A Business Accelerator Model for Advancing Sustainability Transformations

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ABSTRACT

Multi-scalar, integrated and transformational solutions are necessary to address the complex problems of climate change and sustainable development. Cities are using urban living labs to develop and test such solutions; however, the pace of transformation does not yet match the urgency of the problems at hand. In business, accelerators are used to advance new and potentially transformational enterprises, giving fresh ideas an advantage over more established competition, thereby accelerating the pace of change. This article examines the accelerator model and considers its adaptation to urban living labs. From the literature, a multi-scalar business accelerator model is proposed that addresses both individual and system interventions to advance sustainability transformations. Also proposed is a formative-evaluation framework to guide effective implementation of the accelerator model. This article concludes with recommendations for scholars and practitioners working on urban living labs to utilize business accelerators to advance sustainability transformations.

Keywords: business accelerator, sustainability accelerator, sustainability transformation, urban transformation, urban lab

1. INTRODUCTION

Climate change is a global issue that has a multitude of negative effects on populations and the planet. Multi-scalar, integrated and transformational solutions are necessary given the complexity of climate change and recent evidence that current emissions trajectories will cause irreparable damage to the habitability of the planet over the coming decades (IPCC 2018). Although cities are large contributors to climate change because of their growth and mass consumption, they are also hubs of innovation that can lead to transformative solutions (Ernstson et al. 2010; Bulkeley 2013).

Cities and universities are using urban living labs, urban sustainability transition labs and other experimental settings to develop and test such solutions (Voytenko et al. 2016; Wiek et al. 2017). These settings offer room for adaptive governance and experimentation in collaboration with various stakeholders, public and private actors (Menny et al. 2018). While the number of experimental settings in urban areas increases, they still struggle with many challenges, resulting in the transformational effects they promise rarely being demonstrated and confirmed (Schäpke et al. 2017). For example, the research project Governance for Urban Sustainability Transitions (GUST) studied multiple urban living labs throughout Europe. Their results show that each of the labs involved had its own shortcomings: the Smart City Graz project had room for improvement in solidifying real learning mechanisms, the labs in Newcastle were focused on the economic aspects of urban regeneration rather than engaging the local communities, and the Lund lab struggled with resident participation and collaboration across sectors (McCormick et al.

2015; Breitfuss-Loidl et al. 2016; Lindsay Mai et al. 2016). In addition, an urban lab in Manchester encompassing a project for the redevelopment of the Oxford Road corridor was intended to foster innovation and co-production of this space, but the "laboratorization here currently involves the retrenchment of existing modes of governance under the guise of innovation" (Evans and Karvonen 2014, p.426). Even though urban labs might face particular challenges, incorporating aspects of real-world practice into research provides them an advantage over traditional research settings, particularly in more practical and results-oriented sectors such as business and economic development.

Similar to urban labs, business incubators and accelerators offer particular experimental settings that have also been used for advancing urban and regional sustainability (Mieg 2012; Lamine et al. 2018). Business incubators tend to work with aspiring business ideas by providing collaborative working space and networks for support, while business accelerators typically work on a cohort basis with existing businesses to aid in growth and scaling (Isabelle 2013; Dobson 2018). However, current business accelerators, including those claiming orientation towards sustainability, are focused on the *economic* acceleration of the businesses involved rather than system transformation (CSB 2017). They focus on economic outputs such as jobs created, funds and revenue generated, and the number of businesses impacted by their programs rather than sustainability outcomes such as improving inter- and intragenerational justice, using resources more efficiently, or improving ecological integrity. Considering that growth and consumption are contributors to climate change, the business sector is currently lacking in addressing these issues and is a key intervention point for transforming current systems.

To address these gaps, this article provides a Business Accelerator for Sustainability Transformation (BAST) model. This accelerator model is intended for use as an experiment in an urban lab. The accelerator aims to address the gaps of current urban labs and accelerators in three ways: through continuous experimentation that occurs with each business that participates in the accelerator; through accelerating sustainability interventions through its operations and individual businesses that participate; and through intervening at, and making connections between, multiple scales. An evaluation framework for the development of such accelerators is then provided that can be applied within an urban living lab or other experimental setting. This evaluation framework provides a guided way of confirming whether the accelerator is achieving the transformative solutions it intends. The following research questions are addressed to accomplish this:

1. What are the features of exemplary sustainability-oriented business accelerators currently in operation?
2. What are the key features that differentiate a business accelerator for advancing sustainability transformations?
3. How can the real-world development and implementation of such an accelerator be formatively evaluated?

