THE IMPACT OF VIDEO GAME PROTOTYPING IN AN ACCELERATOR AS VIEWED VIA SPATIAL, TEMPORAL, AND PRODUCT SCALES

O IMPACTO DA PROTOTIPAGEM DE VIDEOGAMES EM UM ACELERADOR VISTO POR MEIO DE ESCALAS ESPACIAIS, TEMPORAIS E DE PRODUTO

EL IMPACTO DE LA CREACIÓN DE PROTOTIPOS DE VIDEOJUEGOS EN UN ACELERADOR VISTO A TRAVÉS DE ESCALAS ESPACIALES, TEMPORALES Y DE PRODUCTOS

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Abstract

Objective of the study: We seek to understand two aspects of a business accelerator: first, how an accelerator influences early product development, and second, how an accelerator impacts participants during and after acceleration.

Methodology/approach: We conducted an ethnography of a rapid prototyping program in video game development. Methods included 810 hours of participant observation, 58 interviews, and hundreds of analyzed material artifacts.

Originality/Relevance: We add insight into the impact and outcomes of an accelerator program across multiple scales: spatial, temporal, and product. Our study is one of the first to examine a formal video game development accelerator.

Main Results: Accelerator participants created 42 prototype games, two companies received additional funding, but no games were released within one year of the program. Product scales changed over time from expectations, to prototypes, to final games. The spatial-temporal scale of the accelerator was open to interpretation. Participants and observers held two main spatial-temporal perspectives (present-local and future-global) that changed over a one year time period.

Theoretical/methodological contributions: First, we conceptualize an accelerator as a dual competitive place where participants and observers engage in dueling and evolving spatial-temporal perspectives over time. Second, we develop the concept of an accelerated digital product scale to explain the process of evolvement from an accelerator product to a potential final product.

Social/Management contributions: We conclude the impact of an accelerator is more complex than the structure or the output. The accelerator may rapidly generate ideas or prototypes, but this does not guarantee a quicker final product release.

Keywords: Accelerator. Video games. Ethnography. Incubators. Creative industries.

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Resumo

Objetivo do estudo: Buscamos entender dois aspectos de um acelerador de negócios: primeiro, como um acelerador influencia o desenvolvimento inicial do produto e, segundo, como um acelerador impacta os participantes durante e após a aceleração.

Relevância/originalidade: Adicionamos insights sobre o impacto e os resultados de um programa de aceleração em várias escalas: espacial, temporal e de produto. Nosso estudo é um dos primeiros a examinar um acelerador formal de desenvolvimento de videogames.

Metodologia/abordagem: Realizamos uma etnografia de um programa de prototipagem rápida no desenvolvimento de videogames. Os métodos incluíram 810 horas de observação participante, 58 entrevistas e centenas de artefatos materiais analisados.

Principais resultados: Os participantes do Accelerator criaram 42 protótipos de jogos, duas empresas receberam financiamento adicional, mas nenhum jogo foi lançado dentro de um ano do programa. As escalas de produtos mudaram ao longo do tempo de expectativas para protótipos e jogos finais. A escala espaço-temporal do acelerador estava aberta à interpretação. Participantes e observadores tinham duas perspectivas espaço-temporais principais (presente-local e futuro-global) que mudaram ao longo do período de um ano.

Contribuições teóricas/metodológicas: Primeiro, conceituamos um acelerador como um lugar competitivo duplo onde participantes e observadores se envolvem em duelos e perspectivas espaço-temporais em evolução ao longo do tempo. Em segundo lugar, desenvolvemos o conceito de uma escala de produto digital acelerada para explicar o processo de passar de um produto acelerador para um produto final potencial.

Contribuições sociais/para a gestão: Concluímos que o impacto de um acelerador é mais complexo do que a estrutura ou a saída. O acelerador pode gerar ideias ou protótipos rapidamente, mas isso não garante uma liberação mais rápida do produto final.

Palavras-chave: Aceleradora. Indústria de videogames. Etnografia. Incubadoras. Indústrias criativas.

Resumen

Objetivo del studio: Buscamos comprender dos aspectos de un acelerador de negocios: primero, cómo un acelerador influye en el desarrollo temprano del producto, y segundo, cómo un acelerador impacta a los participantes durante y después de la aceleración.

Originalidad/Relevancia: Agregamos información sobre el impacto y los resultados de un programa acelerador en múltiples escalas: espacial, temporal y de producto. Nuestro estudio es uno de los primeros en examinar un acelerador formal de desarrollo de videojuegos.

Metodología/enfoque: Realizamos una etnografía de un programa de creación rápida de prototipos en el desarrollo de videojuegos. Los métodos incluyeron 810 horas de observación participante, 58 entrevistas y cientos de artefactos materiales analizados.

Principales resultados: Los participantes de Accelerator crearon 42 prototipos de juegos, dos empresas recibieron financiamiento adicional, pero no se lanzaron juegos dentro del año del programa. Las escalas de los productos cambiaron con el tiempo, desde las expectativas hasta los prototipos y los juegos finales. La escala espacio-temporal del acelerador estaba abierta a interpretación. Los participantes y observadores tenían dos perspectivas espacio-temporales principales (presente-local y futuro-global) que cambiaron durante el período de un año.

Aportes teóricos/metodológicos: Primero, conceptualizamos un acelerador como un lugar competitivo dual donde los participantes y los observadores se involucran en duelos y perspectivas espacio-temporales en evolución a lo largo del tiempo. En segundo lugar, desarrollamos el concepto de una escala acelerada de productos digitales para explicar el proceso de pasar de un producto acelerador a un producto final potencial.

Contribuciones sociales/gestión: Concluimos que el impacto de un acelerador es más complejo que la estructura o la salida. El acelerador puede generar rápidamente ideas o prototipos, pero esto no garantiza un lanzamiento más rápido del producto final.

Palabras clave: Aceleradora. Industria de los videojuegos. Etnografía. Incubadoras. Industrias creativas.

Introduction

Business and technology accelerators are becoming an increasingly popular organizational form with approximately 7,000 appearing worldwide since the first in 2005 (Crișan, Salanță, Beleiu, Bordean, & Bunduchi, 2021). The growing literature has focused primarily on accelerator structures, immediate outputs, and evaluations of success (Battistella, De Toni, & Pessot, 2016; Bone, Gonzalez-Uribe, Haley, & Lahr, 2019; Cohen, Bingham, & Hallen, 2019; Pauwels, Clarysse, Wright, & Van Hove, 2016). The understanding of participation impact in an accelerator remains underdeveloped. Despite calls for research into the impact of accelerators on participants (Roberts & Lull, 2019), many studies take a homogenous approach and consider potential impacts using a single or at most a couple of scales (Cohen, Fehder, Hochberg, & Murray, 2019). Accelerated organizing promises a future where more is done in less time. Here, the accelerator formalizes the process while presenting an idyllic image of a clean, effective laboratory where companies and products are honed in a trial by fire. In-depth *in situ* analysis could help illuminate the impact of acceleration.

Within video game development, there are informal accelerators known as *game jams* - "a rapid prototyping strategy to deliver innovation and new ideas" (Kennedy, 2018, p. 709). These special events can produce the skeleton of a game in as little as a few hours (Aurava, Meriläinen, Kankainen, & Stenros, 2021). This empirical setting makes clear what constitutes acceleration. That is, the digital game industry generally takes multiple years to produce a game (Johnson, 2013; Panourgias, Nandhakumar, & Scarbrough, 2014), but an accelerator aims to speed the process up. The program in this study combined elements of a traditional accelerator with a game jam, thereby offering the potential for unique insight.

