„Problemy Zarządzania (Management Issues)"
Vol. 20, No. 1(95), p. 173–190, e-ISSN: 2300-8792
https://doi.org/10.7172/1644-9584.95.8

Knowledge Transfer in Virtual Business Incubators

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Submitted: 20.09.2021 | Accepted: 13.12.2021

Abstract

Purpose: Virtual business incubators (VBIs) have become a rising phenomenon, as the role of digitalization in the entrepreneurial context has been gaining increasing relevance. The ongoing COVID-19 pandemic additionally underlines the importance of virtual solutions *per se*. To be effective, virtual business incubators must rely on effective knowledge transfer (KT). This paper aims to identify factors influencing knowledge transfer in virtual business incubators and to determine in which direction these factors influence KT.
Methodology: For this purpose, a qualitative single case study is applied within an internationally acting virtual business incubator, using 12 semi-structured interviews with incubator management and staff, as well as incubatees.
Findings: The findings suggest that precise communication, weak ties, heterogeneous contexts, and low engagement all influence knowledge transfer in virtual business incubators, each in a different way outlined in the paper.
Research limitations/Implications: As a qualitative study, this research might be exposed to researcher bias and cultural bias.
Originality/Value: This study extends the descriptive, conceptual VBI literature by adding the level of dynamic processes within the incubator. These new insights into the dynamic level enable precise intervention in the course of the KT, allowing challenges and strengths to be analyzed and understood theoretically and addressed and strengthened practically. This is indispensable to the successful operations of VBI processes.

Keywords: virtual business incubator, knowledge transfer, knowledge, business incubator.

JEL: L26, M13, O33

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Suggested Citation: Reit, T. (2022). Knowledge Transfer in Virtual Business Incubators. *Problemy Zarządzania (Management Issues)*, *20*(1), 173–190. https://doi.org/10.7172/1644-9584.95.8.

Transfer wiedzy w wirtualnych inkubatorach przedsiębiorczości

Streszczenie

Cel: wirtualne inkubatory przedsiębiorczości (VBIs – Virtual Business Incubators) stają się coraz częstszym zjawiskiem, ponieważ rola cyfryzacji w kontekście przedsiębiorczości ma coraz większe znaczenie. Trwająca pandemia COVID-19 dodatkowo podkreśliła wagę rozwiązań wirtualnych. Aby być skutecznymi, wirtualne inkubatory przedsiębiorczości muszą opierać się na efektywnym transferze wiedzy (KT – Knowledge Transfer). Celem niniejszego opracowania jest identyfikacja czynników wpływających na transfer wiedzy w wirtualnych inkubatorach przedsiębiorczości oraz określenie, w jakim kierunku czynniki te wpływają na KT.

Metodologia: zastosowano jakościowe studium pojedynczego przypadku w ramach działającego na skalę międzynarodową wirtualnego inkubatora przedsiębiorczości, z wykorzystaniem 12 półstrukturalnych wywiadów z kierownictwem i pracownikami inkubatora oraz podmiotami korzystającymi z jego usług.

Wyniki: wyniki badań sugerują, że precyzyjna komunikacja, słabe więzi, heterogeniczne konteksty i niskie zaangażowanie wpływają na transfer wiedzy w wirtualnych inkubatorach przedsiębiorczości, przy czym każdy z tych czynników wpływa na transfer w inny sposób.

Ograniczenia /implikacje badawcze: jako badanie jakościowe może być narażone na stronniczość badacza i uprzedzenia kulturowe.

Oryginalność/wartość: niniejsze badanie rozszerza opisową, konceptualną literaturę dotyczącą VBI o temat dynamicznych procesów zachodzących w inkubatorze. Nowe spojrzenie na poziom dynamiczny umożliwia precyzyjną interwencję w przebieg KT, pozwalając na analizę i teoretyczne zrozumienie wyzwań i mocnych stron oraz praktyczne podejście do nich. Jest to niezbędne do skutecznego działania procesów VBI.

Słowa kluczowe: wirtualny inkubator przedsiębiorczości, transfer wiedzy, wiedza, inkubator przedsiębiorczości.