2. RESEARCH DESIGN

Exemplary sustainability-oriented accelerators were identified and reviewed based on publicly available information. Selection criteria were that the accelerator is oriented towards sustainability (social justice, environmental protection, economic viability), is currently running, provides information on how it is operated, has successfully accelerated businesses, and provides information on outputs. Four accelerators were selected that represent diversity in goals and

operations. Characteristics of each accelerator were extracted from the annual reports, accelerator webpages, and external reports and categorized for comparison. The scale, area of focus, and goal of each accelerator were extracted to identify the intervention points and aspects of sustainability being addressed by each accelerator. In addition, as this paper argues conducting an accelerator as an experiment with urban labs, aspects of the Lüderitz et al. framework for sustainability transition experiments were used that could be identified from the sources (inputs, processes, outputs) to analyze the chosen accelerators (Lüderitz et al. 2017). Together, these features allow comparison for how far current sustainability-oriented accelerators are achieving sustainability transformations by evaluating how the outputs of each accelerator are achieved, who these outputs are affecting, and if these outputs translate into sustainability outcomes.

Characteristics unique to a BAST were identified via discussions with a number of experts from Arizona State University, City of Phoenix, City of Tempe, and Local First Arizona based on this information. Characteristics that are necessary in running an accelerator were synthesized from the existing accelerators and combined with the unique characteristics of the BAST to create the final model. The full evaluation framework proposed by Lüderitz et al. was then applied to the BAST (ibid). An evaluative guide with guiding questions relevant to each aspect of the BAST was then developed for use in the implementation stage (not part of this article).

3. RESULTS

3.1. Features of Existing Sustainability-oriented Business Accelerators

Four existing sustainability-oriented business accelerators were chosen to analyze through the lens of transition experiments to compare how far these current accelerators are achieving sustainability transformations. These accelerators cover environmental, social and economic focuses of acceleration.

The *Techstars Sustainability* accelerator is a technology-focused accelerator that works with entrepreneurs producing technologies that address issues such as climate change or that sustainably provide food or water. They are included within the Seed Accelerators Ranking project as a platinum accelerator. The main difference of the Techstars Sustainability accelerator compared with conventional accelerators is their focus on businesses producing sustainable technologies and their partnership with Nature Conservancy, who provides mentorship on sustainability subject matters.

Fuerza Local is an equity-focused accelerator that works with under-served micro-entrepreneurs. In addition to the generic accelerator characteristics, Fuerza Local runs a lending circle for its participants that allows them to build their credit while in the program. Additionally, it provides access to credit through partnering financial institutions upon graduating from the program. Fuerza Local focuses on accelerating minority-owned businesses as a response to unfair targeting and predatory lending toward Latino populations.

The *NYC Worker Cooperative Business Development Initiative* (WCBDI) is a cooperative-focused accelerator. They are assisted by the Small Business Services of the New York City government and work with both current and aspiring cooperatives. The WCBDI works at multiple levels to create an environment where worker cooperatives can grow and thrive. In addition to working at the enterprise level where they provide educational materials and build capacities, the WCBDI works at the local network and government level. At the local network level, they partner with

community-based organizations providing business development services to extend the reach of assistance to current and aspiring cooperatives in the area. For example, they are partnered with the Worker's Justice Project which is an organization that aims to build power as a collective against economic and racial injustices for day laborers and domestic workers. Additionally, since the WCBDI is housed within the local NYC government, they work to support cooperatives through local laws that require reporting on the program and encouraging city bidding to worker-owned businesses.

The *Uncharted* accelerator is a social venture accelerator that works with entrepreneurs, organizations, investors and governments addressing social issues such as early childhood poverty, urban poverty, and food insecurity. They operate by accelerating ventures vertically and horizontally to address these specific social issues. For example, Uncharted runs a program targeted to address food insecurity called Food Access. With this program they partnered with the City of Denver and provided a 5-day intensive bootcamp and mentorship to scale 10 venture enterprises aimed at addressing food insecurity in low-income neighborhoods in Denver, Colorado. In addition, they facilitated the creation of a trade association around actors addressing food insecurity and started the process of co-creating a reverse RFP.

Tables 1 summarizes the key features of the portrayed accelerators as described in the methods section.

Table 1. Characteristics of business accelerators oriented toward sustainability of businesses

