For three variables we used a dummy variable ("BPC Sustainability Award", "gender", and "context green economy") (see Appendix 1).

5. Analysis and results

For the analysis, we applied the partial-least-squares method (PLS) developed by Wold (1960). This is a variance-based structural equation modelling (SEM) technique commonly used in various research fields (Hair et al., 2019b), such as international business (e.g., (Richter et al., 2016)), marketing (e.g., (Hair et al., 2012; Henseler et al., 2009)), strategic management (e.g., (Hair et al., 2012)), family business (Sarstedt et al., 2014), entrepreneurship

(e.g., (Thai and Turkina, 2014), and corporate sustainability management (e.g., (Gelhard and von Delft, 2016). The PLS approach has several advantages over covariance-based SEM methods (Chin, 1998; F. Hair Jr et al., 2014). In PLS, reflective and formative measurement models can be considered simultaneously. PLS models require smaller samples. As a rough guide, Chin (1998) recommends a sample size that is at least ten times as large as the number of indicators of the most complex formative construct, or ten times as large as the largest number of independent constructs. Finally, the PLS approach does not make any assumptions about normal distribution. Some researchers also argue that fields that are dynamic in nature or where theory development is in an early stage often require a PLS SEM approach (Richter et al., 2016). Because of these advantages and the early stage of theory development in our study's field, we chose the PLS approach. We used the software SmartPLS 3 (Ringle et al., 2015). In the analysis, we included all respondents who completed the survey in the analysis (182). Six questions in the survey offered the possibility of skipping the item if answering was not possible (e.g., not knowing details of the competition offers). For these answers the mean replacement method was applied. This option replaces all missing data points with the mean value of all remaining data points per column (i.e. indicator or variable). Mean replacement has the benefit of not reducing sample size. The mean value of the variables does not change, but their variance is affected (Ringle et al., 2015) (see Fig. 2).

5.1. Evaluation of measurement model

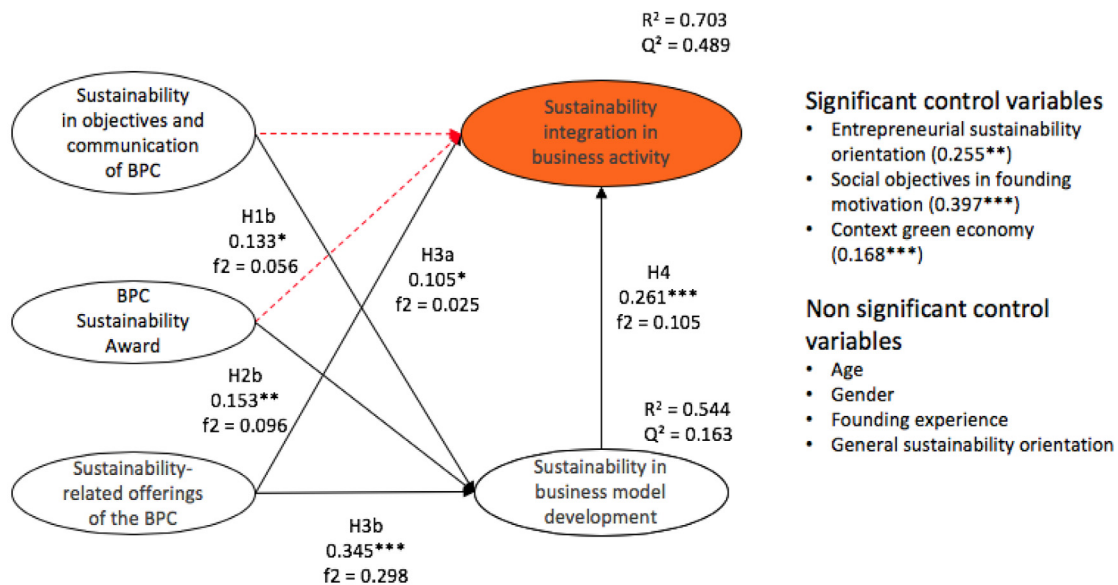
For all multi-items constructs, all items included in the analysis showed loadings of more than 0.7 (see Appendix 2). One item in the

