Identifying patterns of idea diffusion in innovator networks

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IDENTIFYING PATTERNS OF IDEA DIFFUSION IN INNOVATOR NETWORKS

Research-in-Progress

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Abstract

The diffusion of innovative ideas throughout a social network of innovators depends crucially on how people are connected and influence each other, and particularly on the advocacy of influential individuals. We contend that existing conceptualizations of innovation diffusion and peer influence do not suffice to capture the multi-faceted nature of idea diffusion. To address this challenge, we adopt concepts from both innovation management and social network analysis to identify patterns of idea diffusion. Using topology analysis and percolation analysis, we examine the impact of peer influence on the percolation of idea-related artifacts. We demonstrate the applicability of our approach using the preliminary results of our study with one of Switzerland's major independent banking software providers. The outcome will not only have valuable contributions to the studies of innovation management and social network analysis, but also make a methodological contribution by introducing the examination of artifact percolation to study idea diffusion.

Keywords: Idea Diffusion, Innovation Diffusion, Innovation Networks, Social Network Analysis, Innovation Management

Introduction

In today's ever-changing business environment, the companies stand out that manage to continuously enthuse their customers through innovative ideas while formerly prominent firms frequently fall back when they do not recognize the potential of disruptive ideas in time (cf. Christensen 1997). As innovation cycles shrink, ever more companies shift from traditionally centralized, R&D-oriented organizational structures to a decentralization of ideas and more flexible, cost-efficient, and network-based work structures, opening up the innovation funnel to both peripheral inside innovators and external collaborators (cf. Desouza 2011, pp. 7-15, Stoetzel and Wiener 2013). Nowadays, everybody can be an innovator in no time. Ever since Apple and Google launched their online app markets – the App Store and Google Play respectively – success stories of privately developed apps reaching millions of downloads outweigh each other. More and more companies recognize the potential of this innovation glut and leverage ideas from external sources. In this context, online social networks and corporate social media increasingly gain importance, attracting researches from various disciplines, particularly innovation management (IM) and social network analysis (SNA).

However, existing literature on IM focuses primarily on managing processes and establishing organizational structures that favor the generation of innovative ideas. Research on open innovation examines the usage of both inflows and outflows of knowledge to accelerate internal innovation and expand the market for external innovation (Chesbrough et al. 2005). In this context, the recently thriving literature on intrapreneurship emphasizes empowerment of front-line employees and management of innovations that come from all parts of the organization (Desouza 2011). Finally, literature on the diffusion of innovations focuses on how innovative products and services spread through the communication channels of a social system (Rogers 2010). However, these perspectives lack a deeper understanding of idea diffusion and the factors that favor it. Ideas do not simply cross communication channels themselves, but depend crucially on topology and dynamics of the underlying social network, particularly on the distribution of influential and susceptible individuals, gatekeepers and promoters, decision-makers and operational staff, and their respective attitude towards the idea. Therefore, it is necessary to examine these factors of idea diffusion from a network perspective. We contend that the missing link between the extent of idea diffusion, the level of advocacy for the idea within the underlying social network and the likely success of the innovation may lie in the way people are connected and influence each other.

On the contrary, network science has contributed a lot to better understand structures and dynamics in social networks, but lacks a deeper understanding of their respective impact on idea diffusion. Structural properties of information and communication pathways in social networks have been examined as a way to compare different kinds of communication dynamics in different networks (Adamic and Adar 2005; Eckmann et al. 2004; Kossinets et al. 2008). Finding that network topology and burstiness generally hinder diffusion, the dynamics of information spreading have recently been examined by Karsai et al. (2011). Aral (2011) and Iyengar et al. (2011) examine the role of peer influence and social contagion in new product diffusion – an approach that seems promising for the innovation diffusion discipline as well. As online social networks become increasingly widespread, understanding social contagion becomes not only more feasible but also more crucial (Sundararajan et al. 2012). Therefore, studying peer influence and social contagion is a promising approach to improve the way we conceptualize idea diffusion in innovator networks.

