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Distant and Local Knowledge: Investigating the Effect of Changing Interest in Knowledge Generation

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Completed Research Paper

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Abstract

This study examines how changes between drawing inspiration from distant knowledge and focusing on local knowledge affect contributions in online communities. The research compares two theoretical frameworks for understanding knowledge generation: The tension-based view highlights the tensional perspective of initially engaging with distant knowledge before narrowing the focus to specific domains to foster creative behavior. Conversely, the foundational view posits that creative behavior requires local expertise before it is combined with insights from distant knowledge domains. We collected data from 15 Q&A forums hosted by Stack Exchange and used natural language processing to analyze users' contributions and changes in interest. Our findings suggest that both theories explain knowledge generation. Individuals need to engage with more distant knowledge over time but also streamline their interests between local and distant knowledge domains to generate more valuable and novel contributions. The study enriches understanding of knowledge generation in online communities and offers insights into how to support creative individuals.

Keywords: Changing interest, knowledge generation, knowledge distance, online communities, organizing for innovation in the digitized world, quantitative text analysis

Introduction

Individuals in online communities are a source of new and valuable ideas, and they often participate in online communities to present their knowledge or engage with peers (Hwang et al. 2015; Pollok et al. 2021; Resch and Kock 2021). Their interactions on these platforms facilitate feedback, collaboration, and inspiration (Beretta 2019; Claussen and Halbinger 2021; Singh and Phelps 2012). The literature has investigated community members' characteristics to gain a better understanding of their creative behavior (Jensen et al. 2014; Poetz and Schreier 2012). There is an ongoing debate over which information fosters individual knowledge generation in online communities (Hwang et al. 2019; Resch and Kock 2021). Knowledge distance is a form of knowledge breadth to "*trace similar attention dynamics across different knowledge domains*" (Aceves and Evans 2023). Hence, knowledge distance describes the interest of individuals to interact within more heterogeneous (i.e., distant) vs. homogenous (i.e., local) knowledge domains. Interest in distant or local knowledge may influence knowledge generation positively or negatively (Boh et al. 2014; Jeppesen and Lakhani 2010). Distant knowledge enables the recombination of different

domains (Burt 2004; Fleming 2001; Stanko 2016) but can overwhelm individuals because of information overload (Aral and van Alstyne 2011; Jones et al. 2004). Individuals engaging with local knowledge build expertise and can identify potential in this local knowledge domain (Teodoridis et al. 2018). They distinguish valuable from worthless ideas. However, an intense focus on local domains can lead to cognitive entrenchment (Dane 2010). Consequently, no single view prevails as to whether local or distant knowledge favors knowledge generation best. Several studies propose contingency factors such as social embedding (Pollok et al. 2021; Resch and Kock 2021; Safadi et al. 2021; Soda et al. 2021), development experience (Mannucci and Yong 2018; Pollok et al. 2021), and the turbulence of a knowledge domain (Teodoridis et al. 2018) as explanations for seemingly contradictory findings of distant and local knowledge on individual knowledge generation. In addition, a conceptual study highlights the knowledge generation process in the form of changing knowledge needs as a potential solution to the seemingly contradictory findings (Perry-Smith and Mannucci 2017; Zaheer et al. 1999). Nevertheless, the knowledge generation process in online communities where individuals search, discuss, and create knowledge is far from understood empirically and conceptually. Considering changing interest in distant and local knowledge over time reveals two theoretical modes that explain knowledge generation: The tension-based view proposes *inspiration before focus*, while the foundational view prioritizes *focus before inspiration*.

Perry-Smith and Mannucci (2017) theorize different knowledge needs of individuals depending on time to describe the tension-based view: This dynamic understanding aligns with the dynamic understanding of online communities (Faraj et al. 2011). Distant knowledge facilitates inspiration, while focusing on a local knowledge domain fosters elaboration and ultimately leads to creative contribution. Distant knowledge makes it possible to combine knowledge and generate multiple ideas, which allows individuals to focus on a specific knowledge domain to elaborate (Afuah and Tucci 2012; Stanko 2016). Studies have recently investigated the social effects of this theoretical framework (Mannucci and Perry-Smith 2022; Ter Wal et al. 2023), but the contextual notion of changing interest still lacks empirical evidence.