1. Introduction

Entrepreneurs and their startups are considered an essential driver of economic growth and innovation, as they foster economic competition and introduce novel business concepts (Zinke et al., 2018). However, they often lack necessary business skills, resources, and capabilities due to their company's newness. Furthermore, in most cases startup entrepreneurs' business networks are still weak and they struggle to obtain financial support (Sungur, 2015). Thus, many different types of startup support systems have been established in the last decades, with incubators being among the most important ones. They increase the survival rate of new businesses by app. 30% and reduce their costs by app. 40% (Zinke et al., 2018; Center for Entrepreneurial Innovation, 2015). In our digital age, where the general focus for entrepreneurs and firms is shifting from physical space to value creation, virtual business incubators (VBI) have been emerging as growing startup support systems (Hausberg & Korreck, 2020). Triodos Facet have conducted one of the most extensive research on VBIs so far. They define a virtual business incubator by positioning it into the larger topic area of traditional incubators: *"A business incubator is a service provider that offers a comprehensive package of services (more than one)*

https://doi.org/10.7172/1644-9584.95.8

designed to support, facilitate and accelerate the growth of starting businesses. A virtual business incubator does this with services and tools that are – at least to a significant extent – independent of the location of the service provider and/or the users of these services." (2011, p.22). Consequently, just like their physical counterpart, VBIs provide different kinds of startup support for their incubatees However, given their virtual character, VBIs allow their entrepreneurs to access worldwide resources such as international virtual training programs, a virtual community of fellow entrepreneurs, virtual networks containing experts, mentors and coaches, as well as online access to financing and funding opportunities without the need of physical proximity (Tsai, Hsieh, Fang, & Lin, 2009; Triodos Facet, 2011). Moreover, VBIs provide notable cost and time savings both for the VBI management and the incubatees due to the eliminated travel and accommodation necessities. Furthermore, they are considerably more scalable than physical startup support services, as their virtual character allows the lodging of an almost unlimited number of entrepreneurs, experts and mentors, regardless of their location (Rusko, 2011; Tsai et al., 2009). The practical relevance of VBIs is additionally underlined by the findings of Nowak and Grantham (2000), who state that an incubator's most important resources are communication and knowledge. These are non-physical resources so physical proximity is not necessarily needed for successful business incubation.

In addition to the availability of important incubator resources, their transfer to the entrepreneurs is also of decisive importance for incubator success (Albort-Morant & Ribeiro-Soriano, 2016). As mentioned, among several resources that incubators provide, knowledge and its transfer are among the most important ones for startup and incubator success (Rojas, 2010; Hackett & Dilts, 2004). The VBI's transfer of knowledge to its incubatees is essential for the latter to recognize and create business opportunities, as well as to raise capital, take advantage of the market and use business-relevant technologies, thus increasing the efficiency of the incubation program. (Fukugawa, 2013; Rubin, Aas, & Stead, 2015). Paolini and Modaffari further have found that knowledge transfer from incubators to their incubatees is the most important tool to overcome startups' difficulties in their early stage (2021).

However, despite this increasing relevance of VBIs and the essential role of knowledge transfer for their success, literature has so far neglected this connection. This has led to uncertainty concerning the nature of knowledge transfer in VBIs, as well as the resulting opportunities to leverage positive impact factors and address difficulties. To overcome this theory gap, this study conducts a qualitative single case study in a an internationally operating virtual business incubator. The aim is to understand actual knowledge transfer in VBIs, identify impact factors on knowledge transfer and understand their way of impact. In addition to their contribution to close the above-mentioned research gap, the results will include important practical implications for effective knowledge transfer in VBIs.