construct “sustainability-related offerings of the BPC” was excluded from the analysis because its loading of 0.548 was too low. Construct reliability was assessed by calculating Cronbach's α , composite reliability and average variance extracted (AVE) (see Table 1). Almost all constructs showed satisfactory levels that were in line with the usual threshold values (Chin, 1998; Hair et al., 2011). However, the construct “sustainability in business model development” was slightly below the recommend threshold of 0.7 for Cronbach's α and pA. Still, the composite reliability score for this construct exceeded the recommended threshold. This indicates adequate reliability at the construct level, despite relatively low Cronbach's α and pA values. Discriminant validity was assessed at both the item level and the construct level (Chin, 1998; Hair et al., 2011). In the case of item discriminant validity, Appendix 2 shows that each item's loading with its associated construct exceeds loading on each of the other constructs. At the construct level we tested the Fornell-Larcker Criterion. Here, we compared the root of each construct's AVE and the latent variable correlations. The analysis revealed satisfactory discriminant validity (see Table 2).

5.2. Results of structural model

This study estimates the path coefficients with the path method and uses the bootstrapping procedure with replacement (5000 resamples) to generate the corresponding standard errors. Fig. 2 includes all results of the PLS analysis.

To assess the explanatory power of the PLS-model, this study further evaluates the model by its R² and Cohen's f² (Hair et al., 2019a). Since the results (see Fig. 2) indicate R² values of 0.703 for “sustainability integration in business activity” and 0.544 for



BPC = Business plan competition, H = Hypothesis, f² = Cohen's f² values, Q² = Stone-Geisser Q² values, R² = coefficient of determination, significance level: * = p-value ≤ 5% = significant, ** = p-value ≤ 1% = strong significance, *** = p-value ≤ 0,01% = very strong significance.

Fig. 2. Results of structural equation model (SME) with partial least squares (PLS).

BPC = Business plan competition, H = Hypothesis, f² = Cohen's f² values, Q² = Stone-Geisser Q² values, R² = coefficient of determination, significance level: * = p-value ≤ 5% = significant, ** = p-value ≤ 1% = strong significance, *** = p-value ≤ 0,01% = very strong significance.

Table 1
Construct reliability.

	Cronbach's α	Composite Reliability	AVE
Sustainability in business model development	0.638	0.845	0.732
Sustainability-related offerings of the BPC	0.742	0.836	0.560
Sustainability integration in business activity	0.830	0.898	0.746
General sustainability orientation (control variable)	0.901	0.938	0.834
Entrepreneurial sustainability orientation (control variable)	0.911	0.944	0.849

Table 2
Discriminant validity (Fornell-Larcker criterion).

	1	2	3	4	5	6	7	8	9	10	11	12
1. Sustainability in objectives and communication of the BPC	1.000											
2. BPC Sustainability Award	0.048	1.000										
3. Sustainability in business model development	0.330	0.212	0.856									
4. Sustainability-related offerings of the BPC	0.290	0.020	0.479	0.748								
5. Sustainability integration in business activity	0.288	0.183	0.692	0.398	0.864							
6. Age	0.053	-0.104	-0.012	-0.211	-0.065	1.000						
7. Gender	-0.084	-0.045	-0.203	-0.183	-0.247	0.005	1.000					
8. Founding experience	-0.059	0.105	0.110	-0.096	0.083	0.310	-0.002	1.000				
9. Context green economy	0.051	-0.030	0.388	0.107	0.429	-0.038	-0.101	0.140	1.000			
10. General sustainability orientation	0.216	0.090	0.404	0.146	0.452	0.146	-0.288	0.103	0.123	0.913		
11. Entrepreneurial sustainability orientation	0.204	0.067	0.452	0.204	0.566	0.152	-0.294	0.123	0.190	0.835	0.922	
12. Sustainability objectives in founding motivation	0.236	0.098	0.534	0.214	0.711	-0.007	-0.195	0.101	0.269	0.479	0.546	1.000