Identifying patterns of idea diffusion in innovator networks is considerably different from examining innovation diffusion. Whereas innovation diffusion examines the diffusion of completed products or services throughout companies, our goal is to examine the diffusion of ideas throughout social networks. In contrast to completed products, evolving ideas often exist only as an abstract conception in their developers' mental model, i.e. an image in the mind of a person (Partridge 1991, pp. 303-304), which is usually intangible and volatile. Additionally, ideas may result in a product or service at some point in time, but their diffusion happens much earlier. Due to the highly collaborative and iterative nature of idea development (Hartmann et al. 2013), difficulties arise particularly in the context of defining measurements of diffusion. Ideas do not only diffuse, but are constructed and negotiated in social interaction. The initial image in the mind will most probably change when one sees the physical image that answers to the idea of it. While recent studies (Aral and Walker 2012, Bakshy et al. 2012) analyze information diffusion in Facebook, emphasizing the impact of individual factors such as peer influence, information dissemination and information exposure, idea diffusion is presumably determined by a series of factors that are more difficult to measure. To some extent, this might attribute to today's scarce usage of enterprise social networks (ESN) for the development of ideas, which would enable the conduct of similar network studies in the context of innovation. Moreover, idea diffusion comprises much more than the sheer diffusion of information. Since innovative ideas usually affect several business domains, diffusion obeys cross-disciplinary collaboration. Current approaches disregard the role of peer influence and social contagion in this context. Without a deeper understanding of these aspects, conceptualizing patterns of idea diffusion in innovator networks is hardly feasible. Our research aims to close this gap by unifying the perspectives of IM and SNA in a comprehensive approach.

To fulfill this objective, we are currently conducting a study with one of Switzerland's major independent banking software providers (in the following termed BITS – Banking and IT Solutions) – an industry highly depending on innovative ideas. By 1) analyzing social networks of innovators and organizational structures at BITS, 2) tracking the dissemination of innovation artifacts and 3) comparing different courses of idea diffusion in different social networks, we focus our discussion on these research questions:

1) What are the factors that facilitate the diffusion of innovative ideas throughout a social network of innovators?
2) By which patterns do ideas diffuse the communication channels of a social network of innovators?

In doing so, we seek to improve the way idea diffusion is currently conceptualized. Researchers from IM disciplines (particularly open innovation, intrapreneurship, and innovation diffusion) and researchers from SNA (particularly information diffusion, social contagion, and peer influence) will both benefit from this improved conceptualization as it facilitates the consolidation of their theories. Companies striving to further elaborate their innovation processes will also benefit from a deeper understanding of idea diffusion as it facilitates deducing guidelines on how to maximize effectiveness and efficiency of communication channels and organizational configurations.

Related Work

Innovation Management (IM)

Literature on managing innovation has thrived since Henry Chesbrough (2003) introduced the concept of open innovation to academic literature. According to the open innovation paradigm, companies should purposefully use both inflows and outflows of knowledge to accelerate internal innovation and expand the market for external innovation (Chesbrough et al. 2005). This perspective on open innovation also embraces peripheral internal innovators as sources of innovation, i.e. employees inside an organization but outside the traditional R&D department (Neyer et al. 2009). Some refer to this as internal open innovation, as opposed to external open innovation with collaborators outside of the organization (Stoetzel and Wiener 2013). Internal open innovation is mainly driven by a "decentralization of ideas" (Desouza 2011, p. 8-14), causing companies to shift from traditional R&D silos to network- and community-based work structures. Since R&D departments usually only enable experienced employees to work on ideas with a long-term impact, ambassadors of intrapreneurship advocate the empowerment of front-line employees to facilitate collecting ideas from all parts of an organization. Being intrapreneurial refers to employees that "share the drive and zeal of entrepreneurs", but rely on resources provided by an organization (Desouza 2011, p. 34). They do so because they want to focus on developing ideas, but need the organization's support when it comes to providing technology resources, skilled team partners, established partner networks and financial or legal expertise.