2. Conceptual Background

Knowledge transfer in virtual business incubators has not been a focus topic in VBI or knowledge transfer theory until now. VBI literature has been focusing on formal characterization of virtual business incubators rather than on any internal dynamic processes. Nowak and Grantham introduced the studies on VBIs in 2000 by presenting VBIs as a conceptual model focused on virtual value creation. In their work, they defined necessary VBI characteristics like early strategic alliance formation, human resource focus and capital, IC management expertise, distributed resources, private sector lead role, formalized control systems, national and international business and market focus and reach. In his qualitative study, Zedtwitz (2003) and later Carayannis and Zedtwitz (2005) investigated the characteristics of virtual business incubators, which contained the matching between entrepreneurial need and professional advice, the online access to networks, the lack of physical proximity, the focus on entrepreneurs' particular needs and the overall lower interaction. The latter hinders startups from taking advantage of synergy effects, the exchange of problem solutions, and personal networking. Heilmann et al. (2015) and Barbero et al. (2012) have touched on the dynamic component a little bit more by deriving success factors of VBIs such as the specialization on local circumstances and strategic alliance formation. However, these results were not investigated empirically but extracted from literature. The most wide-ranging research was conducted by Triodos Facet in 2011. Twelve VBIs were included in the research, which investigated VBI typologies, their tools, service concepts, costs and revenues and competencies. Even though the researchers have conducted interviews with VBI employees and experts, they rather followed their predecessors' trend of descriptive characterization of VBIs.

In summary, VBI literature mainly statically describes characteristics and resources of virtual business incubators without addressing internal dynamic processes such as knowledge transfer to entrepreneurs – which is crucial for the incubator's success. This is also caused by the fact that at the time of increased research on virtual business incubators, the latter did not even exist in their current form, giving existent VBI literature a need for refurbishment. This circumstance, together with increasing digitalization in our current era, once again underscores the importance of this topic and its empirical research. Unfortunately, literature about physical business incubators does not serve as a research pillow in this case either, as it hardly investigates knowledge transfer inside the business incubator. Moreover, the processes, tools, communication or focus of a virtual incubator do not match those of a physical one (van Tilburg, van der Sijde, Molero, & Casado, 2002).

Knowledge transfer has not had a common definition in literature until now. For this paper, the following definition by Liyanage, Elhag, Ballal, and

https://doi.org/10.7172/1644-9584.95.8

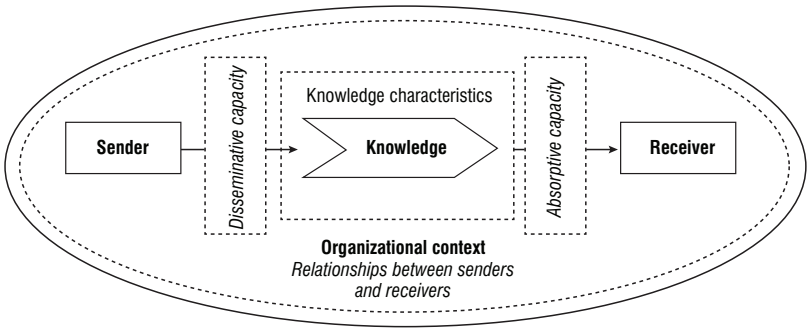
Li (2009) is used, as it embraces the various shades of transferring knowledge and simultaneously provides a clear understanding of the process' nature: *"[Knowledge transfer] is the conveyance of knowledge from one place, person or ownership to another. Successful knowledge transfer means that transfer results in the receiving unit accumulating or assimilating new knowledge"* (p. 22). Knowledge transfer is a complex process as it frequently requires a significant amount of effort, time, and resources from the recipient to properly assimilate the knowledge (Nonaka, Toyama, & Nagata, 2000). In the entrepreneurial context, it can occur through observation of activities, verbal communication and transmission, knowledge sharing, participation in activities and training or contact with other entrepreneurs (Gudkova, 2007; Nonaka & Takeuchi, 1991). Liyanage et al. (2009) argue that in the knowledge transfer process, the knowledge giver has to be able to identify relevant knowledge and be willing to transfer it. The knowledge receiver should be willing to acquire the respective knowledge and have the capacity to absorb and process it (absorptive capacity). In this process, intrinsic factors such as culture and extrinsic influences such as socio-economic factors may influence the knowledge transfer.