Accelerator	Area of Focus	Level of Focus	Inputs	Processes	Outputs	Goal
Techstars Sustainability Accelerator	Sustainability-oriented technology businesses	-Singular enterprises	-Funding -Personnel -Partnership with The Nature Conservancy -Knowledge of business development and growth practices	-Provide mentorship -Provide trainings over a 3-month period -Provide financial support	-Increased businesses producing sustainable products and services	"Help sustainably provide food and water and address global issues like climate change." (TechStars 2019)
Fuerza Local	Under-served micro-entrepreneurs	-Singular enterprises	-Funding -Personnel -Knowledge of financial literacy and business development -Network of financial institutions	-Weekly trainings for 6 months on financial literacy and business development -Run a lending circle -Provide scholarships to participants at the conclusion of the program	-Increased minority-owned and financially literate, businesses with a built credit history - Increased jobs in local economy	"Creating opportunities for small business development in low-income communities…" (Local First Arizona Foundation 2018)
NYC Workers Cooperative Business Development Initiative	Cooperatives or businesses interested in cooperatives	-Singular enterprises -Local networks -Local government	-Funding -Personnel -Local policies that support cooperatives -Internalization within the city government -Network of local businesses and community-based organizations	-Connect with local nonprofits -Provide mentorship -Provide educational services -Provide one-on-one services organizations -Build capacities on hiring further personnel	-Increased worker cooperatives -Increased hires within worker cooperatives -Increased capacities of existing and aspiring worker cooperatives	"Cultivate an economic environment where worker-owned businesses can grow and thrive in New York City" (NYC Small Business Services 2018)
Uncharted	Problem-specific social ventures	-Singular enterprise -Local networks -Local government	-Funding -Personnel -Network of local businesses, investors and community-based organizations -Collaborative projects with local government	-Provide mentorship -Provide 5-day bootcamp -Provide connections to investors -Facilitate connections between participants and other actors	-Increased funding and revenue of participating enterprises -Increased jobs -Increased lives impacted	"Scale and connect organizations to tackle social problems." (Uncharted 2018a)

The reviewed accelerators contribute to sustainability in different ways. The Techstars Sustainability accelerator uses an enterprise focused approach, supporting sustainability solutions at the intervention point of technology producing businesses. By accelerating businesses with sustainable technologies that address climate change they contribute to reducing greenhouse gases and using resources more efficiently. However, Techstars' focus on the growth and scaling of single enterprises producing technologies does not address the contribution of the traditional growth model of businesses, which is a contributor to climate change, or equity issues present within the sector.

Conversely, Fuerza Local works to address and improve the racial inequity that is present within the current economic system by working with under-represented communities within the state of Arizona. They work with enterprises in the region to improve financial literacy and provide funding opportunities that these communities would not otherwise receive. Through this they strengthen the local economy and improve these communities' livelihood sufficiency by increasing their economic opportunities and viabilities, in addition to improving the equity of the region. For example, in 2017 graduates of their program created 112 jobs within the region and had gross sales over $5 million (Local First Arizona Foundation 2019). However, like Techstars, Fuerza Local is also only addressing the intervention point of single enterprises, perpetuating the traditional economic growth practice. They also do not address the environmental impacts of the businesses they are accelerating.

Rather than only focusing on enterprises they work with, the WCBDI is trying to create a system shift by working at multiple scales. By also collaborating with local organizations and local government, the WCBDI creates a more supportive environment for worker cooperatives. Improving the viability of worker cooperatives contributes to improving the local economy, livelihood sufficiency and equity of the region. For example, the WCBDI provided educational services to a cleaning cooperative that is owned by migrant workers to increase their knowledge and economic viability which is reflected by the increase in their client base (NYC Small Business Services 2018). By aiding in the growth of this cooperative, the livelihoods of under-represented communities and the local economy are strengthened due to increased revenue, and improvements in equity are achieved. Although the WCBDI supports under-represent communities, it is still focused on the economic aspects of the system for cooperatives as seen through their government actions and cooperative priorities. The WCBDI also does not address the environmental impacts of the businesses they work with, such as through resource efficient practices or renewable energy sourcing.

The Uncharted accelerator takes a more holistic systems approach to achieve their goals of accelerating solutions for social problems. Using their Food Access program as an example, they address the enterprises involved, local networks and local government to collectively identify and work toward a solution for food insecurity in the Denver region. The outputs of their program strengthen the local economy and improve livelihood sufficiency by improving the economic viability of these impact ventures and increasing the connections between the ventures involved. These connections help reduce the amount of food waste and food miles which contributes to reductions in greenhouse gases and addresses some of the environmental side effects of food production and distribution. Additionally, they address equity directly by improving food access to low-income populations in the region which they do both through the ventures they worked with and through an association and reverse RFP they helped facilitate. Finally, they conducted transformative capacity building activities during their bootcamp such as facilitating collaborative

activities and conducting a strategy workshop that created concrete next steps to increase the likelihood of real-world implementation of the items discussed during this period.

While Uncharted is leading a progressive accelerator model that addresses prominent issues, they do not provide the combination of characteristics that lead to sustainability transformations. For example, the work of their accelerator does not promote or prioritize shifting to carbon-neutral business practices. One of the businesses they worked with utilizes electric tricycles for deliveries which does provide a reduction in emissions in comparison to traditional vehicle delivery methods. However, there is no mention of whether they receive electricity from renewable sources. Another enterprise grows organic produce via aquaponics which increases water efficiency, yet again the energy source to run the aquaponics is not mentioned as being from renewable resources. In addition, the businesses they work with are already using integrated impact models before entry into the program. While this allows the relation between the acceleration of these businesses and their impact outcomes to be tightly knit, the accelerator does not provide guidance for businesses shifting from current growth models to alternative business models, thus supporting a niche of businesses rather than transforming the local economy. Finally, the structure of their program is not optimal for successful transition. The Uncharted Food Access program, and other programs of theirs, provide a 5-day intensive bootcamp for its participants. This short time frame does not allow time between trainings for applicants to reflect on and implement what they learned from one concept before moving onto the next concept; Uncharted itself mentions in their report that they would have preferred at least twice the amount of time (Uncharted 2018b). Additionally, accelerators typically provide trainings over a 3 to 6 month period to achieve their goals of scaling (Dobson 2018). In conclusion, even though Uncharted is one of the more transformational business accelerators currently in operation, it still does not adequately address all aspects of acceleration necessary to transform systems for sustainability.