Companies with a high intrapreneurial activity establish "environments of play" to foster employees' creativity (Desouza 2011, pp. 57-60). Prominent examples are the slides and fireman's poles in Google's offices (Brown 2008) and the "big atrium" in Pixar's central office (Rao et al. 2008). The building was constructed in a way that simply does not allow employees to finish their working day without running into their co-workers. This fosters collaboration and facilitates the flow of ideas across organizational units. To promote the flow of ideas, it is crucial to maximize channel efficiency and effectiveness, as well as maintain their integrity in different contexts. “Ideas should take as few intermediary hops as possible on their way to a destination” (Desouza 2011, p. 57) to prevent them from being overly distorted by noise in the channels. Analyzing channel efficiency places a stronger focus on the structure and dynamics in the underlying social networks to understand how ideas really diffuse. Cantner et al. (2011) pursue this by examining innovation networks in regional knowledge bases. They analyze regional innovation networks based on patents and find that a specialized regional knowledge base tends to result in relatively fragmented network structures, which may strengthen the position of gatekeepers. However, their research focuses mainly on the output of three R&D departments in three different regions. Hence, other relevant organizational structures (especially decentralized, network-based ones) have not been thoroughly examined. Graf and Krüger (2011) examine the performance of gatekeepers in regional innovator networks. They found that being well connected both vertically (with internal innovators) and horizontally (with external innovators) in an organization has a strong positive effect of innovation success. Hence, the most capable intrapreneurs are those that a) excel in establishing a personal network of innovators (Desouza 2011, p. 72) and b) collaborate with central gatekeepers.

In recent years, the importance of communication channels has particularly increased due to the occurrence of new digital channels (Tuomi 2002) and the ongoing paradigm shift to the so-called attention economy (Davenport and Beck 2001, p. 20, Yardi et al. 2009). For example, while a couple of years ago the main goal was to be among the top search results in Google for your field of interest, the goal today is to maximize visibility by “going viral” through Facebook, Twitter and similar channels. This seems to have tremendous effects both on the way ideas are generated (maximize content luridness, maximize interactivity) and communicated (maximize linkage, maximize throughput). Rogers (2010, p. 35) distinguishes four main elements that influence the spread of an idea: 1) the innovation, 2) communication channels, 3) time, and 4) a social system. Our scope is to examine patterns of idea diffusion throughout a social system and the communication channels through which it is connected.

Peer Influence and Social Network Analysis

To examine topology and dynamics in innovator networks, we choose the SNA measures *clustering coefficient, proliferation, homophily, assortativity, percolation,* and *preferential attachment*. The clustering coefficient of a node A denotes the probability that two randomly selected connectors of A are connected, too (Easley and Kleinberg 2010, pp. 48-50; Rapoport 1953). A high clustering coefficient in innovator networks implies a small average path length between any two innovators. Proliferation represents the total number of innovators adopting an idea (Zhang et al. 2013). Homophily denotes the circumstance in which two connected nodes in a network share certain characteristics (Easley and Kleinberg 2010, pp. 86-90). Similarly, assortativity denotes the tendency to mix with similar nodes (Newman 2003). Innovator networks should ideally disclose low levels of homophily and assortativity as successful collaboration requires more complementary than substituting characters (Desouza 2011, p. 125). Percolation has been adopted from materials science, denoting the process of a liquid flowing through porous material. In SNA, percolation is often used to describe the social network’s ability to let information spread. Finally, preferential attachment describes the network property that newly joining nodes tend to connect to nodes that are already well connected. Some refer to this as the “fitter get richer” phenomenon or “Matthew Effect” (Gay and Dousset 2005; Merton 1968). Small world networks tend to have a high clustering coefficient and hence small average path lengths (Watts and Strogatz 1998). Connections in scale-free networks follow a power law distribution, i.e. the k^{th}-most connected node has $1/k^s$ as many connections as the most connected one (Albert and Barabasi 2002; Zipf 1935). Power law distributions dynamically evolve in networks whose population grows according to preferential attachment (Barabasi and Albert 1999). Innovator networks tend to disclose high levels of assortative mixing and preferential attachment (Gay and Dousset 2005). Therefore, they are likely to comply with the scale-free network model. Since the scale-free network model is based on the aforementioned models of Zipf (1935), the findings of Vitanov and Ausloos (2012) support this assumption. By juxtaposing common approaches to study knowledge diffusion, they conclude that such models provide useful information for the analysis of idea diffusion in social systems.

In recent years, several studies have examined the impact of peer influence and social contagion on information diffusion (Aral et al. 2009; Aral 2011; Iyengar et al. 2011). Aral and Walker (2011) use randomized trials to identify peer influence in networks – an important step towards capturing what promotes social contagion. Other studies (Aral 2013; Aral and Walker 2012) emphasize the importance of the distribution of influential and susceptible members over the social network. Both the diffusion impact of influential members promoting an idea and susceptible members adopting it shall be examined. Bakshy et al. (2012) examine the role of tie strength in information diffusion. They find that weak ties "play a necessary role in facilitating information flow" (ibid) when information is shared exclusively between some nodes. This however seems to shift as information becomes more readily available. We contend that both an in-depth examination of network topology, including a characterization of tie strength, as well as a causal empirical estimation of peer influence are essential to better conceptualize the multi-faceted nature of idea diffusion. This requires finding suitable measures for influence, advocacy and tie strengths.