Knowledge transfer theory has been considering characteristics and relations of knowledge senders and receivers (Gaur, Ma, & Ge, 2019), the characteristics of knowledge itself (De Luca & Rubio, 2019; Liyanage et al., 2009), and the organizational context, which has been mostly limited to networks (Kumar, Kumar, Haque, Chowdhury, & Islam, 2017), macro and micro organizational contexts (Milagres & Buchardt, 2019); and virtual teams (Sarker, Nicholson, & Joshi, 2005; Castellano, Davidson, & Khelladi, 2017). The incubator context inside the organizational frame has only been mentioned with reference to physical incubators in China (Du & Wang, 2019), neglecting its virtual counterpart. This context gains importance when considering that virtual business incubators differ from common corporates -which are prioritized in knowledge transfer theory- in essential respects: first, there is no supervisor-employee relationship between the incubatees and the incubator management/staff. Relationships are characterized by flat hierarchies and informal interaction. Together with the digital character of the VBI, this implies a different knowledge transfer nature in VBIs, as knowledge transfer heavily depends on communication structures (Liyanage et al., 2009). Furthermore, the entrepreneurs work on their own businesses and, as in the case of common firms, do not pursue an overriding goal of another institution. They participate in VBIs with the intention of gaining knowledge and skills to develop their own businesses. The transfer of knowledge therefore per definition plays a central and overriding role in VBIs compared to corporate organizations. Differences also exist in the boundaries of the institutions, because when compared to a company, the corporate boundaries of VBI are more open and the members more expansive, leading to many more cultural, organizational,

and structural contexts where knowledge transfer can take place. These differences imply that knowledge transfer in virtual business incubators is influenced by unique, VBI-specific circumstances and significantly differs from knowledge flow in other organizations, which makes it inevitable to study knowledge transfer in the VBI context.

Figure 1 visualizes focus topics in the knowledge transfer literature.

Figure 1
Elements of knowledge transfer



Source: Minbaeva, 2007.

Given the remarkable research and practical importance of knowledge transfer in virtual business incubators and the lack of research in this area, this research firstly aims to provide an understanding of knowledge transfer in virtual incubators by the factors which influence them and secondly aims to understand the directions of these influencing factors. To achieve the research aim, the following research questions will be investigated:

RQ1: Which factors influence knowledge transfer to incubatees in the context of virtual business incubators?

RQ2: How do these identified factors influence knowledge transfer in virtual business incubators?

3. Methodology

This research, given the novelty of its topic and the phenomenon to be investigated, is designed as a qualitative single case study according to Yin (2013). Social constructivism is considered as a social lens, which assumes that reality is created through human interaction and that knowledge is socially constructed (Kukla, 2000; Prawat & Floden, 1994).

The virtual business incubator investigated is Bridge for Billions (BfB), which is a successful, internationally operating virtual business incubator founded in 2015 in New York and currently based in Madrid. The startups

https://doi.org/10.7172/1644-9584.95.8

it supports belong to several business areas including agriculture, culture, health, high-tech, education, environment. BfB selects its participants by their application forms and personal interviews, after which the entrepreneurs can take part in the BfB incubation program including fitting mentorships, a 3-month training program, access to a network of experts and fellow entrepreneurs, as well as support from the BfB management team. While working through the program, the BfB system automatically captures the inserted content and progress of the entrepreneurs into a business plan. Since the beginning of its support program, BfB has supported more than 1900 entrepreneurs with more than 1000 ventures from 87countries, with 64% of its entrepreneurs still in business after 2 years (Bridge for Billions, 2020).

Bridge for Billions has been chosen as a case for this research since it is one of the very few VBIs corresponding to this study's criteria of a) being a completely virtual incubator, b) covering the widely acknowledged core incubation services, and c) counting with several years of successful employment.

Data has been collected in 2020 through 12 semi-structured interviews with the VBI's CEO, COO, (former) marketing content creator, product manager, performance analyst (counting these as "staff members"), three mentors, and four (former and current) incubatees. This paper refers to the interviewees with the abbreviation "S" for staff member, "M" for mentor, and "I" for incubatee. The interviews lasted between 45–80 minutes and the female/male ratio was 5/7. All interviews have been conducted and transcribed in English. The participants' age ranged from 20 years to 45 years.

Given the newness of the topic, the data has been analyzed using a systematic inductive approach. It has been coded according to Gioia et al. (2012) with the help of the coding software MAXQDA. Following Gioia, the transcribed interviews have been paraphrased and coded into first and second-order categories and assembled into an aggregated dimension. In the next step, the data structure has been converted into a model answering the research questions. Adopting the incubator perspective, this research has considered unidirectional knowledge transfer, meaning the transfer of knowledge from the incubator (management and other staff members, mentor, and expert network) to its incubatees (entrepreneurs taking part in the incubation program). Hence, data has been coded accordingly, considering the top-down flow of knowledge within the interviews.