In contrast to the theoretical approach of Perry-Smith and Mannucci (2017), the foundational view of knowledge assumes that generating knowledge requires local interest to build expertise (Dane 2010; Kaplan and Vakili 2015; Weisberg 1999). Local knowledge can inhibit creativity because it creates inflexibility. However, it may also favor knowledge generation (Dane 2010; Teodoridis et al. 2018). Although the foundational view does not explicitly focus on processes, it proposes a sequential aspect of knowledge generation. Local knowledge allows individuals to assess problems or solutions for customer needs and gauge whether potential knowledge recombinations work. By contrast, non-experts without local knowledge cannot assess whether a domain is potentially valuable for further exploration. After evaluating a situation with local knowledge, individuals break out of their schemes and experiment to solve the initial problem. In that case, individuals build on knowledge based on distant inspiration (Dane 2010).

Currently, no empirical evidence supports one or the other theoretical approach in online communities because the literature usually takes a static view of knowledge generation (e.g., Hwang et al. 2019; Safadi et al. 2021) or investigates the social side (Mannucci and Perry-Smith 2022; Ter Wal et al. 2023). A dynamic view is a possible way to solve contradictory findings between the effects of distant and local knowledge, helping both research and practice better understand knowledge generation (Faraj et al. 2016; Sundararajan et al. 2013). Therefore, we ask: *How do changes between inspiration and focus (i.e., changing interest in distant and local knowledge) affect individuals' knowledge contributions?*

Kaplan and Vakili (2015) suggest that both theoretical arguments explain advantages for creative behavior. Following their idea, we focus on Q&A communities as a place of knowledge generation and analyze two hypotheses that illuminate the advantages of both theoretical approaches. First, a potential explanation for the different modes between inspiration and focus can be the generation of novel versus valuable knowledge contributions. Although multiple scholars find a positive relationship between novelty and value, the necessary capabilities for novel vs. valuable knowledge might differ (Amabile 1983; Chen and Althuizen 2022; Ghosh and Wu 2021; Kaplan and Vakili 2015). Kaplan and Vakili (2015) show that investigating a specific knowledge domain fosters new knowledge, while distant knowledge increases the generation of valuable knowledge. However, they take a static approach, which overlooks potential dynamic mechanisms between distant and local knowledge. A second explanation for the distinct processual understandings of knowledge generation is two variants of interest. While the absolute level (knowledge distance) describes the average tendency of individuals to engage in distant or local knowledge, ambidextrous interest describes individuals' capacity to engage simultaneously in both distant and local knowledge instead of doing so

sequentially. Ambidextrous interest defines an individual's flexibility and ability to combine generalist and specialist characteristics (Hwang et al. 2019; Katila and Ahuja 2002). Consequently, we analyze whether the mode of the foundational or the tension-based view depends on novel vs. valuable knowledge contributions or on mechanisms of knowledge distance vs. ambidextrous interest.

We collected a dataset from a collection of Q&A forums hosted by *Stack Exchange* and assessed data from 15 forums in which community members ask questions, provide answers, comment, and vote on contributions (e.g., Safadi et al. 2021; Smirnova et al. 2022). We captured the evolving knowledge distance among community members over time through their participation in discussions. Therefore, we transferred the text data to vector embeddings by using natural language processing, namely the transformer model S-BERT, and calculated the cosine distance of users' contributions to related posts (Aceves and Evans 2023; Reimers and Gurevych 2019). By aggregating all contributions per quarter (Safadi et al. 2021; Zaheer et al. 1999), we can observe the change in interest over time and empirically analyze changes' impact on novel and valuable contributions. To investigate individuals who shape the community, we focus on users actively contributing, resulting in a final sample of 8,120 active community members.