Research Design

To answer our research questions, we combine approaches from IM with methods from SNA to study patterns of idea diffusion at BITS. Starting with an analysis of the organizational configuration, we identify departments with a considerably high innovation activity and interview 32 experienced innovators. Questions address collaboration structures and the usage of artifacts in the development of ideas, focusing on concrete innovations that have been developed at BITS or that are currently in progress. In addition to our interviews, we extract relevant innovation artifacts and communication data from frequently used tools, such as intranet, company wikis, project management tools, issue tracking systems, and email. Based on this dataset, we model the innovator networks at BITS (one per idea) and identify dimensions that influence idea diffusion. Having constructed our model, we use topology analysis and percolation analysis to identify patterns of idea diffusion. Figure 1 illustrates this approach and the next sections present the single steps in further detail.

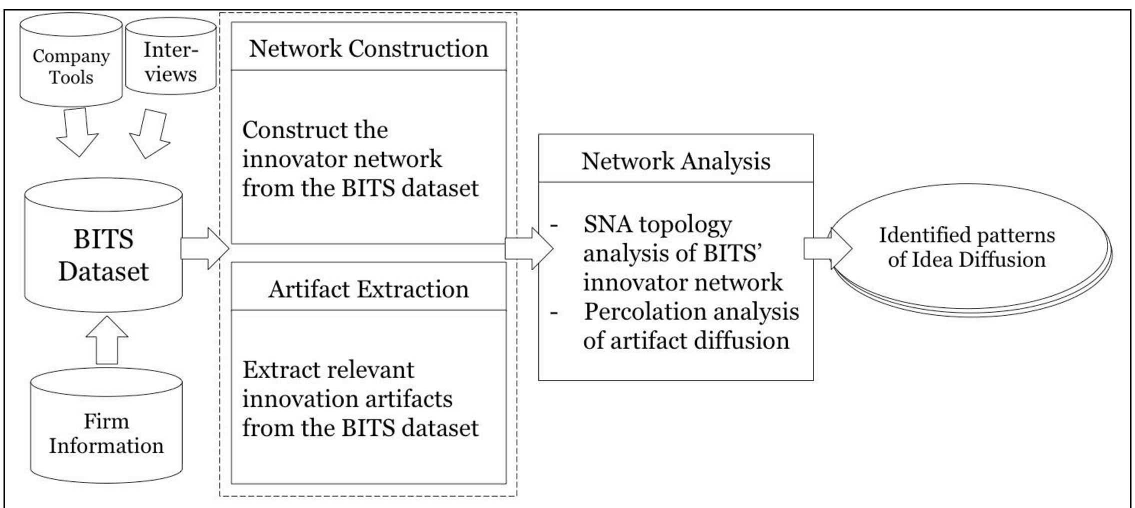

Figure 1. Unifying the IM perspective and SNA methods into a comprehensive approach to examine patterns of idea diffusion

BITS Dataset

The core activity of BITS lies in the development and distribution of its house-own core banking system. Around 1000 employees in two development centers and seven subsidiaries worldwide collaboratively innovate with customers (mostly retail banks), partners (specialized units e.g. for technical or outsourcing problems), and universities. It is therefore an excellent subject for examining idea diffusion in innovator networks in the context of cross-disciplinary collaboration. We start by analyzing the organizational configuration of BITS in the context of innovation. The executive board of BITS has collaborated with us on fostering the innovation processes for about two years. Against the background of this previous collaboration, we regard the company as complying with an "advocate model" (Desouza 2011, pp. 33-43), in which the CEO and a group of established decision makers select from a pool of ideas. Some dedicated organizational units develop most innovative ideas (mostly software tools) for internal and external customers. Hence, we conduct semi-structured interviews with 32 experts from these innovative units of BITS, including both operational staff (software engineers, business analysts, technical writers etc.) and decision-making personnel (lead developers, software architects, project managers, division managers etc.).