We embedded ethnographically in the video game accelerator to explore the organizational form and possible participation consequences. Ethnography involves sustained immersion within an environment (Locke, 2011). Within organizational studies, ethnographic research has demonstrated a potential to reveal multiple perspectives and nuances not available through other methods. Ethnography has further been suggested as a means to provide insight into the complex reality of both accelerators and video game development (Crișan et al., 2021; Whitson, 2020).

We explore the following research questions and the associated implications. We ask: *How does an accelerator impact participants during and after acceleration? How does an accelerator impact early product development?* Specifically, we utilize a multidimensional scalar approach along spatial (Taylor & Spicer, 2007), temporal (Zaheer, Albert, & Zaheer, 1999), and product scales (Slayton & Spinardi, 2016). Digital games are part of the creative industries, but unlike other studies (e.g. Nguyen, Phan, & Pham, 2021), we are not directly examining creativity in this paper. Borrowing from process technologies, we conceptualize the accelerator as a process-based scaling up organization. Primarily, the accelerator is involved in temporal scaling, or "accelerating the performance speeds" of a process (Lehrer, Banerjee, & Wang, 2017, p. 152). This is reflected in a number of studies including a temporal element (e.g. Cohen et al., 2019), except there are still calls for more longitudinal research (Crișan et

al., 2021; Goswami, Mitchell, & Bhagavatula, 2018). Few studies also consider the spatial and product scales of an accelerator. A spatial element is important because accelerators do not 'shelter' companies from the outside world (Cohen, Fehder, et al., 2019). While accelerators aim to scale up companies *and* products (Malek, Maine, & McCarthy, 2014); current research predominantly investigates company outcomes (e.g. Bone et al., 2019). Therefore, we use multiple scales as a tool to explore the impact of acceleration and add to early conceptualizations of the participant experience in an accelerator.

This paper contributes to the existing literature on accelerators, video game development, and scales. Our ethnography incorporates alternative viewpoints within and between different groups of social actors. This goes beyond simple outputs and measures of success, by explicating multi-scalar outcomes. While several studies consider companies admitted to an accelerator compared to those barely missing the cut (e.g. Hallen et al., 2020), our study benefits from both a single industry and an intra-accelerator comparison when analyzing the impact. By focusing on a formal, organized, and repeated game jam, we add to emerging perspectives on new modes of video game development (Kennedy, 2018). Finally, we further contribute by applying multidimensional scales to an accelerated situation.

This paper article is structured as follows. First, we discuss the literature on accelerators, scales, and the digital game industry context. Second, we detail our ethnographic methodology, digital game industry field site, and inductive data analysis. Third, we apply different scales to examine our findings across two themes before discussing the connections between the disparate literature and developing our contributions. Fourth, we conclude the paper with limitations and potential future research suggestions.

Theoretical reference framework

Accelerator outcomes

Accelerators are similar to other Technology Business Incubators (Barbero, Casillas, Ramos, & Guitar, 2012; Mian, Lamine, & Fayolle, 2016), entrepreneurship support (Liu, 2020) and intermediary organizations (Clayton, Feldman, & Lowe, 2018); however, the programs are diverse. We define accelerators as limited-term programs intended to accelerate the development of organizations, individuals, or products via training and education delivered through a cohort structure (Cohen, Fehder, et al., 2019; Hallen et al., 2020; Pauwels et al., 2016). The recent development of accelerators has led to much of the current research concentrating on design and structure categorization (Cohen, Fehder, et al., 2019; Malek et al., 2014; Pauwels et al., 2016). The focus on design led to extensive work trying to measure the output of accelerators, such as correlations between design elements and results - this is best captured by the question of whether accelerators accelerate (Hallen, Cohen, & Bingham, 2020). Other studies evaluate the success of accelerator elements as a whole (Bone et al., 2019; Cohen et al., 2019). Furthermore, positive effects dominate the literature, however, mixed results have also appeared (Crişan et al., 2021). Such mixed results are perhaps explained by the complexity and difficulties

associated with the emergent form and unit of analysis (Hochberg, 2016). Examining structure omits an important component of accelerators: participants, and by extension, the work executed by them. Therefore, a focus on the lived experience, studied *in situ*, might address some of the gaps.

Two prominent gaps exist in the literature on accelerators. First, much of the current research does not delve into outcomes or long-term results of participation; instead, the focus tends to be on outputs, program end results, or after immediate results (Crișan et al., 2021). Potential proxies for measuring success or failure have been suggested as avenues for future research with longitudinal research recommended, taking into account the empirical setting and actors involved (Goswami et al., 2018; Mian et al., 2016). Second, to move beyond the predominance of positive accelerator effects, there are calls for research into the viewpoints of the actors involved in accelerator programs (Crișan et al., 2021). A holistic view will study the impact between and within groups based on differing goals, acknowledging potential negative effects (Hochberg, 2016). Since accelerators comprise of cohorts, intra-group comparison is also useful. The lack of theoretical lenses in accelerator studies has been noted (Mian et al., 2016; Crișan et al., 2021), and this led us to consider possible approaches, specifically, the scalar literature.

Multidimensional scales

Spatial scales and scaling are relatively underutilized in management and organizational literature (Taylor & Spicer, 2007; Chatzidakis & Shaw, 2018). Scale is socially constructed and "constituted and reconstituted around relations of capitalist production, social reproduction and consumption" (Marston, 2000, p. 221). Common spatial scales include household, national, and global scales (Spicer, 2006). Most conceptions of scalar interrelations visualize a nested formation like Russian dolls; however, some alternatives exist, such as overlapping spheres (Chatzidakis & Shaw, 2018; Spicer, 2006). For the purpose of this article, the accelerator is a scale, both spatial and temporal.

Like spatial scales, temporal scales are socially constructed and are a vital requirement in analyzing acceleration. Time scales are "the size of the temporal intervals, whether subjective or objective, used to build or test theory about a process, pattern, phenomenon, or event" (Zaheer et al., 1999, p. 725). Some scholars explicitly incorporate a temporal element into conceptions of scales (O'Reilly, Allen, & Reedy, 2018). Several features of accelerators support in integrating time scales: goals to compress time, fixed-term cohorts, and post-accelerator outcome analysis. By considering different temporal lengths, time scales can provide complex conceptual insights throughout analysis. The accelerator presents additional temporal complexity because actors (participants, observers) experience and orientate to it in different forms.

The scale literature, both spatial and temporal, does not present scales as static and discrete entities. In particular, scaling up of products is inherently dynamic. Further, the scaling up research tends to focus on physical products, like manufactured airplane parts (Slayton & Spinardi, 2016), but another

branch addresses scaling up processes (Lehrer et al., 2017). As virtual products, digital games represent an interesting intersection between physical product and the process of scaling up. In this case, the material matters in the context of both accelerators and digital game development (Cohen, 2013; Whitson, 2020). Since virtual products have different material qualities, accelerating idea generation or prototyping, offers a contrast to traditional manufactured products.

Digital games

Digital games are created and played worldwide. Traditionally, digital (video) games were developed for either personal computers or consoles (e.g. Nintendo, PlayStation). This was the case between the 1980s and the late 2000s when publishers and console manufacturers held the industry's competitive advantage (Johns, 2006). In 2007, the release of the iPhone and its gaming-capability changed the industry (Nieborg, 2015). Digital game development became more democratized and distributed as smaller teams were creating games quicker and cheaper than ever before. Consequently, the geography of mobile game development shifted to smaller, distributed, and remote studios located outside of traditional game development regions (Pottie-Sherman & Lynch, 2019). In these places, alternate forms of organization, such as coworking spaces and accelerators, have appeared.