To ensure qualitative rigor, data and method triangulation have been used in the form of multiple data sources (see above) and multiple interviews. Peer debriefing through discussions and seminars with fellow researchers, as well as member checking through the constant exchange with the interviewees have also contributed to solid data quality.

4. Findings

Precise Communication

Communication, being an important precondition for knowledge transfer (van den Hooff & De Ridder, 2004), showed to be highly characterized by precision in the researched VBI. The interview partners all agreed that the conversation content at BfB is planned, prepared, and structured: mentorings and their content are planned in advance so that entrepreneurs' developments and difficulties can be specifically addressed. In the event of questions, experts are approached with explicit information on the topic, and in most cases, communication with management is also topic-related through chats and e-mails. However, while there are no inconsistencies regarding the precise nature of communication *per se* among interviewees, there are conflicting views on the consequences of this factor. S1 said

> [...] I think that [precise communication] can be incredibly beneficial because it allows it to be structured and you can get the most out of the relationship. I think when it's a little bit less formal, less structured, while it's easier to develop rapport with somebody, sometimes they don't know what the right questions to ask. You kind of go to a mentoring meeting and sit there. (S1)

which was confirmed by one of the incubatees, saying that

> Talking is much more efficient because you can choose whom to contact and exactly know what you will ask and say. You know, I love that you don't have to talk much, you just ask, get the help, done. (I1)

Both S1 and I1 share the opinion that the precise, structured way of communication increases efficiency by specifically addressing needs and providing matching knowledge. While friendly discussions, unscheduled meetings, and small talk can foster socialization, they can pose a barrier to effective knowledge transfer through the lack of structured knowledge retention (Liyanage et al., 2009). However, Alavi and Leidner (2001) state that knowledge transfer can only be successful if knowledge is applied properly, which can be achieved by rich communication. They add that structured communication can further be a hindrance to creativity and innovation. Interestingly, this theory contradiction was mirrored before in the interviews. A BfB mentor said that

> Communication is only related to the topic, [...] empathetic communication is more, more needed to understand my messages. (M1)

A (now former) staff member additionally said that

> Virtual incubators lose the small talk information, communication is very structured and goal-oriented. (S2)

https://doi.org/10.7172/1644-9584.95.8

M1 and S2 both referred to technical, business-related information getting lost due to precise communication from the incubator to its incubatees. The views about the influence of precise communication differ both in the qualitative data and in literature, which is why for this identified factor a case distinction concerning its impact on knowledge transfer is necessary. Precise communication in the VBI influences knowledge transfer positively by quickly matching and linking knowledge holders (mentors, experts, incubation managers) with receivers (incubatees). Hence, the transfer process itself is being accelerated, lean and effective, resulting in a high knowledge-transfer quality (Zahra & George, 2002). On the other hand, the formal character of precise communication also means that relevant knowledge that tends to be transferred in informal conversations is lost. In summary, we can conclude that precise communication fosters knowledge transfer in the VBI whenever the needs and matching solutions are clear, while it can pose a hindrance to KT for knowledge that is complementary and spontaneously transferred in informal conversations.

Weak Ties

As in the case of communication processes, the relationship between BfB's members has mostly shown to be formal, meaning that in most cases there were no strong human ties between the members. Most interviewees have linked these weak ties to the virtual character of the incubator, where it is not possible to e.g. build friendships through physical interaction such as spontaneous talk in the office or going for a coffee after work:

> Creating human relations in a virtual incubator is very difficult because everything is...it's all online. [...] Relationships are virtual and most people are unable to create durable relations. [...] It's harder to educate online because virtual incubators lack the community effect. (S3)

I2 shares a similar opinion:

> Physically you talk about the weather or have a beer and you build trust and friendship and share more. You can also, I mean you can just go and ask your mentor something and talk. (I2)

S4 added that

> It's more difficult for people to build trust physically, they always want to see the person, we want to change that mindset. (S4)

These quotes solidly mirror the overall experiences of the interviewed VBI members about the strength of social, relational ties between the members. Most of them attribute the weak ties to the lack of physical meetings in the VBI. Having known about the virtual concept of BfB from the beginning, the interviewees did not necessarily perceive weak ties as

a disturbing factor. However, knowledge transfer theory implies that close, tight relationships between the individuals and teams of an organization are critical to effective knowledge transfer, as are commitment and loyalty between individuals (Wilkesmann et al., 2009; Linayage et al., 2009). This can be explained by the higher willingness of people to share information and knowledge when they have developed a trusting relationship, as they feel safer about the consequences of sharing (Sun & Scott, 2005).