These comparisons are summarized in Table 2.

Table 2. Comparison of the accelerators regarding sustainability transformation features

Accelerator	Techstars Sustainability Accelerator	Fuerza Local	NYC Workers Cooperative Business Development Initiative	Uncharted
Addresses enterprises?	Yes	Yes	Yes	Yes
Addresses systems?	No	No	Yes	Yes
Cohort-based trainings?	Yes	Yes	No	No
Addresses which Transformative Capacities?	Competence Power	Competence Power	Competence Confidence Power	Competence Confidence Commitment Power
Strengthens local economy and livelihood sufficiency?	No	Yes	Yes	Yes
Reduces greenhouse gas emissions?	Yes	No	No	Yes
Improves equity?	No	Yes	Yes	Yes
Addresses institutional sustainability transformation?	No	No	No	No

3.2. The Business Accelerator for Sustainability Transformation (BAST) Model

The BAST model responds to the gaps of current sustainability-oriented accelerators identified in section 3.1 by addressing the necessary components for a sustainability transition experiment to achieve successful transformations. As the literature suggests that multi-level interventions are needed to support transformations, the BAST model has four distinct scales at which it operates (Donella Meadows 2010; Abson et al. 2017).

Starting at the smallest scale is the level of internal administration. The BAST needs to employ sufficient staffing to maintain program management and obtain sufficient funding to run and provide services to its participants. Without securing these basal components, the BAST would not have the administrative support necessary to run the accelerator.

The next scale is the enterprise level, where the aim is to deliver training materials to local businesses on sustainability practices in a culturally appropriate manner. Knowledge on relevant sustainability practices, such as carbon-neutral practices or energy efficiency practices, and alternative business models are turned into training material and embedded within a curriculum by the BAST administrators. Providing trainings on business practices and models in culturally appropriate ways ensures that the BAST is encompassing environmental, social and economic points for transition. Additionally, the trainings provided by the BAST are the most direct method in which to improve the sustainability of the businesses involved. Therefore, these trainings are designed to build the participants' transformative capacities, or their confidence, competence, commitment and power to implement the knowledge presented from the accelerator program. Building the transformative capacities of the participants is a vital point of intervention as

knowledge transfer is not enough to ensure that sustainability practices are implemented (Wolfram 2016; Keeler et al. 2018).

One level above this is the system level, where the accelerator aims to create and facilitate collaborations between local businesses and other actors. This requires identifying opportunities where connections between businesses, both participating in the program and not, can be successfully made. Increasing connections within the local economy both strengthens the local economy and reduces greenhouse gases. It does this by retaining more money within the local economy and reducing the range in which materials and people have to travel to obtain the services they need (Local First Arizona 2018). Although not the sole focus of the BAST, economic viability is still a key aspect to consider for its participants to ensure self-sufficiency and livelihood sufficiency after leaving the program. The BAST aims to achieve this by connecting participants to local investors and customers that support sustainable practices and enterprises. The investors directly increase the economic viability of the enterprises through investments and the customers indirectly increase economic viability of the enterprises by increasing the market for the products and services of these enterprises.

Lastly, the highest scale that the accelerator operates is that of policy. Change at the level of policy aids to embed the support for sustainability within local institutions. The BAST aims to achieve this change by collaboratively developing programs with the local government that support sustainable practices. To do this lobbying and strengthening relationships with local officials is needed. Lobbying aids in the implementation of local policies that support sustainable practices. Local policies provide legal support and foster a supportive environment for the enterprises involved in the program. Meanwhile, strengthening relationships with government officials improves the likelihood of co-producing sustainability programs. Government-partnered programs expand the access of resources through funding, knowledge and power thus also expanding the BAST's scope of impact for transformation.