“sustainability in business model development”, the proposed research model shows substantial predictive power (Chin, 1998). The calculation of Cohen's f^2 values allows evaluation of the effect size of the predictor constructs (Götz et al., 2010). Here, the values of >0.35 , >0.15 and >0.03 indicate a large, a medium and a weak effect of exogenous variables (explanatory variables) on the endogenous variable (dependent variable) (Chin, 1998). This study also follows the recommendations in the literature (Armstrong, 2012; Chin, 2010; Hair et al., 2019a) (Armstrong, 2012; Chin, 2010) and additionally evaluates the predictive ability of the proposed research model. We assess prediction validity by means of a blindfolded cross validation analysis, which uses an omission distance of 6 and the cross-validated redundancy approach. This analysis reveals the Stone-Geisser Q^2 values (Hair et al., 2012). Since all values are greater than zero, all endogenous constructs show adequate predictive ability (Götz et al., 2010; Henseler et al., 2009). These results show that interpretation of the conceptual model's causal relationships is possible.

Overall, five significant influences can be identified in the model (see Fig. 2). Positive influence of the explanatory variables “sustainability in objectives and communication of the BPC” (0.133^* ; $f^2 = 0.056$), “BPC Sustainability Award” (0.153^{**} ; $f^2 = 0.096$) as well as “sustainability-related offerings of the BPC” (0.345^{**} ; $f^2 = 0.298$) on the dependent variable “sustainability in business model development”. Furthermore, the influence of “sustainability-related offerings of the BPC” (0.105^{**} ; $f^2 = 0.025$) and “sustainability in business model development” (0.261^{***} ; $f^2 = 0.105$) on the dependent variable “sustainability integration in business activity” were found. Two expected influences could not be confirmed in the model, as path coefficients were insufficiently large and not significant (see Fig. 2). In the case of the control variables, the variables “entrepreneurial sustainability orientation” (0.255^{**} ; $f^2 = 0.055$), “sustainability objectives in founder motivation” (0.397^{***} ; $f^2 = 0.304$), and “context green economy” (0.168^{***} ; $f^2 = 0.077$) influence the dependent variable “sustainability integration in business activity”.

6. Discussion

We will now discuss the results of our structural equation model with regard to the hypotheses (H) introduced in Section 3.3. Additionally, we reflect on the appropriateness of the proposed model.

With regard to the contextual factors of BPCs, we find support for the view that the promotion of sustainability in generic BPCs has a positive impact on the integration of sustainability goals and considerations in the business activity of the participating entrepreneurs and start-up teams. While “sustainability-related offerings of the BPW” influences the “sustainability integration in the business activity” directly (H3a), all other independent variables impact the “sustainability integration in the business activity” indirectly via a mediating variable “sustainability in business model development”. Thus, hypotheses 1b, 2b, 3b and 4 are supported. The strongest contextual impact on the integration of sustainability in the business model development of participating start-up teams is that of sustainability-related offerings (webinars, sustainability-focused business development workshops and sustainability questions in the guidelines for business plan development) (H3a and H3b).

While concrete support activities do have a direct positive impact on the integration of sustainability in business activity, the more indirect context variables “sustainability in objectives and communication of the BPC” and “BPC Sustainability Award” do not. Thus, H1a and H2a are not supported by the findings of our investigation. There may be two reasons for this: First, the relevance of sustainability is often not emphasized very strongly or is not well communicated in the objectives and communications of BPCs. With the Businessplan Wettbewerb Berlin Brandenburg (BPW BB) this seems to be the case. This leads to a very diverse picture of how participants perceive the relevance of sustainability in the BPW BB competition. Only 39% of the respondents think that sustainability has high or very high relevance in the BPW BB objectives and communications, while 35% perceive the relevance as

medium and 12% think it is low or very low. No fewer than 14% were unable to assess this. The same is true for the BPW BB Sustainability Award. Only 47% of the respondents knew that the BPW BB awards a special prize for sustainability. Thus, the existence of the special prize is obviously poorly communicated by the organizers of the competition. A second reason for no or low impact of sustainability objectives and communications might be that a BPC is too peripheral to have an impact on actual business activity. With regard to the BPW BB Sustainability Award, the low impact might also have to do with the fact that the prize is awarded only at the end of the third round of the competition, with no or very little time for its impact on the planned or implemented business activity to become apparent.