The digital game industry offers a useful setting for its technological dependence and constant push for innovation (Panourgias et al., 2014). Many studies focus on large 'AAA' companies where professional management practices, departmental compartmentalization, and standard operating procedures dominate (e.g. Whitson, 2020). Therefore, while accelerators have been implemented in various industries, there continues to be limited research specifically examining digital game accelerators. There is some research that considers game jams which we would call an informal accelerator. The main difference between a game jam and a formal accelerator lies in the expected outcomes. Game jams are usually executed for fun (Kennedy, 2018) or as a learning experience (Gaudl, Nelson, Colton, Saunders, Powley, Ferrer, Ivey, & Cook, 2018). While formal accelerators on the other hand, are intended to accomplish specific goals.

Methodology

In this paper, we conceptualize a rapid prototyping initiative (RPI) as an accelerator, located within a larger incubator program and coworking space in the United Kingdom - the DigitalArena (all names are pseudonyms). The RPI is distinct and fulfills the major requirements of accelerators: time-limited, cohort-based, information intensive programs. The DigitalArena houses ten independent digital game development companies. The coworking space and RPI were funded by Kyrios, an independent public funded creative industries development agency. The stated reason for the RPI was to accelerate the generation of original intellectual property. Seven companies elected to participate in the first RPI (see Figure 1). It is worth noting that the participating companies were not uniform. They varied in size,

with some even adding employees during the program. Furthermore, some companies were startups (less than one year old) while others had been developing games for much longer. Each company had existing projects in development. Figure 1The table below provides a summary and perspective for the reader. Companies contributed 25% of their individual budgets (ranging from £10,000 to £20,000), provided invoices for the work, and delivered prototypes at the end of the program to Kyrios. Companies were informed that they could apply for an additional £50,000 for further production if the project was deemed "commercially viable," a term never explicitly defined. The nebulousness may have provided flexibility for Kyrios in awarding funding (Buffart, Croidieu, Kim, & Bowman, 2020). The teams presented their games, with or without visual slides or playable demos, at approximately 3:30 every Friday afternoon.

Figure 1

Companies participating in the RPI

Company	Employees (min / max)	Stage of main project before RPI	Start-up?
A	3 / 6	Vertical Slice	No
B	4	Concept	No
C	3 / 6	Vertical Slice	No
D	2	None	No
E	1 / 2	Publishing	Yes
F	2 / 5	Vertical Slice	Yes
G	2 / 3	Concept	Yes

Source: Our own study.

Data collection

The timeline for events surrounding the RPI is presented in Figure 2. Accelerators differ in length and structure (Pauwels et al., 2016), and the figure below outlines the specifics. Each week centered on a theme (e.g. climate disruption). Repeating the process multiple times in a row allowed us to study the existence interval as both one week and as the full program (Zaheer et al., 1999). Additionally, other events (trade shows, competitive funding pitches) allowed us to expand the time scale further. Participant observation began approximately four weeks before the scheme announcement and continued for a total of 12 months over 2019 and 2020. A final virtual follow up was done with companies to see the one-year status of the projects.

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Figure 2

RPI Timeline

Week	Event
- 4	Initial announcement of RPI to potential participants
0	Bootcamp lasting one week
1-7	RPI (6 weeks of games, 1 week for national holiday)
8	Wrap up week with presentations by each team around commercial justification
11	Large international trade show attended by all teams (GamesExhibition)
17	Deadline for application for additional funding for one prototype
19	Pitches and Q&A for teams applying for additional funding
22	Results of the funding pitches along with feedback emailed to participants

Source: Our own study.

The first author collected data using traditional ethnographic methods (summarized in Figure 3). The ethnographer assumed the role of participant observer, and attended all Friday presentations, conducted interviews with participants and observers (58 total formal and informal interviews), and reviewed material artifacts such as visual presentations and game demos in an effort to triangulate the data (Emerson, Fretz, & Shaw, 1995; Gioia, Corley, & Hamilton, 2013; Whitson, 2020). To gain additional insight, the ethnographer participated in both a local weekend game jam and a week-long science accelerator. Both provided perspective on the participant experience. The ethnography was part of a larger project, but this paper focuses specifically on the RPI.

Figure 3

Ethnographic Methods and Data Collected

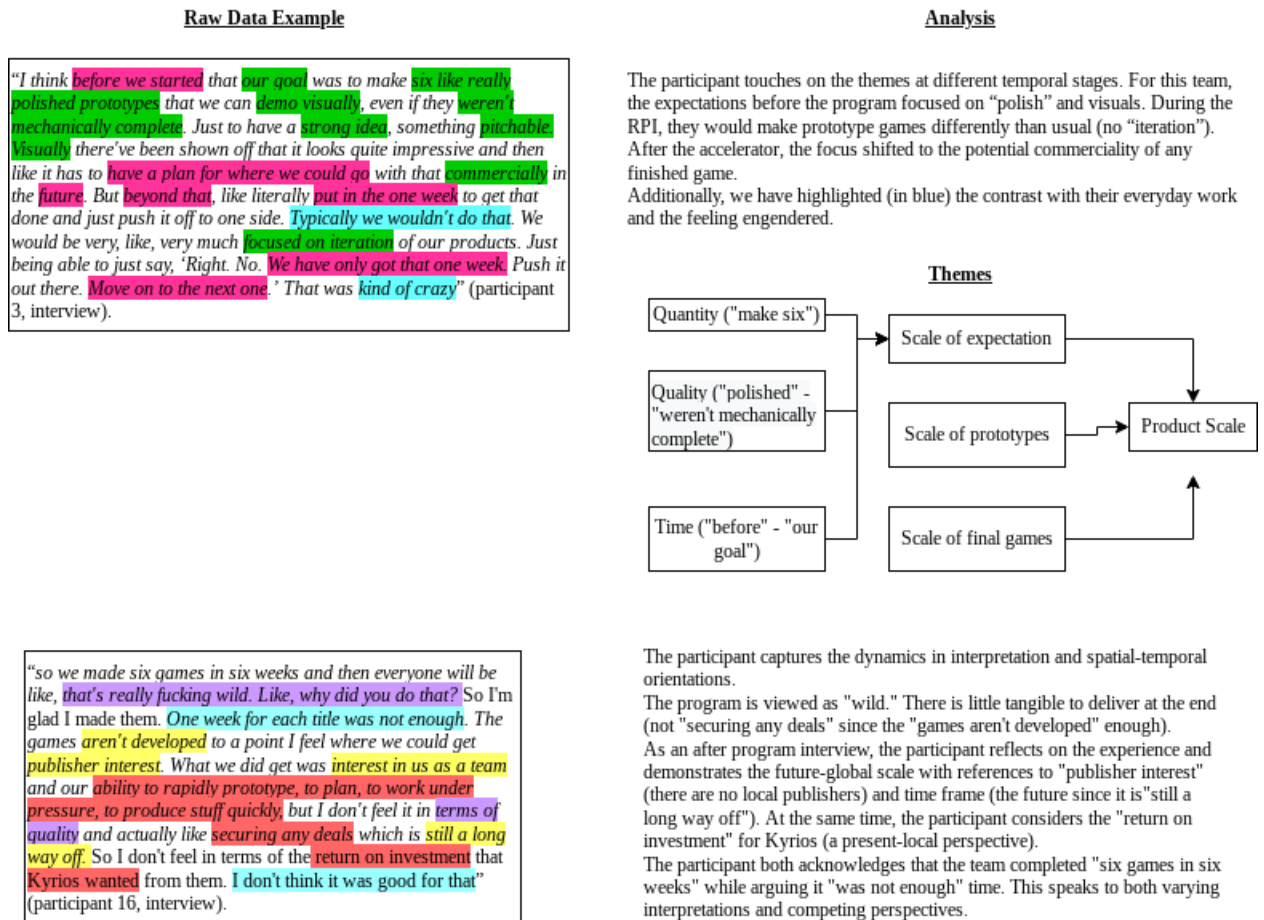| Method	Description
Participant observation	Daily observation of the accelerator space (193 hours during RPI and 811 hours total), including formal meetings, informal conversations, game development sessions, game demo testing, and formal mentor meetings (14 during RPI and 40 total). Field notes and field diary written in real time.
Interviews	Formal, semi-structured background and reflective interviews with informants (all teams, mentors, and support staff). Field notes written in real time (6 interviews) or transcribed from recordings (17 interviews).
	Informal, unstructured interviews during participant observation. Minimum 20 minutes long. All field notes written after interaction for the 35 interviews.
Artifact analysis	Internal messaging app, policy documents, marketing documents, PowerPoint presentations, flyers, game demos, web sites, whiteboard notes, handouts, etc.