The findings show that both theories are part of knowledge generation, yielding valuable and new contributions. While the absolute level (knowledge distance) describes the average tendency of individuals to engage in distant or local knowledge, ambidextrous interest describes the capability of individuals to engage in both local and distant knowledge. Our findings show that the foundational view determines changing interest in knowledge distance. On average, creative individuals engage with more distant knowledge over time for novel and valuable contributions. By contrast, we find support for the tension-based view in the case of ambidextrous interest. Creative individuals investigate a lower variety of local and distant knowledge over time. In summary, individuals who engage with more distant knowledge over time but focus their ambidextrous interest generate more novel and valuable contributions. Our study offers insights into the knowledge generation of individuals. On the one hand, researchers argue that distant knowledge facilitates recombination (Fleming 2001; Stanko 2016). On the other hand, local knowledge enables the identification of anomalies or opportunities (Dane 2010). Both seemingly contradicting views offer insights into knowledge generation. Considering time as a determining factor reveals the value of both interests and leads to the foundational and tension-based view (Dane 2010; Kaplan and Vakili 2015; Perry-Smith and Mannucci 2017; Weisberg 1999). We extend these conceptual arguments by empirically showing that both modes of changing interest are essential for novel and valuable contributions but depend on the nature of interest. For online communities, our study is one of the first to go beyond a static approach that better represents such digital organizations (Faraj et al. 2016; Sundararajan et al. 2013).

Theory

Online communities and the effects of distant and local knowledge

Online communities are highly relevant for society and companies as they are a place of knowledge exchange between community members and a societal platform of collaboration, finally leading to innovations (Faraj et al. 2016; Hippel and Krogh 2003). Online communities are digital organizations defined between classical social media and digital platforms, as Faraj et al. (2016) argue. On the one hand, online communities surpass classical social media, which focus on the choice of individuals to create or lose social ties to others but focuses on a higher community goal and mutual value creation. On the other hand, digital platforms focus on economic value creation and provide the technological framework to allow interactions. Unlike digital platforms, online communities emphasize the human aspect, with social interactions and participant behavior at the core of their value creation. Researchers focus on capturing value in these organizations and analyze open innovation in the form of open-source software (Hippel and Krogh 2003), user innovation (Poetz and Schreier 2012), and crowdsourcing (Bayus 2013). Others research value creation and investigate the influence of members' social embedding (Dahlander and Frederiksen 2011) or impact factors on valuable contributions (Chen et al. 2018).

The key characteristic of all online communities is an online format that allows their geographically distant members to interact, creating overwhelming knowledge flows (Faraj et al. 2016). Community members are intrinsically motivated to engage with the community and show different purposes, including joy, identity, and commitment toward the community (Bagozzi and Dholakia 2006; Lakhani and Wolf 2003). They are

eager to share their knowledge freely (Bauer et al. 2016; Hippel and Krogh 2003) and develop community knowledge (McLure Wasko and Faraj 2000), thereby creating economic and ideologically valuable content (Poetz and Schreier 2012). In this way, they refine and advance other members' knowledge and provide valuable feedback and motivation to their peers (Flath et al. 2017). Common artifacts that allow the active engagement of community members are text posts, comments, or votes that enable varied discussions. Consequently, community members' social engagement has two effects. For the community, interaction enriches the discussion with valuable and novel knowledge, ideas, or arguments. On an individual level, social interaction in online communities inspires members, reveals their interests, and ultimately determines their knowledge generation. In particular, active community members learn about the community's needs (Hwang et al. 2019).

In summary, voluntary contributions through social interactions in online communities offer learning opportunities for their members (Hwang et al. 2019; Singh and Phelps 2012). Through likes, comments, or shared ideas, individuals provide constructive feedback and support to others, mutually develop knowledge, and find answers to their problems. The process of social interaction enables individuals to consciously or subconsciously allocate their interests (Brennecke et al. 2022) and provides stability to interpret distant knowledge (Soda et al. 2021). One's interest in a community's content can inspire (distant knowledge) or provide valuable information through focus (local knowledge) for making creative contributions. Community members can shift their interest over time by investigating more distant knowledge or focusing on a local set of domains. Engaging with distant knowledge fosters cognitive flexibility, which enables individuals to combine different types of knowledge in innovative ways. Conversely, focused interest is often driven by a desire for constructive feedback and building expertise. Besides potential contingent factors determining the value of distant vs. local knowledge, Perry-Smith and Mannucci (2017) propose changes between inspiration and focus as valuable for creative individuals, highlighting both worlds' advantages.