Surprisingly, weak ties have also shown to have a positive impact on knowledge transfer. I3 introduced an interesting perspective by stating that

> You're not that objective or you don't talk in the same way when, when you know the person well. If talking is more or less anonymous, you don't feel judged and can share more. (I3)

This implies that weak ties can pose an opportunity for entrepreneurs to talk about issues they would not normally raise in a more familiar environment, which in turn can be countered with targeted knowledge on the part of the incubator.

Another positive aspect of weak ties was voiced by M3:

> In physical contexts, you know the people better, but this is not profitable, because you lose a lot of time. (M3)

M3 has talked about his mentoring activities in various startup institutions, stating that weak ties allow him to support many more entrepreneurs, as the lack of small talk and friendly conversations gives him more time to schedule and conduct the meetings one after the other. I4 underlined the benefits of weak ties by expressing that

> There is a price you pay for those huge accesses to networks that Bridge provides, it would not be possible to get access to so many people and be close with all of them, you know. (I4)

It follows that M3 and I4 also perceive weak ties as a positive factor, as they save time and allow interaction with a much wider range of people in the network.

Strong ties are usually created between people with a high level of similarities and thus less likely to let novel information and perspectives into the homogeneous circle. Conversely, a big network with weak ties is more likely to gather different perspectives, new knowledge, support critical thinking and result in a more effective transfer of knowledge (Granovetter, 1973). In summary, the influence of weak ties on KT seems to depend on different types of people: for those who need social relations, personal interaction and deep trust to express their needs, weak ties can pose a hindrance on knowledge transfer, as relevant knowledge from the incubator's side cannot be matched with entrepreneurs holding back their

https://doi.org/10.7172/1644-9584.95.8

needs. On the other hand, and out of the same reasons, it results in more efficient knowledge transfer for those who feel more comfortable to express their needs in an anonymous environment and, on the incubator side, those who provoke weak ties to transfer their knowledge to a higher number of incubatees.

Heterogeneous Contexts

BfB's large network entails that the members of the incubator live in different national, cultural, and educational contexts. Thus, misunderstandings tend to occur, particularly in mentor – incubatee relationships:

> Um, another part is the localization of the knowledge. We have a great mentor from Norway, uh, and he is mentoring someone in Ghana, let's say, he might sometimes be lacking some context of the local market that prevents him from giving good advice. (S5)

S3 shared the same opinion when asked where he sees the bottlenecks of the virtual network:

> Eh, I think, they think they will have, they will have a mentor that doesn't know the real or let's say the local market. You know, if I am from Guadalajara, probably I will meet a mentor from Guadalajara that knows everything about the city, about the market, the people. (S3)

When the incubatees were asked about the different contexts and respective interaction with their mentors, I2 stated that

> It might, it might be an issue. It's more difficult than if you are from the same place, I think, even though it's digitally. (I2)

S5, S3, and I2 expressed concerns that mentors might transfer experience, advice, and knowledge from their own context to incubatees who would not be able to use this knowledge in their cultural or country context, which migh result in some disadvantages for the incubatees. The literature explains knowledge transfer difficulties between different cultural and country contexts by the circumstance where the knowledge giver does not encode the knowledge in a way that suits the cultural context of the knowledge receiver, resulting in misunderstandings and an ineffective knowledge transfer process (Chen et al., 2010). Peng and Floden (2001) confirm that knowledge transfer *per se* differs accordingly to the cultures and mentalities of the involved actors.