Source: Our own study.

Data analysis

Data analysis followed an inductive approach (Locke, 2011) and was performed during fieldwork, with concepts being refined over time. Figure 4 provides an example of the coding leading to the main themes. At the suggestion of the second author, the ethnographer applied spatial, temporal, and product scale perspectives to the data. Theoretical sampling guided the research, and specifically for this paper, the follow up to determine the one-year status of projects from the program. We followed a process ontology while moving recursively between data and literature (Gioia et al., 2013; Langley, 1999). The ethnographer further utilized an interpretive epistemology in coding for the impact, outcomes, and consequences of acceleration. Key phrases, such as "time pressure" and "speeding up", provided some reference, but others required interpretive leaps, such as "*doing six, I felt like I could take a risk. It's just a week investment. If I was doing three games, I think I would play it more safe*" (participant 21, fieldnotes). For this participant, the six overall weeks matter less than the length of time per game (six games at one week each and three games at two weeks each). This helped lead to product sub-themes around quantity and quality. Figure 4 further provides some examples of extracting and analyzing phrases. For example, on the top left side of the Figure, an informant's words were coded along product and temporal scales. On the right side, the data was analyzed narratively and using a visual technique (Gioia et al., 2013). For the second quote (bottom left side of the figure), an informant's words were coded narratively into spatial terms, temporal terms, and finally conceptualized into a spatial-temporal perspective. We did not force each scale into every situation or action. We sought to understand and explain the complexity as we aggregated codes. In conversations between the authors, some scales came to the forefront under different circumstances. Therefore, we made a "conceptual leap" by allowing for complex scalar dimensions, concentrating on interconnections and intersections to better explain the findings (Gioia et al., 2013, p. 22). The two sections of our findings do not artificially mirror each other. Our data led us to three product scales over time and two spatial-temporal perspectives for the accelerator.

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Figure 4

Data analysis visualized

Raw Data Example

"*I think before we started that our goal was to make six like really polished prototypes that we can demo visually, even if they weren't mechanically complete. Just to have a strong idea, something pitchable. Visually there've been shown off that it looks quite impressive and then like it has to have a plan for where we could go with that commercially in the future. But beyond that, like literally put in the one week to get that done and just push it off to one side. Typically we wouldn't do that. We would be very, like, very much focused on iteration of our products. Just being able to just say, 'Right. No. We have only got that one week. Push it out there. Move on to the next one.' That was kind of crazy*" (participant 3, interview).

Analysis

The participant touches on the themes at different temporal stages. For this team, the expectations before the program focused on "polish" and visuals. During the RPI, they would make prototype games differently than usual (no "iteration"). After the accelerator, the focus shifted to the potential commerciality of any finished game.

Additionally, we have highlighted (in blue) the contrast with their everyday work and the feeling engendered.

Themes

"*so we made six games in six weeks and then everyone will be like, that's really fucking wild. Like, why did you do that? So I'm glad I made them. One week for each title was not enough. The games aren't developed to a point I feel where we could get publisher interest. What we did get was interest in us as a team and our ability to rapidly prototype, to plan, to work under pressure, to produce stuff quickly, but I don't feel it in terms of quality and actually like securing any deals which is still a long way off. So I don't feel in terms of the return on investment that Kyrios wanted from them. I don't think it was good for that*" (participant 16, interview).

The participant captures the dynamics in interpretation and spatial-temporal orientations.

The program is viewed as "wild." There is little tangible to deliver at the end (not "securing any deals" since the "games aren't developed" enough).

As an after program interview, the participant reflects on the experience and demonstrates the future-global scale with references to "publisher interest" (there are no local publishers) and time frame (the future since it is "still a long way off"). At the same time, the participant considers the "return on investment" for Kyrios (a present-local perspective).

The participant both acknowledges that the team completed "six games in six weeks" while arguing it "was not enough" time. This speaks to both varying interpretations and competing perspectives.

Source: Our own study.

Findings: the impact of an accelerator

We present our findings in two themes based on our two research questions. First, product scale in accelerated prototype development *boomeranged* throughout the process across multiple scalar levels. Second, the accelerator inhabited a *dueling* scale with two different spatial-temporal perspectives.

Scale of products as expectations, prototypes, and final games

Our first theme examines the multiple product scales within the acceleration process. We found three sub-themes related to scale: expectations, prototypes, and final games. There were differences between participants and observers as well as at different times in the process. Overall, the different spatial-temporal scalar perspectives appeared reflected in the product scales.

The goal of the accelerator was to produce ideas and prototypes that could be carried forward. Participants interpreted the *scale of expectation* in two general ways: quality or quantity. The first set of companies aimed to produce several good ideas out of the six. The quality of the good ideas outweighed

any risk of failure. One participant summarized the rationale: "*out of the six, I wanted two like really shit hot ideas. I knew that some weeks… may not pan out, but some of the weeks… a good idea [becomes] a great idea*" (participant 21, interview). For a second set of participants, the goal was to produce prototypes during all six weeks. These actors focused on the quantity of prototypes so as to increase their chances of developing a hit idea. Simply put, "*the overall aim was to get the six games in six weeks*" (participant 4, interview). Later, the quantity of ideas allowed participants to pitch publishers multiple games, in some cases all six. In neither case did acceleration guarantee success:

> "*spontaneous creativity and you know, finding some diamond in the rough is great when it happens, but none of the projects that we worked on really kind of exploded with them. That kind of crazy creative, creative burst and like [an] amazing idea that we are just weren't thinking about*" (participant 15, interview).

This quote reflects a general hope among participants and observers that the program could help uncover some "diamond in the rough" while at the same time acknowledging the failure to find one or more. The different expectation scales led to different prototype scales.

Acceleration forced teams to confront, or balance, competing "*hybrid of tech and creative*" demands within a restricted schedule (participant 16, interview). The *scale of prototypes* was impacted by how actors interpreted the competing demands. An observer summarized the issue:

> "*I think that was again a bit unclear as to what they were actually supposed to have as a final product. Like some teams had very well developed, finished looking games, whereas others had prototypes or some didn't even have a version, like a proper demo of the game. They had just kind of a PowerPoint presentations of everything and kind of displaying it that way. Which was just as effective, but… that can be a bit demoralizing if you're going up next to a team who has spent a lot of time making sure that it's a nice looking demo rather than just a demonstration of the controls kind of thing…. if I do recall, there was one team that had done something very prototype-y and they were questioned on the fact that it was just very prototype-y at the end*" (observer 11, interview).

With only a week to work, participants were forced to choose between the technology (*"a demonstration of the controls"*) or the creative side (*"PowerPoint presentations"*). From a temporal perspective, participants considered the prototype as a standalone one-week demo or the start of a larger game.

Participants adhering strictly to the one-week timeframe interpreted the prototypes as independent entities. As a consequence, with few exceptions, "*None of them feels like a game to us after a week*" (participant 6, fieldnotes). Instead, they were "*ideas on the back of cigarette packets*" (observer 25, interview). These prototypes were idea demonstrations. On the other hand, some participants interpreted the prototype in relation to a potential future game. We term this the scalability of the prototype. For example, "*I would always try to do a core gameplay loop. So, you know, if you can't think of how it feeds back in on itself, it's not going to really work to be scalable*" (participant 4, interview). For these, the prototype scale hinted to the final game scale; however, we found complexity and disconnection in this viewpoint.