Tension-based view of knowledge – Inspiration before focus

From the perspective of social interactions, Perry-Smith and Mannucci (2017) propose that the information needs expressed through social relationships may depend on the idea development phase. The authors argue implicitly that knowledge generation comprises a phase of inspiration followed by a focus phase. Each phase has different requirements for developing creative ideas. In the following, we describe the proposed theory and transfer the authors' idea to the process of knowledge generation (see Figure 1). In principle, the authors come from a tension-based view between knowledge and creativity (Weisberg 1999), meaning that a broad interest is a basis for recombining ideas (Ahuja and Morris Lampert 2001; Stanko 2016).

In the inspiration phase, access to distant information is crucial for stimulating creativity and generating many ideas through association (Amabile 1983; Dane 2010). Recombining the accessed distant knowledge fosters new domains (Flath et al. 2017; Fleming 2001; Stanko 2016). Generating ideas requires cognitive flexibility, which grows through the individuals' inspiration from diverse impressions. The focus phase, by contrast, benefits from support, trust, and focused information. Individuals refine their basic concepts by identifying areas for improvement or inconsistencies and often seek constructive feedback to enhance applicability (Harrison and Rouse 2014). Individuals prepare their ideas to share them with the community. This process often requires complex information. Individuals focus on specific knowledge domains to gain a deep understanding of the knowledge they need. We argue that these changing information needs, generally proposed for creative ideas (Perry-Smith and Mannucci 2017) and on a company level (Afuah and Tucci 2012), also apply to knowledge generation in online communities. From a theoretical point of view, individuals who follow the order of these two phases should produce more creative contributions.

Foundational view of knowledge – Focus before inspiration

The foundational view of knowledge highlights the value of expertise for identifying potential problems and fields of knowledge development (Dane 2010; Weisberg 1999). Kaplan and Vakili (2015) describe how expertise in a knowledge domain makes it possible to break out of existing assumptions and routines. Understanding the main ideas in a knowledge domain allows the sensing of potential weaknesses. When combining this static theory with the basic definition of creativity as a recombination of knowledge (Fleming 2001; Stanko 2016), a process of focus followed by exploration becomes apparent. Based on this understanding, individuals can generate potentially valuable and novel knowledge.

Figure 1. Schema of Changing Knowledge Distance
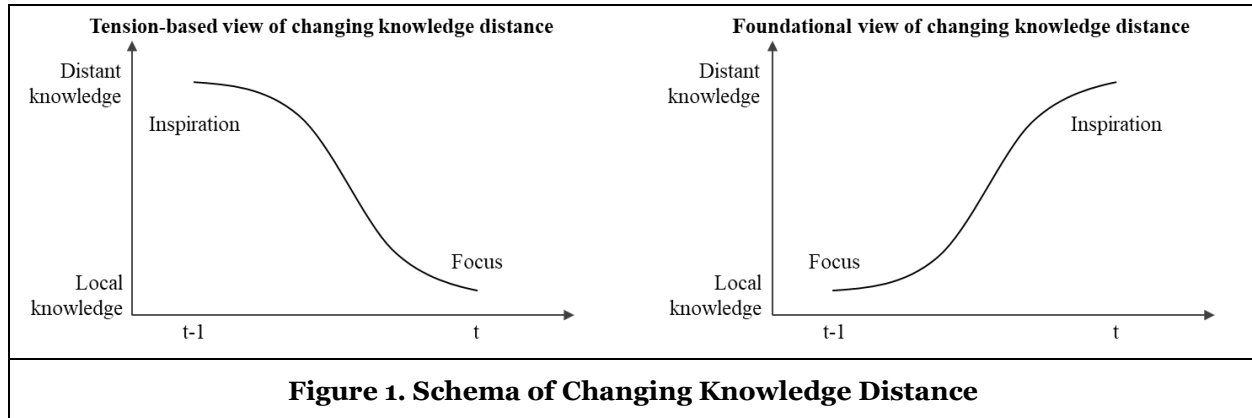
In the process of knowledge generation, focusing on local knowledge and then experimenting with recombination between distant domains increases both the value and the novelty of knowledge generation. In the first phase, creative individuals show expertise in a particular domain. They understand the knowledge domain and see the inconsistencies, problems, or potential underlying root causes (Dane 2010; Teodoridis et al. 2018). By engaging with peers, individuals acquire knowledge about current topics, trends, and foundational ideas, boosting their self-confidence through positive community feedback (Bayus 2013; Haas et al. 2014). Based on this understanding, individuals can identify community problems or initial ideas and avoid information overload (Aral and van Alstyne 2011; Jones et al. 2004). They can filter the impressions of the ongoing discussions and pinpoint the community's interest compared with non-experts. In the second phase, individuals start developing solutions. Breaking out of current schemas reveals cognitive flexibility (Dane 2010). Recombining local and distant information solves community problems by providing new approaches and arguments. Eventually, this behavior signals a high knowledge value to other individuals. The community appreciates such contributions because they combine distant impressions and restructure the community's knowledge.