Our questions address the role of the innovators at BITS, their collaboration with members from other organizational units (both internal and external), and in particular their artifact construction behavior when developing ideas. In doing so, we usually identify a series of concrete artifacts that are built and communicated throughout the innovator network. As these artifacts form concrete idea representations, their analysis and evaluation makes idea diffusion measurable. Artifacts at BITS come in all different shapes, such as scenarios, UI mock-ups, whiteboard sketches, wiki pages, use cases, customer tickets, executable prototypes and so on. Our interviewees provide us the physical or digital artifacts and grant us access to the relevant tools so we can mine for artifacts ourselves. The interviews are recorded and analogously transcribed. The transcriptions are imported into MaxQda[1], a Computer-assisted Qualitative Data Analysis Software (CAQDAS). MaxQda assists us in 1) constructing the network by linking the interview snippets where collaborators are mentioned with profile data of the corresponding collaborator, and 2) extracting the artifacts by linking the interview snippets where relevant artifacts are mentioned. After having collected all the relevant data, we construct the innovator networks as described in the next section.

Network Construction

We ask our interviewees about their role in the divergent (generating) and convergent (refining) phases of the development of concrete ideas. For example, if the interviewee affirms having actively promoted her own original idea, we ask her how and to whom she communicated it first, with whom she collaborated in shaping the idea, whether the idea was finally implemented, and so on. Furthermore, we ask about her participation in innovative projects, how the idea originated and evolved, how feedback was collected and processed, from whom it was collected, and how the recipients reacted to the adoption of the final implementation. In doing so, we gain valuable insights of the innovation activity at BITS and relevant projects about which we can then collect further data (see next section).

Drawing on these insights, we construct the networks of innovators as follows. For every idea that manifests itself in at least one concrete artifact, we construct the network of relevant innovators involved in its development. A node in the network is any employee at BITS or one of its collaborators that 1) actively promotes the idea, and/or 2) is (potentially) valuable for the promotion of the idea because of relevant skills or decision-making authority, and/or 3) is affected by the impact of the idea. Collaborating nodes are connected via an edge. Different types of collaboration may include decision-making authority, regular interaction (e.g. team colleagues), needs-based casual interaction, and personal sympathy.

Artifact Extraction

From the interviews we have conducted so far, we have learned that a lot of idea-related artifacts are distributed over a series of company-wide collaborative software tools, such as the Confluence[2] team and content collaboration tool or the JIRA[3] project and issue tracking software. Quite often, further artifacts such as UI sketches, architectural diagrams, technical specifications or even executable software in the form of a link to a patch set in the Gerrit[4] code reviewing system are attached to the Confluence pages, JIRA issues, or Email. The digital representation of these artifacts comprises a lot of meta-information such as creation date, revision history, authors, editors, and subscribers. This alleviates tracking

[1] http://www.maxqda.com/

[2] https://www.atlassian.com/software/confluence

[3] https://www.atlassian.com/software/jira

[4] https://code.google.com/p/gerrit/

collaboration efforts for an artifact, which also facilitates observing its diffusion. By mining these tools for artifacts related to the innovative projects we identified in the interviews, we seek to get a better grasp on how the idea diffused the innovator network through its relevant artifacts.

Network Analysis

Once we have constructed the innovator networks and extracted the artifacts, we apply topology analysis and percolation analysis using SNA centrality methods, which help identifying influential and susceptible members. High degrees usually indicate high innovation activity and peer influence (Hu and Zhao 2009). SNA measures such as the clustering coefficient, preferential attachment, link density, and homophily are examined to check the innovator network properties against the small world and the scale-free network model. We hypothesize the existence of a percolation threshold (Albert and Barabasi 2002) in innovator networks, i.e. a critical probability p_c below which the network is composed of isolated clusters, but above which a giant cluster spans the entire network. We compare different courses of idea diffusion in different innovator networks to examine whether peer influence increases p_c, i.e. whether high levels of social contagion favor a so-called percolation transition. In a nutshell, we identify patterns of idea diffusion in innovator networks by examining the percolation of artifacts throughout idea-related networks.