In the case of the personal attributes of participating entrepreneurs and students, we found support for the assumption that “entrepreneurial sustainability orientation” and “sustainability objectives in founding motivation” actually have a positive impact on the integration of sustainability goals and considerations in business activity. This matches earlier findings by Kuckertz and Wagner (2010) that individuals who are sustainability-oriented in regard to business are more ambitious in acting upon entrepreneurial sustainability opportunities. The impact of “sustainability objectives in founding motivation” is slightly higher than the impact of “entrepreneurial sustainability orientation”. A reason for this could be that the construct “sustainability objectives in founding motivation” is more closely connected to the actual start-up activity. This could also be the reason why we could not find support for the assumption that “general sustainability orientation” has a significant impact on the actual “sustainability integration in business activity”. This finding does not necessarily contradict earlier findings by Koe et al. (2014). While Koe et al. focused on readiness to become “sustainable entrepreneurs”, we focus on the integration of sustainability in actual business activity.

“General sustainability orientation” does not have a significant impact on founding motivation either; at least, the results of our model do not support such an impact. Unlike “general sustainability orientation” the construct “entrepreneurial sustainability orientation” has a strong positive impact on the integration of sustainability in founding motivation. Here we find the strongest impact in our model.

The findings of our investigation in regard to personal attributes support the assumption that the closer and more concretely the sustainability orientation of students and entrepreneurs is related to start-up activity (entrepreneurial sustainability orientation, sustainability in founding motivation), the higher the impact on the integration of sustainability in actual business activity.

The findings discussed above underline that the proposed model is useful to investigate the influence of an entrepreneurial support system (such as a generic BPC) on actual business activity. The basic structure of the model differentiates between institutional characteristics of an entrepreneurial support system as context variables (objectives, communication, awards and, offerings of a BPC), business model development as mediating variable and actual business activity as dependent variable. This seems to be an appropriate differentiation. The applied variables also seem useful. Nevertheless, in the further development of the model it could be considered to introduce a further context variable reflecting the value and entrepreneurial orientation of involved consultants and coaches, as they can have an influence on the business development activities of participating entrepreneurs and teams (Dickel et al., 2018).

7. Conclusions

7.1. Key results and implications

Our results reveal that specific features or support activities of generic BPCs have an impact on the level of integration of sustainability goals and considerations in start-up business activity. With regard to our guiding research question, our results support the assumption that the promotion of sustainability in generic BPCs leads to a higher level of sustainability integration in the business activity of participating entrepreneurs and start-up teams. Based on our findings we can draw the following key conclusions:

- (1) *Context matters*: Context factors in early (seed and start-up) phases of a new venture have been a neglected field of research in sustainable entrepreneurship. Our findings show that BPCs as a specific type of entrepreneurial support system can actually influence the level of sustainability integration in the business activity of participating entrepreneurs and start-up teams. Thus, from a sustainability viewpoint it obviously makes sense to explicitly integrate sustainability into the concrete support offerings of generic BPCs.
- (2) *Designing the context for sustainable entrepreneurship*: We conclude from our findings that the context of early phase venturing matters, and that it can be designed in such a way that the level of sustainability integration will be increased. With regard to our guiding research question, the results of our empirical investigation underline that not all features and activities of a generic BPC have the same impact on sustainable entrepreneurship. This finding has consequences for the design of generic BPCs and the type and intensity of specific support activities for sustainable entrepreneurship. It does not seem sufficient to just promote sustainability in a general way and to award a special sustainability prize. Instead, it is necessary to systematically integrate sustainability into all parts of the business plan or business model canvas template and guidelines and to offer special workshops and webinars on how to make sustainability an integrative element of business model development.