The stated long-term goal of the RPI was for companies to release a game within 12 months. We found several factors impacting the ultimate product or *final game scale*. First, we quote one of our informants speculating on whether there was a possible link between a one week scale and 52 week scale:

> *"No, not necessarily because I think the whole - that pressure of the week is very much like it's a set deadline and you've the one focus and you're very driven to do that. I think if it's spread out over a couple of months, like after, it can slow down very, very quickly. So it's not - it can be a good indicator of what the game could be, but it's whether or not the team behind them are there. And that can be - you can get a bit of an indication of that from what they've done with their time and whether you feel like they got it... you would have a bit more faith that they might continue this game in a few months and it could get better. But I don't think that a week is a definitive, kinda, you can say that... six months down the line, they'll definitely have this game finished and kind of ready for publishers or whatever"* (observer 11, interview).

In this quotation, the informant struggles with the connection amongst the accelerator, the prototypes, game developers, and scaling to the intended outcomes. What happened during the RPI was just a single consideration.

Our findings support the informant's prediction that the prototype outcome did not indicate the final game outcome. Four factors impacted the outcome (final game scale) after 12 months: (i) funding; (ii) development hours; (iii) idea quality; (iv) planned scale (see Figure 5). Securing additional funding was the most important, as it allowed companies to invest more hours in developing the game. It also influenced which ideas were pursued and the planned scale of the game. The best ideas often required a larger budget than already available as illustrated by the following conversation within a company (fieldnotes):

Participant 21: *If we had £50k, what would we do? What game could we make?...*
Participant 10: *£50k would only get you a vertical slice.*
Participant 21: *I want to build a game with £50k.*
Participant 24: *If you want to build a game with 50k, then you need to rule out [week 3 game].*
Participant 10: *The only game you could really make with 50k would be [week 6 game]. I don't see any of the other games coming in under 50k.*

The above conversation uses budgeting terms, yet each team member is stating a position based on his or her interpretation of the final scale of the game and whether it can be accomplished in a set time. As a consequence, teams revised down the planned scale or pursued a different game. One company initially pitched one game before switching to a different prototype after several months. Another company pursued two games simultaneously. Despite several mobile games with seemingly limited creative and technical complications, no game was released within 12 months and indeed none had a solid planned release date.[1] Five companies continued development on at least one prototype from the RPI with one company securing additional external investment. Finally, while one company "*liked it so much, we are going to do it every quarter*" (participant 5, fieldnotes), the remainder expressed no desire to repeat the experience.

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[1] The first game released occurred approximately 21 months after the accelerator began.

Figure 5

Hard Outcomes of RPI

Company	Further Kyrios Funding	Pursued "best game"*	Stage of Game after 12 months[2]
A	1st round	No	Revised prototype
B	Did not apply	N/A	Original prototype
C	1st round	Yes	Revised prototype
D	Failed 1st round, did not apply for 2nd round	Yes	Original prototype
E	2nd round	No	Revised prototype (secured external R&D funding)
F	2nd round	No	Revised prototype
G	2nd round	No	Revised prototype

Note: *defined subjectively by team, relating to creative and/or commercial potential.
Source: Our own study.

Scale of an accelerator as spatial-temporal perspectives and interpretations

Our second theme examines the scale of the accelerator. We identified three sub-themes. First, the temporal scale of the accelerator was open to interpretation. Second, for participants during the RPI, the accelerator operated on a present-local scalar orientation. Third, this scale did not apply to external observers during the RPI nor participants after the RPI. Instead, there was an alternative scale, which we call a future-global scalar orientation.

The RPI did not feature discrete start and finish points. This created ambiguity in the temporal scale. The most common way participants described the RPI was as *six in six*. The description suggested both an output (six games) and a time period (six weeks). Related to this definition, we found three interesting alternative aspects based around the interplay between 'existence interval,' 'socially constructed time scales' and 'perception of time scales' (Zaheer *et al.*, 1999). First, many of the teams considered 'week' to mean less than seven days. Because of the Friday afternoon demos, there was a "*shift from seven days to four and a half*" days of development (participant 20, fieldnotes). While some admitted to thinking about game development over the weekend, no company admitted to producing work during that time. Second, the experienced reality of the accelerator included more weeks than the six commonly mentioned. As seen previously in Figure 2, the lived experience of acceleration began with a bootcamp and did not finish until after GamesExhibition (a total of 12 weeks). Third, for

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[2] COVID19 lockdown started 9 months into the 12 months. The impact was variable. One company missed a planned release date. Another informant reported, "*We made alot of good progress development wise during the lockdown. One of the advantages I suppose of being at home 24/7 lol*" (participant 21, personal communication).

companies taking a project forward, the pressure to release the game within 12 months might have necessitated continued acceleration. As one informant explained to a mentor, "*It's a very tight deadline. I'm not going to have 8 months of crunch to get a game out*" (participant 21, fieldnotes). The acceleration would have been a different form than experienced during the RPI, but it was still acceleration over normal work. For the companies failing at the first funding round, time compressed further and increased the acceleration pressure. Temporal ambiguity meant that scales were open to interpretation. In the RPI, this led to two different spatial-temporal scalar orientations.

The accelerator impacted the spatial-temporal orientation of participants during the RPI. We labeled the first scalar orientation as a *present-local scale*. By present, we refer to time and the immediate present. By local, we refer to space and the immediate confines of the accelerator. Therefore, in the present-local scale, social actors concerned themselves with what was happening immediately around them. There were three reasons for this. First, acceleration did not allow time for reflection or extensive planning. For example, "*We didn't have time to develop it, so we just thought, what can we do in a week?*" (participant 6, fieldnotes). Actors had to deal with the immediate present, leading some to admit "*I don't know how many of us are picking these things back up after the weekend. As soon as the next week starts, I'm on to the next one*" (participant 15, fieldnotes). Second, the cohort structure of the accelerator meant that companies had locally available comparisons. Participants could physically look around the room any time during the day and see other game developers' same theme creations. For example:

"*I know specifically for me, for my company, it would be well constructed gameplay. The story is already secondary. I don't want to get that impression with a lot of other teams in here. I think they're very much storytellers. I think it's gameologists versus narrologists*" (participant 4, interview).

The locally available comparisons were exemplified by the suggestion of ranking the companies against each other after Friday presentations (ultimately rejected). Third, for many companies, the concern was making the creatively best prototype in the time period. For example, "*If it is a good game and it's unique, that should be enough*" (participant 20, fieldnotes). We previously discussed this in the product scale section. All three of these facets manifested in the Friday afternoon sessions where informal peer review was encouraged. Publicly, teams were hesitant to criticise each other or the prototypes. One informant observed, "*in an ideal world, I would rather have real players play-test the games. They will be more honest than your fellow developers*" (observer 22, fieldnotes). The one exception was a week six prototype which failed to meet the common definition of a game. Outside of the immediate influence of acceleration, a different scale prevailed.