To capture the percolation of artifacts, we examine the degree of diffusion and the advocacy as dependent variables. The degree of diffusion denotes the extent to which an idea is advocated in the underlying social network of innovators. It is a function of proliferation and advocacy (after Zhang et al. 2013). The advocacy variable refers to the overall degree of positive interactions and modifications that are executed by all innovators in the networks to promote the idea. Peer influence, homophily, time, quantity, and average tie strength are selected as independent variables. Peer influence is measured as a weighted linear-additive function of the exposure of innovator i to advocating the idea in the innovator network ($\Sigma_j w_{ij} a_j$), where w_{ij} captures how relevant each innovator j is to i and a_j indicates the advocacy of the idea by j. Time indicates the total amount of time it took from the generation of the first idea artifact until further diffusion finally stagnates, i.e. no more artifacts are generated or promoted. Quantity is measured indicates the total amount of idea-related artifacts that diffuse the innovator network. Average tie strength indicates indicates the communication intensity between any two nodes, e.g. number of emails, collaboratively developed artifacts etc. over the total number of edges.

Preliminary Results

In the first round of interviews, we started with a thorough examination of the *AlphaInnovations* (AI) division, a dedicated organizational unit that arose from the need to extract the promotion of promising ideas from the overloaded *ProductEvolution* (PE) department and to establish an environment that favors innovativeness. Developing radically innovative ideas became a victim of PE's daily business (solving customer issues, give support, bug fixing etc.) in recent years, reducing the focus of its activity to incremental product development. As a result, one of the company's founders built up the AI division in order to pursuit a series of promising ideas that were stuck in the PE department for too long. Many of the participants we have interviewed so far formerly worked for PE and joined AI to work on these ideas. At the time of writing, we interviewed the founder and division manager of AI, the product manager of AI's solution portfolio, two software architects, three developer team leaders, four software engineers, a business analyst, and a technical writer, ranging from two years to two decades of experience with BITS. Today, the AI division consists of three large developer teams that collaboratively develop frameworks and modules that extend the core banking system (CBS) of BITS. The original CBS was initially developed more than a decade ago based on the programming language PL/SQL. As it became more and more cumbersome to extend the rapidly growing CBS due to a lack of modularization, the mission of the AI division is to tailor a middle tier and service layer for the monolithic system. Using the object-oriented programming language Java, the three developer teams seek to substitute legacy PL/SQL code with a modern multi-tier architecture step by step. Hence, the AI division can be seen as an innovation supplier for the PE department.

Many of our interviewees state that innovations at BITS mostly occur from the collaboration of few established innovators within the same department, but rarely from cross-departmental collaboration.

When requesting resources for the development of innovative ideas, employees of BITS contact members of a recently established *IdeaBoard*, a dedicated organizational unit chosen to select from a pool of ideas. These members are mainly perceived as gatekeepers for innovations that candidate for crossing organizational borders. As AI's products are essentially extensions that do not have direct value in themselves without the existing core banking systems, the board members basically select ideas according to their potential value for PE's product portfolio. As a result, our interviewees describe the innovation trajectory as "rather reactive than proactive", meaning that emergent ideas shall aim at improving the existing business incrementally, rather than changing it radically. Moreover, a bigger part of our interviewees estimates that an innovator's reputation has significant impacts on idea diffusion. In order to be successful, it is crucial that the idea is visible and compelling for the influential innovators. One of the IdeaBoard members even stated that being well connected is almost as important as having good ideas.

The various tools that are used at BITS to collaboratively develop and discuss ideas seem to play an important role. Confluence is often used as open space where ideas can be presented and discussed. As the start page of this corporate-wide collaboration tool comprises an activity stream, it commonly catalyzes the diffusion of emergent ideas by depicting to which sections influential members contribute frequently. Our interviewees often describe Confluence as an "idea board" where many evolving ideas are set in motion.

Furthermore, several interviewees state that it takes a considerable amount of training to be really innovative at BITS. As a lot of specialized knowledge about the numerous systems and subsystems exists only implicitly within the heads of few established innovators, the promotion of emergent ideas depends crucially on the support of these people: "You may know all technologies, but as long as you don't know the BITS world, you don't know how to use them", one Software Engineer states. At BITS, this property is especially amplified by the circumstance that there are several divisions like AI competing for their innovations to find their way into the central CBS. In the second round of interviews, we consulted innovators from the PE department, including experts from a specialized task force who are currently working on an online banking suite for the CBS. The ongoing innovation partnerships there are promising sources for further interesting findings. Prototypes are collaboratively developed with external companies and banking personnel, such as an iPad app for wealth advisory. In this context, it is particularly promising to study how ideas can be successfully communicated from BITS developers to customers. For example, one Lead Developer states that one major challenge is to convince the upper management of an idea's benefit for the customer: "Our problem is that our users are not the ones who buy the product. There's a banker in between, and that banker is often rather a problem than an aid."