Hypotheses

We describe two processes of knowledge generation coming from the tension-based and the foundational view of knowledge. From a theoretical perspective, existing research does not offer conclusive evidence favoring one theory over another because knowledge generation is currently underexplored. Both approaches are plausible based on their argumentation. Consequently, we empirically evaluate which theory dominates. Our overall research goal is to investigate how dynamic changes between inspiration and focus (i.e., changing interest in distant and local knowledge) affect knowledge contributions. In the following, we derive two hypotheses for our analysis.

First, we question the extent to which the argumentation in each theory depends on different capabilities (either for novelty or value) as critical components of creative behavior (Amabile 1983; Ghosh and Wu 2021; Kaplan and Vakili 2015). Previous research assumes an overall positive relationship between novelty and value. Still, several studies find that capabilities differ in their actual effects, especially in knowledge generation (Chen and Althuizen 2022). For example, Kaplan and Vakili (2015) show that the inclusion of distant knowledge and diverse expertise leads to fewer novel patents but enhances their value, as measured by citations. Similarly, Hwang et al. (2019) find that broad knowledge facilitates novel contributions, while deep knowledge fosters popular knowledge. These findings mean that novelty and value are related but independent constructs (Ghosh and Wu 2021). On the one hand, the tension-based view of Perry-Smith and Mannucci (2017) articulates a process where inspiration precedes focus. This approach allows individuals to connect distant fields and use their local expertise, fostering a high degree of flexibility and developing novel ideas. Next, reducing flexibility and focusing on peripheral knowledge leads to crystallizing these novel ideas. On the other hand, the foundational view of knowledge generation prioritizes focus before inspiration. By engaging peripherally and not diving too deeply into one specific topic, individuals maintain a balanced perspective that can lead to valuable insights. They subsequently spread their interest and connect distant knowledge fields with core topics, fostering a more informed

recombination of existing knowledge and thereby facilitating the production of valuable knowledge. In short, each theoretical approach facilitates different outcomes.

Hypothesis 1*:*   *A change from local to distant knowledge increases the creation of more valuable knowledge, whereas a change from distant to local knowledge increases the creation of novel knowledge contributions.*