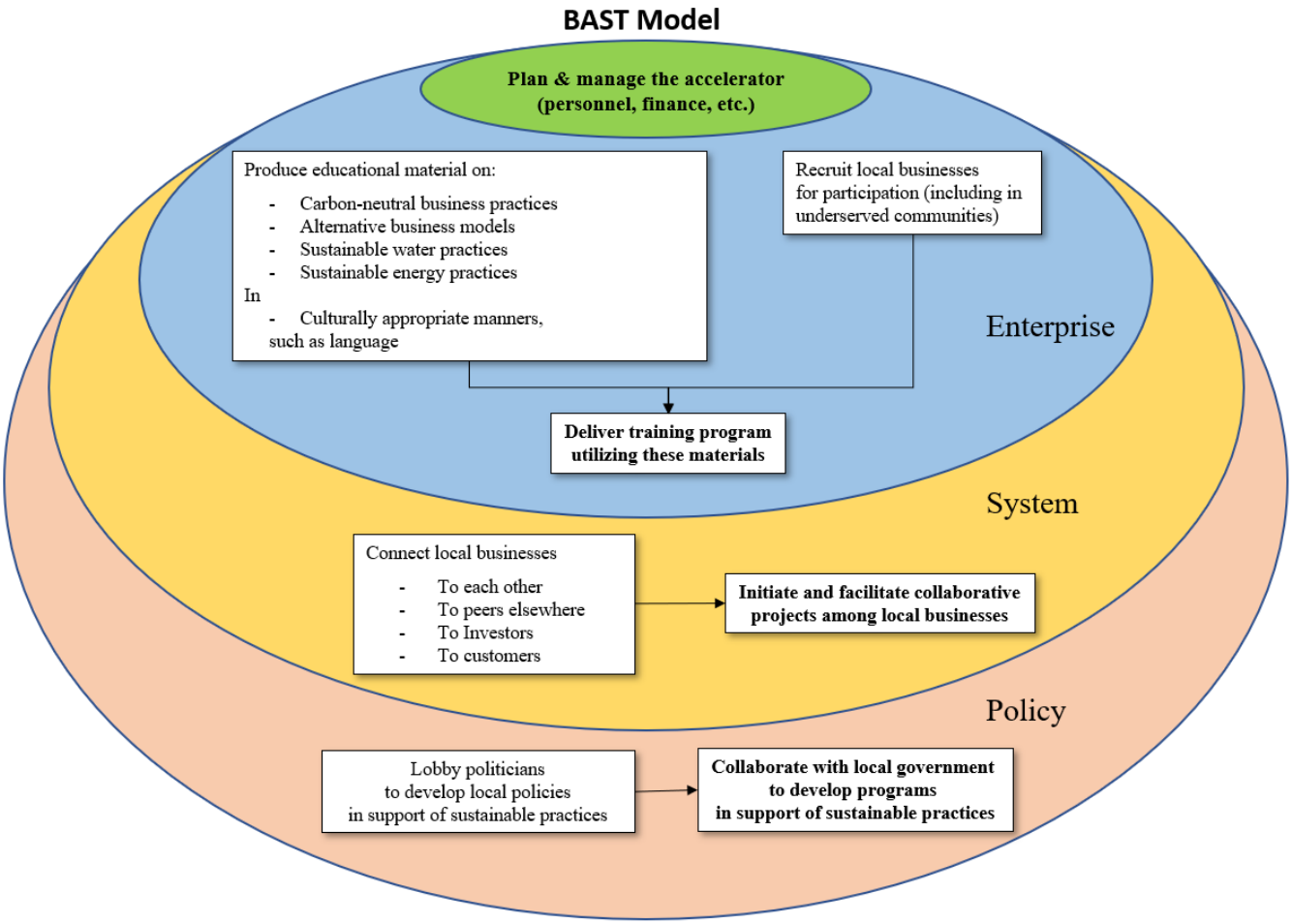

Figure 1. Main features of the BAST model

3.3. Evaluative Framework for BASTs

The Lüderitz et al. evaluative scheme is intended to improve and support sustainability transition experiments, which they describe as experiments that exhibit "cross-organizational collaboration between actors from academia and society (government, industry and citizenry) with the aim of collaboratively fostering transformational change and progress towards greater sustainability" (Lüderitz et al. 2017, p. 62). As section 3.2 argued, the BAST model exhibits features of a sustainability transition experiment and thus the Lüderitz et al. (2017) evaluative scheme was applied to create an evaluative framework for the BAST model (see Figure 2). This allowed for the BAST to be further operationalized and allows sustainability transformations to be embedded and considering during each aspect of its formation and development. This model was broken down into two different phases: the development and ongoing maintenance of the accelerator, and the running of the accelerator. The case study of a current urban living lab attempting to create a BAST focused on food in the Phoenix-metropolitan region is used to explain this framework.

Phase I

Development and Maintenance

Aspects of the development and maintenances of the accelerator phase should act as inputs into the running of the accelerator. These aspects should be done both during the development of the accelerator and repeated throughout its life cycle to ensure that the accelerator is kept up to date. With the Phoenix example, businesses will be identified from existing databases and evaluated by the type of business they are. Business types fall within one of the following three categories: front-runner sustainable businesses wanting to improve their sustainable practices, businesses aspiring to become sustainable or an aspiring business idea addressing a sustainability gap identified within the area. Additional evaluation criteria include the type of business practices used (such as traditional, cooperatives or benefit corporations), if the business is transferable or scalable and the economic viability of the business or idea. These criteria ensure that the potential businesses are being holistically evaluated but also that the participants involved have the capability to complete the accelerator program.