A second spatial-temporal scale manifested simultaneously alongside the first. We labeled this second scalar orientation as *future-global scale*. By future, we refer to a time beyond the initial game development stage (the six in six) of the RPI. By global, we refer to a spatial scale beyond the accelerator, and mostly likely beyond the local region. In the future-global scale, social actors concerned

themselves with what would happen in the global marketplace once acceleration had slowed down. This scale was used by external observers and participants after acceleration. For the same reasons participants used the present-local scale during acceleration, external observers did not. They were not subject to acceleration pressures; therefore, they had time for reflection and the opportunity to consider alternatives. Additionally, they actively sought global comparisons. Finally, and most importantly, external observers were driven by 'commercial viability' as opposed to individual participant goals. The tension between the two scales can be seen in this exchange between a participant and external observer (fieldnotes):

> Participant: *For me, it's the spark. It could be a word, something that sparks a conversation. A genre. A games jam thing. Something that sparks it...*
> Observer: *You don't know what the market opportunities are.*
> Participant: *You don't know where the market will be in six months.*

As seen above, the participant made games after finding artistic or technological inspiration. The observer instead argued for making a game to fit a global market need. The participant rejected an unpredictable future outlook. Once participants finished the six games, participants' scalar orientation would also shift to the future-global. An external observer explained:

> *"You will have finished with rapid prototyping. You will have a little bit of funds. You have to think beyond the DigitalArena... what happens next... The feedback I got from most of you is that you are focusing on the game. You need to be hugely aware of the game's potential. The market and competitors. To me, you go in and build a product every week, but you don't think about the market... How do I know it's going to fly? I expect feedback on the user, the market, the competitors"* (observer 9, fieldnotes).

The observer acknowledged the present-local scale ("focusing on the game") while advocating for a future-global scale ("aware of the game's potential"). Participants shifted from a present-local scale to a future-global scale over times varying from a few minutes to several days later. Occurring on the next Tuesday and Wednesday over an all-company messaging app, the following exchange illustrated the confusion over changing scales:

> Observer: "*As part of the wrap up week as well as demoing any projects that are outstanding i'd like you all to present your competitive analysis across all your projects...*
> Participant (next day): "*Wait, are we meant to present this all on Friday? I'm guessing... not but it's unclear to me, as the last line mentions 'the coming weeks.' Is it meant to be all done and presentable in 2 days, or over the coming weeks?*"
> Observer: "*Yes, to present on Friday.*"
> Participant: "*A full market analysis for all of our games on this Friday? That's a lot of research with not a lot of lead-up time, I doubt I'm alone in thinking this here...*"
> Observer: "*You definitely aren't - but I did flag this last Friday to expect to show your revenue projections across all prototypes, we aren't looking for a full market analysis but definitely look at worse case and best case scenarios.*"

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The transition between scales was not consistent across participants. As mentioned earlier, the accelerator conceivably continued through GamesExhibition and as such, participants struggled with both acceleration and changing scales at the same time.

In line with the future-global scale, we examined one last consequence of the RPI. What did companies do afterward? We looked at the scale of the company and the projects pursued in the long run (see Figure 6). There was no consistency in company direction. In five cases, the RPI represented a temporary change in direction and operations for the companies. Two teams scaled up and two teams abandoned existing projects after the RPI while the rest reverted to pre-acceleration status. Finally, having tested the prototypes at GamesExhibition and against Kyrios funding, five companies continued to work on at least one prototype over the year period.

Figure 6

Company direction after RPI

Company	Scaled up team	Existing projects	Prototypes pursued
A	Sustained	restarted	one
B	No	started new	zero
C	Sustained	restarted	one
D	No	restarted	one then zero*
E	Temporary	none	two
F	Temporary	abandoned	one
G	No	abandoned	one then different one*

Note: *change in direction based on Kyrios funding results, see also Figure 5.
Source: Our own study.

Discussion

We situate our findings and contribute to the literature in two ways. First, we draw on the literature of scales to develop the concept of an *accelerated scale* in relation to rapid prototyping and product development. While the accelerator aided in developing prototypes with potential, the consequences extended beyond the program. Second, we illustrate the changing spatial-temporal views over time and conceptualize the accelerator as a place of competing spatial-temporal perspectives. Finally, we briefly consider the practical implications.

Boomerang acceleration

Applying different scalar perspectives to prototypes and final games offers potential insight. First, we discuss insights from different time scales, and later, product scales. We consider three points in time and what this suggests about changing perceptions of the accelerator and products created. Much of the accelerator literature examines immediate outputs (Crișan et al., 2021). At the end of week six, the companies had produced 42 prototypes. The product scale varied and few had been played. Using this time scale, participants and observers considered the accelerator a success and held out promise for the future. Participants had achieved the six games in six weeks that many of our informants referenced. At the end of week 22, two prototypes were funded by Kyrios for further development. The rest were "dead" or in limbo. At that point, our findings showed developers questioning their own talent and what observers thought of their products. As we noted in Figures 5 and 6, only several a couple companies pursued their best game due to implied limited commerciality. Our final time scale was 12 months, responding to calls for longitudinal research (Goswami et al., 2018). Whereas other studies have used funding as a proxy for success (Buffart et al., 2020; Cohen et al., 2019; Hallen et al., 2020), we concentrated on released games since this was the goal set out by the RPI (see also Barbero et al., 2012). As we noted in Figure 5, our findings showed zero games were released by the one year deadline. Five games remained in various stages of development. The accelerator failed to accelerate development when analyzed against this longer time scale. Surprisingly, the final product scale of the finished game did not matter in terms of release, as even the smallest scale games missed planned release time frames. This suggests the post-accelerator time period, rather than the scale of the final game or participation in an accelerator, was a better indicator of achieving the goals of the accelerator.

Building on the above, we make our first contribution by conceptualizing an *accelerated product scale*. Scaling up an accelerated digital product is both similar and differs when compared to manufacturing domains (Lehrer et al., 2017). First, the digital product scale is inclusive to each product or game. For example, a puzzle level in a mobile game will likely have a smaller scale than an open-world level in a console game. Here, the scale is relative and inclusive to the final game, like a percentage of the whole. Second, the economic and geographic scale of the game is defined by time and resourcing. Developers shifted the scale based on expectations of time availability at different stages of development. In our findings, we showed how developers talked differently about creating for one week versus one year of development time. Finally, as seen in Figure 7, acceleration drags products toward one side of the spectrum, thereby forcing participants to compensate before reaching the final product in what might be called boomerang acceleration. Based on our findings, we propose three initial types of boomerang acceleration: (i) technical-artistic; (ii) commercial-creative; (iii) iterative-experimental. It also explains how the anticipated process of development ends up nonlinear.

Figure 7

Accelerated Digital Product Scale
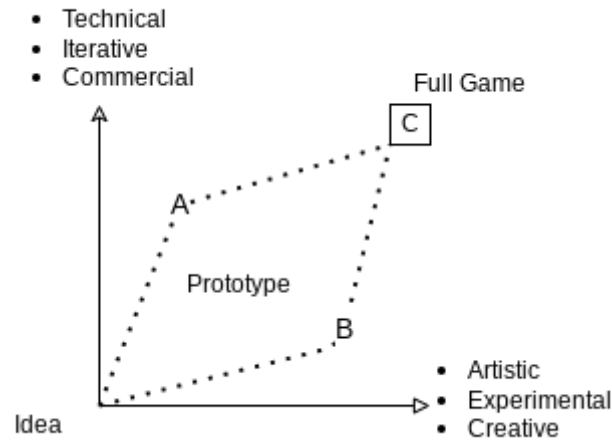
Dueling perspectives

Our findings show the impact of acceleration on products and the accelerator. They further suggest that an accelerator leads to more in less time under certain perspectives. By examining shorter time scales and quantity of ideas produced, for example creating six prototype games in six weeks, an accelerator seemed to accelerate output. On the other hand, by extending the time scale and considering quality, our findings suggest the accelerator does not accelerate the release of a finished product, at least within the one-year target, nor does it drive the best idea. This contributes to the limited literature on negative consequences of participation in an accelerator (Hochberg, 2016; Crişan et al., 2021).