On the other hand, many interviewees have stated the advantages of heterogeneous contexts:

> [In physical business incubators, mentors are] all locally, they all have more or less the same way of thinking. I think that maybe in Bridge for Billions or in other incubator which does online, but I don't know if there are more online incubators similar activity to Bridge for Billions or not, but I think that if they have mentors from different parts of the world, it's easily for you to find the good match. (I1)

M2 added from the mentoring perspective:

> Um, I have many different other perspectives, I can give them great advice that actually challenged their way of thinking. (M2)

Literature explains the positive impact of heterogeneous contexts on knowledge transfer with new learning opportunities coming from the different perspectives of the knowledge giver and combinatory synergies emerging from the different contexts of knowledge giver and receiver (Boh, Nguyen, & Xu, 2013; Vaara, Sarala, Stahl, & Björkman, 2012). The interviews suggest that in the first stages of incubation, heterogeneous contexts contribute to the effectiveness of knowledge transfer as they provide new perspectives and opinions from different angles and thus extend the entrepreneurs' horizons. At the beginning of incubation, the incubatee still has a lot of possibilities to assess different opinions and adapt his business idea to the most suitable ones. On the other hand, in some cases heterogeneous contexts showed to impede the knowledge transfer effectiveness in advanced stages of incubation, as incubatees need more context-specific knowledge and advice in advanced stages and supporters with very different backgrounds may not understand the peculiarities in the context the respective entrepreneur is living and working in.

Low Engagement

The fourth factor influencing knowledge transfer in virtual incubators is the low engagement of incubatee members, which means the relatively low levels of intensity when it comes to interaction. This is not a surprise, as virtual contexts generally tend to be characterized by low interaction (Zedtwitz, 2003). The latter can express itself by incubatees not being committed to appointments or the incubation program:

> When you skip a meeting, you don't run into the next person the next day, it doesn't really affect your network. [...] In virtual incubators, you don't have the same feeling of letting somebody down. (S2)

> There is way more discipline needed for virtual incubation, it's so easy to leave. (M1)

S2 and M1 have clearly realized the challenge of low engagement and explained it by the ease of skipping appointments in a virtual incubator, where incubatees don't have to take responsibility for their cancellations face-to-face. Other staff members explained the phenomenon by the heterogeneous context people are living in, which results in not sharing a lot of similarities. Another explanation was that the emotional buy-in of virtual incubators is not as high, which is why incubatees do not feel committed to their incubation obligations. I3 and I4 agreed on this opinion:

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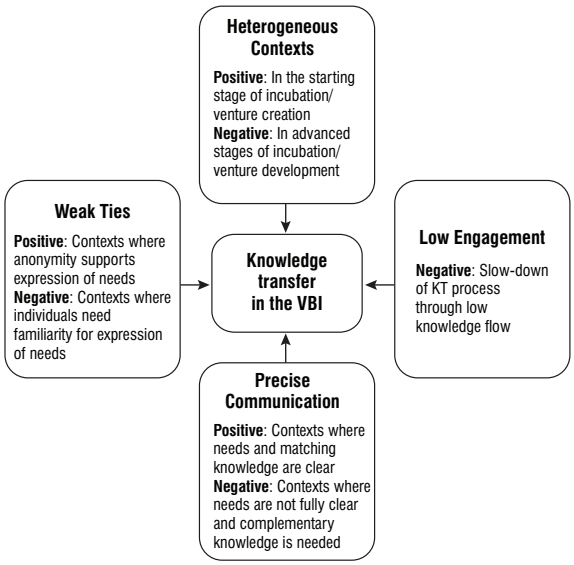
It's normal for virtual incubation to cancel things, it's no big deal. (I3)

If you are physically there it's more difficult to escape. I could have engaged more, but I didn't. (I4)

However, high engagement, intense collaboration, and participation in many organizational processes are acknowledged to be critical influencing factors for effective knowledge transfer (Gudkova, 2007). High engagement in organizations results in the constant exchange of knowledge and ideas, building and increasing the knowledge-base of the organization (Liyanage, 2009). Consequently, the low engagement in VBIs misses the potential of knowledge exchange and thus slows down knowledge transfer in the incubator. Figure 2 visualizes the findings.

Figure 2
KT influencing factors and their directions



Source: Own depiction.