Businesses that meet the evaluation criteria should then be compiled into a pool to contact for recruitment. Recruitment to these businesses should ensure that potential participants are aware of the intended goals of the BAST and the commitment required on entering. The Phoenix BAST will also research best practices from literature and existing front-runner sustainable food businesses to then analyze and create a database of sustainable practices that will be created into training materials. This pool of best practices ensures that the training materials are evidence-based.

Finally, the capacities of the administrators should be built in such a way that they exhibit the expertise necessary to successfully run the accelerator. For example, the Phoenix BAST anticipates providing trainings and programs for the administrators that focus on how to carry out the processes of the accelerator such as, how to deliver capacity-building programs to the businesses involved.

Phase II

Inputs

As mentioned in section 3.2 the BAST should have sufficient funding and staff that ensure support for it to run. The Phoenix BAST received funding from the National Science Foundation (NSF) that lasts through 2020. This NSF funding contributes to the transparency of the BAST and the commitment of the project partners to carry out the experiment because of the required reporting that accompanies it. However, funding from external sources will also need to be sought out to achieve sufficient levels of support. Additionally, staff members should include actors from both academia and society. With the Phoenix BAST, staff includes members from the university, cities and local nonprofit in the area. These staff should compile their knowledge and skills regarding sustainable business practices and acceleration, alternative business models, local demographics and relevant local issues to provide as a curriculum to the participants of the accelerator. The information provided within this curriculum should pull from the expertise of each of the staff members involved to produce a holistic training program for the participants.

Processes

The BAST should then provide these trainings to its participants. The Phoenix BAST anticipates delivering trainings via methods such as workshops, multi-stakeholder panels, games or visioning exercises. Because these trainings are based in best practices, they are built on sound methodology.

Trainings should also be structured so that there are deliberate times for reflection built in to allow participants to implement what they learn. The BAST should also provide support for its participants that enables them to work through barriers and use these as opportunities for learning that inform the accelerator practices.

Additionally, connections should be made between the participants and other actors in the system that foster collaborations between these actors. Connections between local businesses that the accelerator could help facilitate are already being suggested with the Phoenix BAST, such as connecting local coffee sellers wanting to add tea products with local farms with space to grow tea. These types of connections secure the supply and demand of the product and reduces the amount of food miles that would occur if the tea were sourced elsewhere. Finally, collaboration should occur between the accelerator and local government actors. The Phoenix BAST anticipates doing this by partnering with the cities of Tempe and Phoenix to aid in the administration of the accelerator.

Outputs

The BAST should create an increase of connections between local businesses and other actors in the local system. These connections create new networks that support solutions for sustainable transformation. The BAST should also build the transformative capacities of the participants through specific capacity building exercises that were stated in the processes section. This increase in capacities increases the likelihood of the participants to implement the trainings they receive into their everyday practices. The BAST should also create an increase in the number of businesses using alternative business models. Unlike traditional business models, alternative business models provide the ability for enterprises to prioritize social and environmental goals alongside their economic success. As a result, increasing the number of businesses using alternative business models shifts businesses, both current and new, away from traditional growth models. The BAST should also result in programs with local government that support sustainable practices which . Lastly, the BAST should also produce knowledge on best practices for accelerating a sustainable transition based on what worked for each business that participates. For example, the Phoenix BAST anticipates generating knowledge on how to best accelerate a sustainable local food economy.

Outcomes

The BAST outcomes should address various categories of sustainability transformations. The Phoenix BAST anticipates strengthening the local economy and increasing livelihood sufficiency by creating new connections between the businesses involved and other local actors and the implementation of alternative business models, such as cooperatives. Additionally, the accelerator intends to increase resource efficiency and reduce greenhouse gases by increasing the likelihood of implementation of the sustainable practices they learn about due to the capacities that are built during the program and government programs. The increased connections between local actors should reduce food miles, also reducing greenhouse gases. The accelerator should also improve intragenerational equity by ensuring that under-represented populations are recruited, and that delivery of the trainings is provided in Spanish to reduce the likelihood of excluding under-represented communities. Intergenerational equity should also improve due to programs for sustainability being incorporated into local government that help provide longevity of these effects. These programs should also improve the democratic decision-making. Together, these outcomes should transform the economic, social and environmental realms of the system toward sustainability.