Discussion

At the time of writing, we have just finished compiling the BITS dataset. While we were processing the transcribed interviews, we also started to categorize the identified innovation projects and allocated the collected artifacts to them. For example, the many innovation partnerships that currently circulate around the recently established online banking suite at PE each form a separate category. For each of these categories, we construct the network from the involved persons and extract the relevant artifacts as described in the Research Design section. However, our so far presented findings result from qualitative data analysis and will have to be complemented by the quantitative examination described in this paper.

Interestingly enough, our current findings suggest that peer influence and preferential attachment play a central role in the diffusion of ideas throughout the innovator networks at BITS. Many potentially valuable ideas may be shut down if they are not properly packaged and communicated, but once that two or three influential innovators advocate the idea, it quickly becomes a self-selling item, as the aforementioned interview statements suggest. This circumstance also seems to affirm our assumption that peer influence contributes a lot to exceeding the percolation threshold in innovator networks.

In this regard, we concur with Vitanov and Ausloos (2012), who state that some stages of idea diffusion can be described by epidemic models. More specifically, we suggest that social contagion and peer influence are appropriate epidemic models to analyze dynamics of idea diffusion in innovator networks from a quantitative perspective. However, these quantitative models alone may most probably not suffice to improve existing conceptualizations of idea diffusion substantially. Instead, qualitative models that draw on existing conceptualizations of innovation diffusion should supplement quantitative models like social contagion and peer influence when patterns of idea diffusion are studied.

Additionally, our current findings regarding cross-departmental communication seem to indicate that idea diffusion at BITS complies with a centralized hierarchical diffusion pattern, as described by Desouza (2011, pp. 33-43). In this regard, the findings seem to confirm our assumption regarding the compliance with an advocate model of intrapreneurship (cf. section "BITS Dataset"). But then again, the findings regarding the recent establishment of the IdeaBoard do not fit into that picture. This organizational institution would rather indicate compliance with a "producer model" (ibid), where systems for identifying, funding, and harnessing ideas with potential for radical innovation are in place. Additionally, our findings suggest that the traditional role distinction between innovators, early adopters, early majority, late majority and laggards by Rogers (2010) does not suit the complex structure of the underlying innovator networks at BITS. In this regard, we constitute that existing conceptualizations of intrapreneurship and innovation diffusion alone are too static to capture the more dynamic nature of idea diffusion. The topic of idea diffusion clearly has conceptual and epistemological vagueness that requires a more explorative approach. Hence, a more thorough examination of the actual idea communication practices from an IM and SNA perspective will be substantial. We claim part of our contribution as studying this phenomenon from these two perspectives.

Intended Contributions and Future Work

Although we might not be able to capture the full extent of viral idea diffusion (which, however, is very hard to capture in general), we contend that our artifact-driven approach places a stronger focus on diffusion patterns than existing conceptualizations based on observational data do. To the best of our knowledge, our research is the first to study the diffusion of emergent innovative ideas throughout the communication channels of a social network of innovators by examining the impact of peer influence on the percolation of idea-related artifacts. We believe that this will essentially improve current conceptualizations of idea diffusion patterns and make significant contributions to both IM and SNA research, as it facilitates deducing guidelines on how to optimize organizational configurations in a way that fosters the generation of valuable innovative ideas from all sides. However, as our current focus is to encourage research on idea diffusion from both IM and SNA perspectives, and to establish an appropriate statistical model, the results of our study with BITS should be seen as a first step towards identifying patterns of idea diffusion rather than a comprehensive study. Once we have fully established the taxonomy of collaboration structures, we will be better able to classify innovator networks in subsequent studies. To obtain more solid results, comparative empirical studies with several companies are necessary. These should examine additional factors such as the role of the organizational configuration (e.g. with which intrapreneurship model does the company comply) or the type of the idea under observation (radical or incremental, respectively strategic, tactical or operational) in order to identify a variety of the presumably manifold patterns of idea diffusion.

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