Additionally, different definitions of "commercial viability" might further change the perspective across spatial-temporal scales. The findings support previous research showing economic development incubators do not meet their objectives (Barbero et al., 2012); however, we complexify the reasons why. Product outcomes show how output during the accelerator does not translate into long term hard outcomes. Here, accelerated scaling is not sustained over time. In some ways, the accelerator hinders development of the best ideas. Teams self-selected either prototypes they could deliver on a limited scope, or reduced the scope of the best ideas. Our findings suggest other factors, such as time and resources, leading to greater long-term impact than acceleration. Finally, our findings allow us to suggest a possible scale for accelerators. We show how acceleration extends beyond the typically assumed spatial-temporal boundaries of the accelerator. This complements research on the connection between accelerators and the greater world (Cohen, Fedher, et al., 2019; Goswami et al., 2018). Alternatively, rapid prototyping can be seen as a mini-accelerator within a larger, longer accelerator.

Our findings led us to our second contribution in which we conceptualize the spatial-temporal scales of an accelerator. Instead of traditional nested scales, we took inspiration from Chatzidakis and

Shaw (2018) in reimagining visualizations of scales. Our findings suggest there are two simultaneous and competing spatial-temporal scales within an accelerator: present-local and future-global. Social actors faced tension between the two spatial-temporal scales. Time pressure during the rapid prototyping trapped them within a single scale. Most commonly, participants also inhabited the present-local scale where they focused on the current situation and space. Meanwhile, accelerator observers, not facing the same time pressure, could shift orientations between scales. Predominantly, they used the future-global scale. As we showed in excerpts from a mentor meeting and message board exchange, the scales interact and clash during interactions where one side tries to assert the value of one scale over another. The tension resulted in a dual competitive place where the incongruence between spatial-temporal scales impacted the experience and outcomes. The incompatibility was an inherent feature of the accelerator due to the different impact of acceleration on participants and observers. Building on the literature on both spatial and time scales (Liu, 2020; Taylor & Spicer, 2007; Zaheer et al., 1999), we were able to explicate a previously undefined aspect of an accelerator. Figure 8 illustrates the changing spatial-temporal perspectives of participants and observers over time. Changes did not happen at discrete points in time, but we reference some events to situate the conceptual in the empirical. The observer scale did not last the full year as observers moved on to other cohorts or concerns.

Figure 8

Scalar perspectives over time
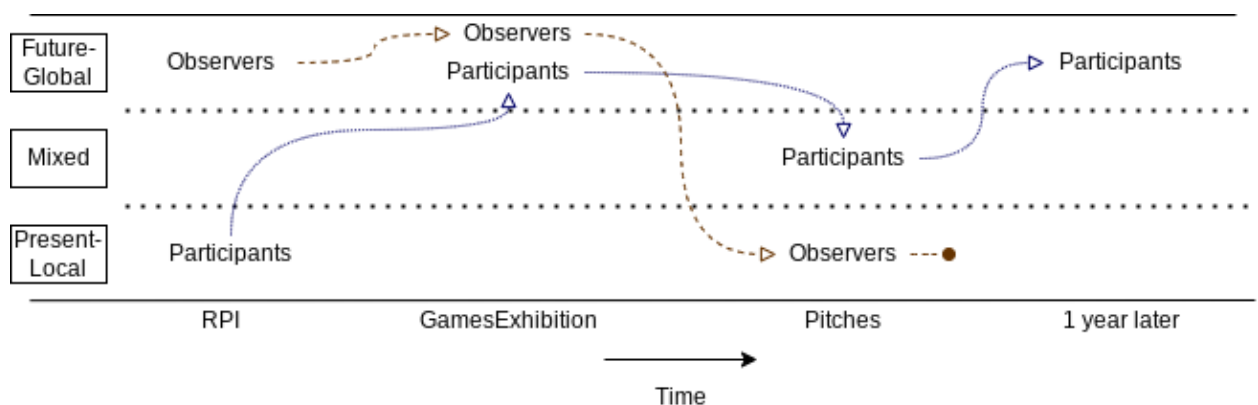
Source: Our own study.

Finally, our study has policy and managerial implications. Our findings suggest rapid prototyping in the video game industry, such as in game jams, is useful as a way to generate ideas, thereby complementing existing research (Aurava et al., 2021; Gaudl, et al., 2018; Kennedy, 2018). We have also shown participation in a digital game accelerator resulting in complex outcomes. The success of the outcomes, for the individuals and organizations involved as well as the products, changes depending on the spatial-temporal scale applied. Since different scales are open to interpretation, the choice and articulation of scales for evaluation purposes may impact the structure and experience of acceleration.

Conclusion

In this study, we conceptualize a rapid prototyping program in the digital game industry as an accelerator. We show the complexity and intricacies of an accelerator by examining the impact across spatial, temporal, and product scales. We suggest a dual competitive scalar orientation of an accelerator and developed a new accelerated digital product scale. Participants, observers, and the accelerator organization do not enter *tabula rasa*. They all enter the program with expectations and varying spatial-temporal orientations that change over time. We call this dueling spatial-temporal perspectives. Accelerators only accelerate part of products, people, or organizational development. This often requires addressing opposite areas after the formal end of the accelerator program. We call this boomerang acceleration.

Our study is a single case study of one accelerator in the video game industry; within the case, the one week prototyping was repeated six times offering a degree of replication. There are many forms of accelerators (Pauwels et al., 2016), so further research is needed to support the transferability of our findings. Further, while the study incorporates a longitudinal dimension, we do not make claims to comprehensiveness across the entire time period. Instead, we sought to capture the complexity and multiple dimensions within the data.

Future research can extend our study by measuring impact over different time periods and outcomes. This raises the question of how the temporal length of an accelerator is related to outcomes (see also Liu, 2020). The dual spatial-temporal perspectives we identified in an accelerator share interesting parallels with the experience of asylum seekers. Recent research has shown asylum seekers experience dueling spatial-temporal perspectives via "stuckedness" rather than acceleration (Lubit, 2022). Future research could examine the connection between these two seemingly opposite situations that lead to similar outcomes.

As the organization of work continues to evolve, the accelerator mirrors the acceleration already appearing in society. Often portrayed as a panacea for testing start-up ideas, performance in an accelerator may not accurately predict the long-term impact on a company, product, or business model. Acceleration places blinders on both participants and observers organizers; however, in an accelerator, the experience of acceleration separates participants from observers and creates interaction from different scalar perspectives. An accelerator can be imagined as the first leg in a relay race. The baton must be passed to the next runner to complete the race no matter how fast the first leg is run.

Authors' contributions

Contribution	Gidley, D.	Palmer, M.
Contextualization	X	X
Methodology	X	----
Software	----	----
Validation	X	----
Formal analysis	X	----
Investigation	X	----
Resources	X	------
Data curation	X	----
Original	X	----
Revision and editing	X	X
Viewing	X	----
Supervision	X	X
Project management	X	-------
Obtaining funding	----	----

References

Aurava, R., Meriläinen, M., Kankainen, V. & Stenros, J. (2021). Game jams in general formal education. *International Journal of Child-Computer Interaction*, 28: 100274. https://doi.org/10.1016/j.ijcci.2021.100274

Barbero, J. L., Casillas, J. C., Ramos, A., & Guitar, S. (2012). Revisiting incubation performance: How incubator typology affects results. *Technological Forecasting & Social Change*, 79: 888-902. https://doi.org/10.1016/j.techfore.2011.12.003

Battistella, C., De Toni, A. F. & Pessot, E. (2017). Open accelerators for start-ups success: a case study. *European Journal of Innovation Management*, 20: 80-111. https://doi.org/10.1108/EJIM-10-2015-0113

Bone, J., Gonzalez-Uribe, J. Haley, C., & Lahr, H. (2019). The impact of business accelerators and incubators in the UK. BEIS Research Paper Number 2019/009.