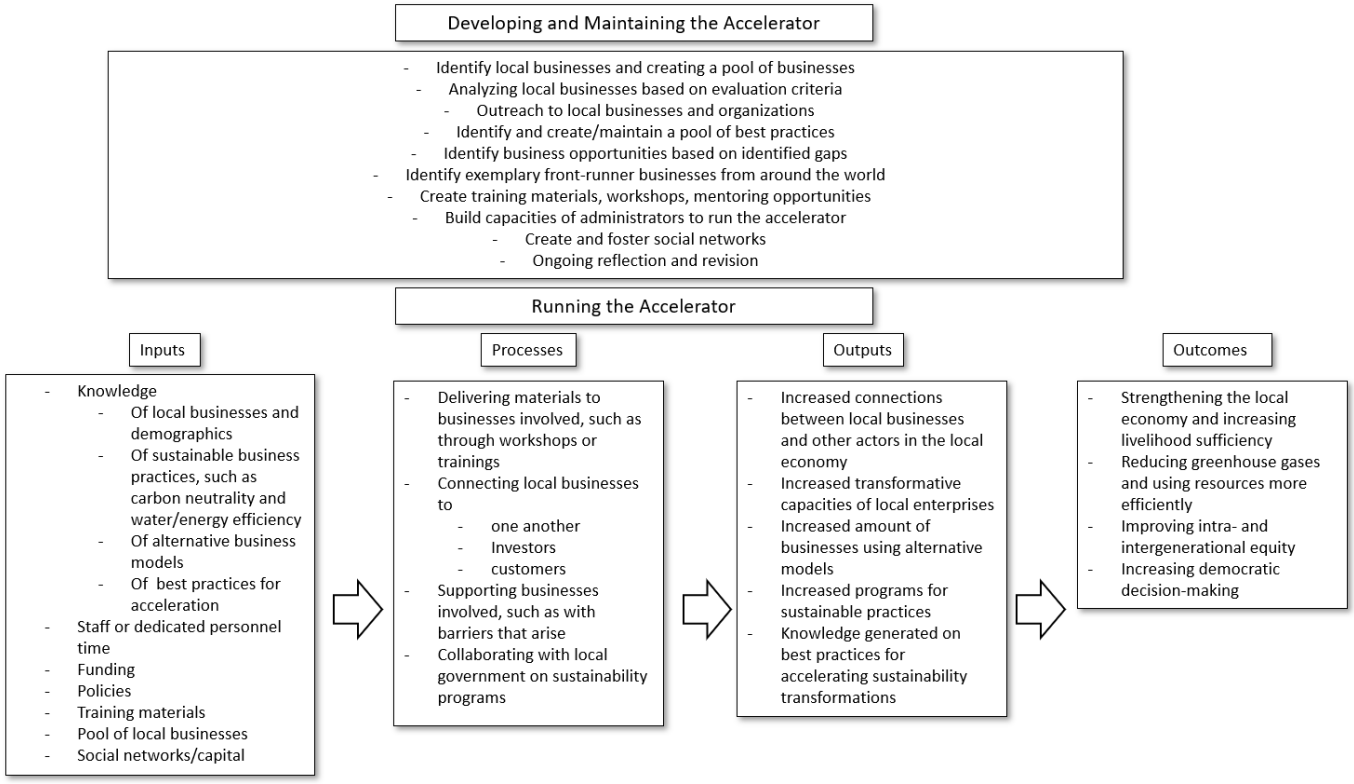

Figure 2. Evaluation framework for the BAST model

An evaluative guide was created to assist in the development and ongoing evaluation of BASTs (see Table 3).

The formative-evaluative framework provided within this section can and should be used as a guide for development and implementation by scholars and practitioners. Each section of the evaluation framework has an accompanied grouping of evaluative questions that should be considered during this process. These questions are meant to ensure that the goals of the accelerator are being integrated and embedded throughout the process in order to achieve sustainability transformations.

The model and evaluation guide, however, are generic and can applied to multiple sectors. The food sector was used as an example but other sectors, such as energy or hospitality, could be easily substituted. Therefore, scholars and practitioners should ensure they specify the development of the BAST to their sector when going through the development and implementation phases of the model. This specification should occur by selecting best practices that are relevant to the sector of interest. For example, with the Phoenix case best practices and trainings might include water efficient food production which would not be applicable for an energy focused BAST.

One way to evaluate whether the accelerator is achieving its intended outcomes, and how, is via a combination of surveys and interviews (Wiek et al. 2014). According to the authors, key documents should be reviewed to create a visual storyboard that accompanies the survey to account for memory distortion of the participants and improve accuracy of responses (ibid). This storyboard should include the number, type and sequence of events, such as trainings or workshops, along with who participated in them. A specified questionnaire should be developed

that asks about the involvement and perceived effects of the participants. This should be followed by statistical analyses to identify causal linkages between project events and their effects. In addition to, or replacement of, the statistical analysis qualitative interviews can be conducted and analyzed to further support the effects identified from the survey. These evaluations can occur throughout the program, such as following each training session and/or at the conclusion of the program to identify whether the accelerator is achieving its desired effects and thus success.