Based on these findings, it can be concluded that policy makers in the field of innovation and entrepreneurship policy as well as practitioners and organizers of generic BPCs should consider systematically integrating sustainability issues and concrete offerings and tools for sustainability-oriented business model development into generic BPCs and other generic support activities within entrepreneurial ecosystems.

The fact that not all hypotheses are supported by our findings, allows for further conclusions that are particularly relevant for policy makers, practitioners and organizers of BPCs:

- (1) *Connect sustainability issues as closely as possible to business venturing and start-up activities*: Our results suggest that a high general sustainability orientation of students and entrepreneurs does not automatically lead to the integration of sustainability goals and considerations into actual business activity. It seems necessary to relate sustainability issues closely to the role of business and entrepreneurship in society (entrepreneurial sustainability orientation) and to support the integration of sustainability into the founding

motivation of students and first-time entrepreneurs. The more sustainability becomes part of the “dominant logic” (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986) of entrepreneurs and the “entrepreneurial DNA” of start-up teams in general, the more likely it seems that companies will contribute effectively to achieving Sustainable Development Goals.

- (2) *Ensure that sustainability is properly integrated into the generic BPC and communicated effectively:* The fact that we could not find support for the assumption that sustainability goals and communication of the BPC have an impact on sustainable entrepreneurship might have to do with the level and quality of integration of sustainability into the generic BPC. If the cognitive and strategic framing (Cornelissen and Werner, 2014) of the BPC is expected to have an impact on the participants and on sustainable entrepreneurship, sustainability should be an explicit goal of the competition, which needs to be communicated effectively. The majority of participants have to perceive sustainability as an important goal and element of the competition. The same holds true for awards.

7.2. Limitations

Our investigation was focused on one single generic BPC, which clearly constitutes a limitation of our research. The impact-related research approach should be expanded to other BPCs (generic and specific) and to other elements or approaches in the entrepreneurial support system such as public funding schemes, incubators or accelerator programs. Furthermore, future research needs to dig down deeper in the effect pathways of cognitive and strategic framing of entrepreneurial support systems.

7.3. Future research

Our findings provide relevant theoretical implications and

indicate future research avenues. Theories of cognitive and strategic framing (Cornelissen and Werner, 2014) and framing concepts such as the “dominant logic” (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986) can fruitfully connected with the theory of entrepreneurial support systems (Fichter et al., 2016a, b). Also, in the further development of the used model it could be considered to introduce a further context variable reflecting the value and entrepreneurial orientation of involved consultants and coaches, as they can have an influence on the business development activities of participating entrepreneurs and teams. This also refers to the framing perspective which helps to explain the role support systems such as BPCs play in influencing the orientation and venturing activity of participating entrepreneurs. Nevertheless, our empirical findings give only a first and general indication of the relevance of framing and support system theories. Future research needs to investigate in much more detail how a dominant logic of sustainable entrepreneurship emerges and how the design of support systems such as BPCs exactly influences the orientation and motivation of entrepreneurs and the sustainability performance of their venture.

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Appendix 1. Construct operationalization

Constructs	Items	Scale	Source
Sustainability in the objectives and communications of the BPC	1	6-point Likert-scale	Own development
BPC Sustainability Award	1	Nominal yes/no	Own development
Sustainability-specific aspects in BPW guidelines for business model development (business plan and canvas)	2	6-point Likert-scale	Own development
Use of sustainability-related offerings of the BPC	5	6-point Likert-scale	Own development
Sustainability integration in business activity	3	6-point Likert-scale	Own development
Controls			
Age	1	1–100	
Gender	1	Nominal w/m	
Founding experience	1	6-point Likert-scale	Own development
Context green economy	1	Nominal yes/no	Own development
General sustainability orientation	3	6-point Likert-scale	Kuckartz and Rheingans-Heintze (2006)
Entrepreneurial sustainability orientation	3	6-point Likert-scale	Kuckartz and Wagner (2010)
Role of sustainability objectives in the founding motivation	1	6-point Likert-scale	Own development