5. Conclusion and Discussion

This paper has identified four factors influencing knowledge transfer in virtual business incubators and has shown in which way this influence occurs. Before data collection, I expected the outcoming factors to influence the transfer of knowledge unidirectionally, so either positively or negatively. Surprisingly, all factors except for the one of low engagement had both

negative and positive influences on knowledge transfer in the VBI, depending on the context they acted in. This shows the complexity of knowledge transfer in general and in VBIs in particular, underlining its research and practical importance.

This study's novel combination of the knowledge transfer concept and virtual business incubators contributes to closing the literature gap explained at the outset of this paper. With effective knowledge transfer being an essential factor for VBI success, this study's findings not only show actual, empirically derived insights of influencing factors and their directions but also position them into their context by differentiating the various contexts they act in. Hereby, this study extends the descriptive, conceptual VBI literature by adding the level of dynamic processes, the knowledge transfer, within the incubator. The latter are more complex than the former and describe the causes of incubator success rather than list outcomes and character traits of the VBI. These new insights into the dynamic level enable precise intervention in the course of the KT, allowing challenges and strengths to be analyzed and understood theoretically and addressed and strengthened practically. This is indispensable to the successful operations of VBI processes.

As for the practical context, insights gained from this paper can be utterly useful for VBI management, as well as for respective (non)governmental actors responsible for virtual startup support. The findings can help these actors in the process of creating and maneuvering VBIs in our digital era, thus contributing to SME and ecosystem success in their regions.

So far, knowledge transfer has only been studied in the corporate organizational context, neglecting the importance of these processes in virtual business incubators. However, the latter have been a rising phenomena in the last years and highly dependent on effective knowledge transfer. The COVID-19 crisis has additionally underscored the importance of virtual solutions, which do not rely on physical proximity and provide wider access to networks and resources (Engels, 2020). Thus, this research also contributes to knowledge transfer theory by expanding it by the virtual organizational context of VBIs. The VBI-specific findings show how and in which contexts KT can be negatively or positively influenced by the same factor. Especially in our times of rising digitalization these insights provide an important basis for further KT research in virtual environments.

Limitations

As a qualitative case study, this paper is exposed to the dangers of researcher bias. Although methods such as triangulation have been implemented to meet this risk, it is still possible that the researcher may have influenced the results by subjective perceptions. Furthermore, Davis and Silver (2003) stated that interviewees give different answers dependent on their nationality. Because the interviews have been conducted with

https://doi.org/10.7172/1644-9584.95.8

people from different countries, this factor may have played a biasing role. Moreover, He and van der Vijver (2012) found out that research participants with different native languages may bias the research through the lack of contextual coverage of the source. As a German native speaker, I conducted the interviews in English. Most of my interviewees were not native English speakers either, which is why this form of bias may have occurred in the research process.

Practical implications

This research has shown that engagement intensity is a critical challenge for virtual incubators. VBI management should thus develop mechanisms to overcome the quoted challenges such as low emotional commitment or easy cancellations without consequences. Bridge for Billions meets these challenges by creating life maps of the incubator's members and by bringing in more and more personal and informal communication and interaction. The negative impacts of weak ties, precise communication and heterogeneous contexts should be addressed by incubator management accordingly to the incubator context in order to fully benefit from their positive impact on knowledge transfer.

Outlook

Currently, there is very little relevant research on VBIs and the existing literature – although it has managed to build a solid (conceptual) ground – is outdated in certain respects, as actual virtual business incubators have only emerged in the last few years. Resulting from the above-mentioned reasons, knowledge transfer in particular and resource transfer in general are considered critical research topics in VBI literature. It would be interesting to see knowledge transfer characterized in the national context to analyze how the influencing factors, particularly heterogeneous contexts, change in a narrower environment. Furthermore, knowledge transfer could be researched in the context of learning mechanisms in virtual business incubators to find out how transferred knowledge is adapted and which knowledge transfer factors influence the learning mechanisms in VBIs. Moreover, as this study has only considered unidirectional knowledge transfer, future research could investigate bidirectional KT to embrace the KT aspects that got lost due to the limited perspective of this paper. Therefore, it is of high relevance to conduct research on other resource (transfer) processes and their roles, such as (the transfer of) social capital and networks, which, alongside knowledge, represent the most relevant resources of a business incubator.

Funding

This research received no funds.

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