Table 3. Guiding questions for evaluating the BAST model

Phase	Evaluative Question
Development and Maintenance	Are local businesses included that align with the goals of the accelerator?
	Are the criteria used to evaluate local businesses fair and comprehensive toward the accelerator's goals?
	Is the outreach conducted in a way that appropriately conveys the goals and expectations of the accelerator?
	Are best practices that make up the database for which sustainability recommendations are drawn from up to date, transferrable and scalable?
	Are training materials produced in culturally appropriate ways?
	Does the development and maintenance of the accelerator build the capacities of the administrators to run the accelerator?
	Are social networks created that increase the impact of the accelerator?
	Are there opportunities built in to reflect on the accelerator's practices and incorporate revisions?
	Are the capacities of the administrators built that increase their ability to run the accelerator?
Inputs	Are there sufficient staff members to run and deliver the accelerator?
	Are there sufficient funds to support the accelerator?
	Do the administrators of the accelerator possess sufficient knowledge on relevant subjects to run the accelerator?
	Do current policies exist that would support or benefit the accelerator? If no, can new policies be created that do?
	Do current social networks or social capital exist that would support or benefit the accelerator? If no, can new networks be created that do?
	Are the training materials available via inclusive methods?
Processes	Are training materials delivered in a way that builds transformative capacities within its participants?
	Are connections between accelerator participants and others being made in a way that maximizes the success and support for the participants?
	Is sufficient support provided that aids the participants in overcoming barriers they may face?
	Are collaborations between the accelerator and local government being made that advance support for sustainability?
Outputs	Does the accelerator increase connections between local businesses and other actors?
	Does the accelerator increase the capacity of local enterprises participating to improve and implement sustainable practices?
	Does the accelerator increase the amount of businesses in the area using alternative business models?
	Are best practices generated on how to optimally run the accelerator?
	Are programs being created with local government that support sustainable practices?
Outcomes	Does the accelerator strengthen the local economy and increase livelihood sufficiency?
	Does the accelerator create more efficient use of resources and reduce greenhouse gas emissions?
	Does the accelerator increase democratic decision-making?
	Does the accelerator increase intra- and intergenerational equity for its participants and geographical area?

4. DISCUSSION

Urban labs and business accelerators are not delivering on transformative solutions necessary to address climate change. The accelerator model argued for in this article provides a way to advance the delivery of these sustainability transformations in a multi-scalar and integrated way. The accompanying evaluation guide also provides insights into how to implement such an accelerator.

One of the most surprising findings during this process was that there are current accelerators that come close to doing what the BAST model aims to do without being part of an urban lab, such as with Uncharted. This is interesting because the urban lab provides a structured space in which experimentation and uncertainty are acceptable and expected components, whereas these factors are less desired in real-world applications. But accelerators like Uncharted have developed programs that are not only cross-organizational but also embrace the uncertainty in identifying necessary solutions. However, these accelerators are still lacking in some areas which can be addressed by using the structure of an urban lab and conducting the accelerator as a transition experiment to fill these gaps. The BAST model addresses the environmental, social and economic impacts of its participants and works to create a system that supports implementing the capacities built during the program related to sustainable practices. Being an experiment within an urban lab also allows for the goal of sustainable transformation to be embedded throughout the formation of the accelerator by using evaluation schemes such as the Lüderitz framework.

Additionally, the BAST model also addresses the gaps of urban labs not delivering on their transformative potential. The BAST employs institutional experimentation which is a higher level of experimentation than is normally conducted in urban labs (Karvonen et al. 2014; Karvonen and Heur 2014). As mentioned in section 3.2, the BAST model aims to work at the level of both systems and policy to support sustainability practices for businesses. These two intervention scales represent informal and formal institutions and are a critical leverage point as they include structures that can either enable or constrain sustainability and sustainability transformation (Abson et al. 2017). The BAST model, therefore, aims to use these leverage points to enable sustainability transformation and produce knowledge on the best ways to do so.

It is also important to note that although these gaps could have been address in multiple ways, an accelerator model was the best form of experimentation. This is because it aims to transition current businesses, and the current system, toward sustainability rather than filling niches in the current system with sustainable businesses such as an incubator would. Furthermore, rather than providing a model for a singular sustainable business which could then be transferred or scaled, the accelerator model is able to experiment with creating a network of sustainable businesses and an economy and environment that is supportive of these businesses as well, which increases the scope of impact and transformation.

5. CONCLUSIONS

This article contributes to urban experimental research by proposing a novel business accelerator model that aids in sustainability transformations and provides a formative-evaluative framework for its implementation. The potential for this BAST model to create long term transformations toward sustainability was identified throughout this article, however, as this is a theoretical framework, further research needs to be conducted that empirically supports the model.

Additionally, while the BAST model prioritizes building transformative capacities in its design, what remains uncertain is the explicit capacities the BAST builds for the actors involved and how it builds them. Targeted experiments that address these areas should be conducted to further expand and support the BAST model alongside providing more detailed evidence-supported recommendations for scholars and practitioners.

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