Appendix 2. Items and loading on each of the other constructs

	ME	SD	1	2	3	4	5	6	7	8
1. General sustainability orientation (GSO) (Kuckartz and Rheingans-Heintze, 2006)										
GSO1: There should be a just relationship between generations; we should not loot the environment at the expense of future generations.	5.43	1.07	0.923	0.758	0.464	0.239	0.043	0.386	0.151	0.400
GSO2: Trade between the rich countries of the planet and developing nations should be fair.	5.25	1.20	0.935	0.810	0.486	0.191	0.089	0.384	0.132	0.459
GSO3: We should not consume more resources than can grow back again.	5.45	1.01	0.880	0.712	0.343	0.155	0.122	0.332	0.114	0.370
2. Entrepreneurial sustainability orientation (ESO) (Kuckertz and Wagner, 2010)										
ESO1: Companies should give a high priority to environmental protection.	5.31	1.16	0.739	0.911	0.489	0.200	0.039	0.407	0.188	0.504
ESO2: Social responsibility should be the fundamental basis of every company.	5.20	1.14	0.791	0.935	0.527	0.161	0.067	0.399	0.188	0.526
ESO3: Founders and companies should regard ecological and social sustainability as an opportunity for their entrepreneurial activities.	5.25	1.18	0.778	0.919	0.493	0.205	0.077	0.445	0.187	0.534
3. Sustainability objectives in founding motivation (SOFM)										
SOFM: What is the role of social goals (environmental protection, well-being, fair working conditions, etc.) in your motivation as a founder?	4.52	1.58	0.479	0.546	1.000	0.236	0.098	0.534	0.214	0.711
4. Sustainability in objectives and communications of BPC										
SOBPC: When you look at the goals of the BPW and its communications (BPW BB website, manual, etc.), what significance do the organizers and the supporters of the BPW BB attach to the topic of sustainability?	4.22	1.40	0.216	0.204	0.236	1.000	0.048	0.330	0.290	0.288
5. BPC Sustainability Award (BPCSA)										
BPCSA: Did you know about the special Sustainability Award?	1.53	0.50	0.090	0.067	0.098	0.048	1.000	0.212	0.020	0.183
6. Sustainability in business model development (SBMD): In working out your business model for the BPW BB, did you explicitly consider the sustainability aspects of your business idea?										
SBMD-BP: In working out your business plan.	4.02	1.68	0.376	0.431	0.551	0.262	0.146	0.890	0.428	0.670
SBMD-C: In working out a canvas.	3.91	1.69	0.311	0.335	0.343	0.311	0.226	0.820	0.391	0.498
7. Sustainability-related offerings of the BPC (SOBPC): Please indicate the extent to which you made use of the following sustainability-specific aspects of BPW BB.										
SOBPC1: Questions and criteria in connection with sustainability in the manual	3.52	1.84	0.171	0.218	0.206	0.311	0.057	0.411	0.754	0.410
SOBPC2: The Sustainability Webinar	1.91	1.59	0.054	0.112	0.132	0.174	0.012	0.292	0.720	0.240
SOBPC3: The Sustainability Workshop	1.94	1.77	0.115	0.165	0.158	0.237	−0.056	0.335	0.761	0.273
SOBPC5: Networking offerings on the topic of sustainability	2.23	1.77	0.069	0.088	0.127	0.108	0.032	0.372	0.756	0.223
8. Sustainability integration in business activity (SIBA)										
SIBA1: Ecological or social sustainability were taken into account strongly in my/our newly worked out or revised business model for BPW BB.	4.09	1.68	0.311	0.443	0.568	0.175	0.213	0.550	0.239	0.824
SIBA2: Since my participation in BPW BB the topic of ecological or social sustainability has been of major significance in my founding concept.	3.93	1.71	0.346	0.395	0.601	0.267	0.166	0.642	0.390	0.875
SIBA3: In future entrepreneurial activities (starting new businesses, contents of the actual business concept, opening up new markets), I will take ecological or social sustainability aspects into account.	4.57	1.47	0.501	0.617	0.669	0.295	0.104	0.599	0.391	0.891

Notes: ME = Mean; SD = Standard Deviation.

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