Buffart, M., Croidieu, G., Kim, P. H., & Bowman, R. (2020). Even winners need to learn: How government entrepreneurship programs can support innovative ventures. *Research Policy*, 49: 104052. https://doi.org/10.1016/j.respol.2020.104052

Chatzidakis, A. & Shaw, D. (2018). Sustainability: Issues of scale, care and consumption. *British Journal of Management*, 29: 299-315. https://doi.org/10.1111/1467-8551.12292

Clayton, P., Feldman, M., & Lowe, N. (2018). Behind the scenes: Intermediary organizations that facilitate science commercialization through entrepreneurship. *Academy of Management Perspectives*, 32: 104-124. https://doi.org/10.5465/amp.2016.0133

Cohen, S. (2013). What do accelerators do? Insights from incubators and angels. *Innovations: Technology, Governance, Globalization,* 8: 19-25. https://doi.org/10.1162/INOV_a_00184

Cohen, S., Bingham, C. B., & Hallen, B. L. (2019). The role of accelerator designs in mitigating bounded rationality in new ventures. *Administrative Science Quarterly*, 64: 810–854. https://doi.org/10.1177/0001839218782131

Cohen, S., Fehder, D. C., Hochberg, Y. V., & Murray, F. (2019). The design of startup accelerators. *Research Policy*, 48: 1781-1797. https://doi.org/10.1016/j.respol.2019.04.003

Crișan, E. L., Salanță, I. I., Beleiu, I. N., Bordean, O. N., & Bunduchi, R. (2021). A systematic literature review on accelerators. *Journal of Technology Transfer*, 46: 62–89. https://doi.org/10.1007/s10961-019-09754-9

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic fieldnotes*. University of Chicago Press, Chicago.

Gaudl, S. E., Nelson, M. J., Colton, S., Saunders, R., Powley, E. J., Ferrer, B. P., Ivey, P. & Cook, M. (2018). Rapid game jams with fluidic games: A user study & design methodology. *Entertainment Computing*, 27: 1-9. https://doi.org/10.1016/j.entcom.2018.02.007

Gioia, D., Corley, K., & Hamilton, A. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia Methodology. *Organizational Research Methods*, 16: 15-31. https://doi.org/10.1177%2F1094428112452151

Goswami, K., Mitchell, J.R., & Bhagavatula, S. (2018). Accelerator expertise: Understanding the intermediary role of accelerators in the development of the Bangalore entrepreneurial ecosystem. *Strategic Entrepreneurship Journal*, 12: 117-150. https://doi.org/10.1002/sej.1281

Hallen, B. L., Cohen, S. L. & Bingham, C. B. (2020). Do accelerators work? If so, how? *Organization Science,* 31: 378–414. https://doi.org/10.1287/orsc.2019.1304

Hochberg, Y. V. (2016). Accelerating entrepreneurs and ecosystems: The seed accelerator model. *Innovation Policy and the Economy,* 16: 25-51. http://dx.doi.org/10.1086/684985

Johns, J. (2006). Video games production networks: Value capture, power relations and embeddedness. *Journal of Economic Geography*, 6: 151–180. https://doi.org/10.1093/jeg/lbi001

Johnson, R. S. (2013). Toward greater production diversity: Examining social boundaries at a video game studio. *Games and Culture*, 8: 136–160. https://doi.org/10.1177/1555412013481848

Kennedy, H. W. (2018). Game jam as Feminist methodology: The affective labors of intervention in the Ludic economy. *Games and Culture*, 13: 708–727. https://doi.org/10.1177%2F1555412018764992

Langley, A. (1999). Strategies for theorizing from process data. *The Academy of Management Review,* 24: 691-710. https://doi.org/10.5465/amr.1999.2553248

Lehrer, M., Banerjee, P. M., & Wang, I. K. (2017). When the sky is the limit on scale: From temporal to multiplicative scaling in process-based technologies. *Technological Forecasting & Social Change*, 117: 151-159. http://dx.doi.org/10.1016/j.techfore.2016.12.006

Liu, Y. (2020). The micro-foundations of global business incubation: Stakeholder engagement and strategic entrepreneurial partnerships. *Technological Forecasting & Social Change*, 161: 120294. https://doi.org/10.1016/j.techfore.2020.120294

Locke, K. (2011). Field research practice in management and organization studies: Reclaiming its tradition of discovery. *Academy of Management Annals*, 5: 613–652. https://doi.org/10.5465/19416520.2011.593319

Lubit, A. J. (2022). A mother's experience of asylum: Conflicting temporalities, belonging, and evolving care relations. *Journal of Intercultural Studies*, [In Press]. 43: 464-479. https://doi.org/10.1080/07256868.2022.2086226

Malek, K., Maine, E. M. A., & McCarthy, I. P. (2014). A typology of clean technology commercialization accelerators. *Journal of Engineering and Technology Management*, 32: 26-39. https://doi.org/10.1016/j.jengtecman.2013.10.006

Marston, S. A. (2000). The social construction of scale. *Progress in Human Geography*, 24: 219–242. https://doi.org/10.1191/030913200674086272

Mian, S., Lamine, W., & Fayolle, A. (2016). Technology Business Incubation: An overview of the state of knowledge, *Technovation*, 50–51: 1-12. https://doi.org/10.1016/j.technovation.2016.02.005

Nieborg, D. B. (2015). Crushing candy: the free-to-play game in its connective commodity form. *Social Media + Society*. https://doi.org/10.1177/2056305115621932

Nguyen, T. T., Phan, H. T. T., & Pham, V. T. (2021). Impact of creativity on student entrepreneurial intention. *International Journal of Innovation*, 9: 646-663. https://doi.org/10.1016/j.technovation.2016.02.005

O'Reilly, D., Allen, S., & Reedy, P. (2018). Reimagining the scales, dimensions and fields of socio-ecological sustainability. *British Journal of Management*, 29: 220-234. https://doi.org/10.1111/1467-8551.12278

Panourgias, N. S., Nandhakumar, J., & Scarbrough, H. (2014). Entanglements of creative agency and digital technology: A sociomaterial study of computer game development. *Technological Forecasting & Social Change*, 83: 111-126. https://doi.org/10.1016/j.techfore.2013.03.010

Pauwels, C., Clarysse, B., Wright, M., & Van Hove, J. (2016). Understanding a new generation incubation model: The accelerator. *Technovation*, 50–51: 13-24. https://doi.org/10.1016/j.technovation.2015.09.003

Pottie-Sherman, Y. & Lynch, N. (2019). Gaming on the edge: Mobile labour and global talent in Atlantic Canada's video game industry. *The Canadian Geographer / Le Géographe canadien*, 63: 425-439. https://doi.org/10.1111/cag.12522

Roberts, P. & Lall, S. (2019). Observing acceleration: Uncovering the effects of accelerators on impact-oriented entrepreneurs. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-00042-4

Slayton, R. & Spinardi, G. (2016). Radical innovation in scaling up: Boeing's Dreamliner and the challenge of socio-technical transitions. *Technovation*, 47: 47-58. https://doi.org/10.1016/j.technovation.2015.08.004

Spicer, A. (2006). Beyond the convergence–divergence debate: The role of spatial scales in transforming organizational logic. *Organization Studies*, 27: 1467–1483. https://doi.org/10.1177/0170840606067515

Taylor, S. & Spicer, A. (2007). Time for space: A narrative review of research on organizational spaces. *International Journal of Management Reviews*, 9: 325-346. https://doi.org/10.1111/j.1468-2370.2007.00214.x

Whitson, J. R. (2020). What can we learn from studio studies ethnographies?: A "messy" account of game development materiality, learning, and expertise. *Games and Culture*, 15: 266–288. https://doi.org/10.1177/1555412018783320

Zaheer, S., Albert, S., & Zaheer, A. (1999). Time scales and organizational theory. *The Academy of Management Review,* 24: 725-741. https://doi.org/10.2307/259351