Second, we see potential differences in the nature of interest and differentiate between knowledge distance and ambidextrous interest in the context of the modes of "inspiration before focus" and "focus before inspiration." Knowledge distance describes the tendency of individuals to interact with more local or distant knowledge on an aggregated level. Local and distant search behavior have independent effects (Zhu et al. 2019), and combining these behaviors increase the new product performance (Hwang et al. 2019; Katila and Ahuja 2002). We posit that inspiration and focus can be achieved not only by the absolute level of knowledge distance but also by the simultaneous combination of local and distant knowledge. For interest ambidexterity, we propose that individuals can also benefit from the simultaneous interest in distant and local knowledge. In principle, we question what happens if individuals increase or decrease their ambidextrous behavior and draw similarities to the tension-based and foundational views. Therefore, ambidextrous interest expands the definition of knowledge distance as it describes the ability of individuals to interact in both local and distant knowledge domains. Following this argumentation in a broader sense, an individual can balance exploration and exploitation simultaneously (Luger et al. 2018). Individuals with ambidextrous interests drive local knowledge and can discuss new knowledge domains rather than focusing exclusively on a specific distance. Consequently, while distance describes the level of interest, ambidextrous interest describes the engagement with local and distant knowledge, representing individuals' cognitive variance and flexibility. Both constructs fit the argumentation of the theories, and distinct knowledge distance variables might show different effects on the value of the idea (Beretta 2019). We picture the underlying mechanisms of ambidextrous interest in the following (see Figure 2).
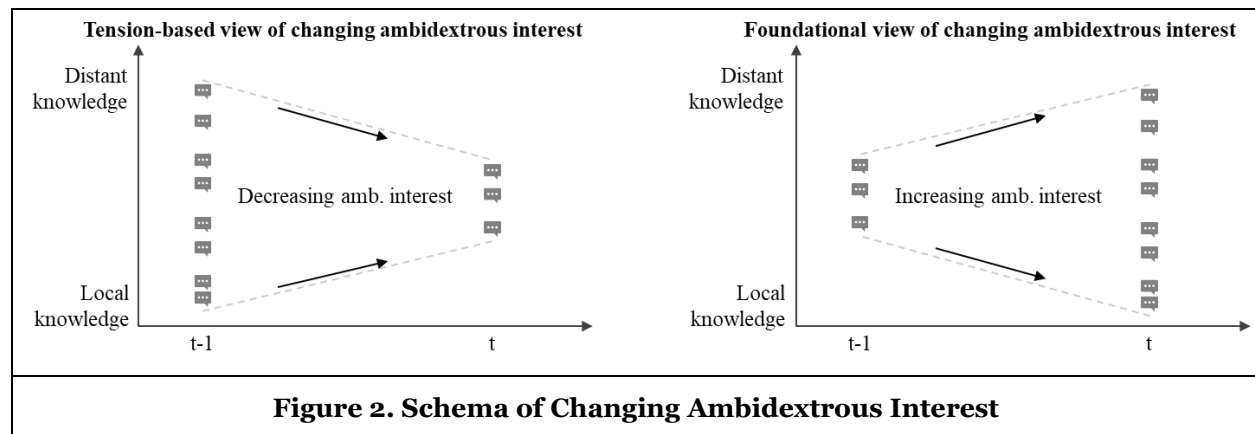

Figure 2. Schema of Changing Ambidextrous Interest

The tension-based view of Perry-Smith and Mannucci (2017) describes inspiration before focus. Considering the ambidextrous interest in the inspiration phase, individuals have the local expertise and combine this knowledge with distant impressions. They show high flexibility and connect distant fields with their local expertise. In the second phase, creative individuals change ambidextrous interests by reducing this flexibility. They focus on peripheral knowledge, neglecting both their core expertise and the most distant impressions. Individuals apply their ideas, inspiration, and expertise at the edges of their knowledge base and develop creative solutions. The foundational view of knowledge generation describes focus before inspiration. Coming from a peripheral position and not engaging too much in a specific topic nor inspiring with highly different knowledge allows individuals to get a picture of the community and the related topics. Subsequently, they spread their interest and connect distant knowledge fields with core topics. We expect that such changes do not increase creativity but signal new community members behavior:

While knowledge distance quantifies the absolute breadth of knowledge engagement, ambidextrous interest delves into the dynamic balance between local and distant knowledge domains. This varied engagement

allows for rich and adaptable knowledge generation that fosters novelty and value. Like the tension-based view of Hypothesis 1, the high initial flexibility followed by a focused approach leads to novel contributions. However, unlike Hypothesis 1, we acknowledge that distant and local knowledge mechanisms are not simply additive but also interactive for ambidextrous interest. Therefore, the transition from high to low ambidextrous interest within the context of each view is not merely a sequential step but a strategic adjustment that enhances the potential for value. Individuals showing ambidextrous interest have high explorative and exploitative behavior, providing expertise and flexibility simultaneously. If they narrow their interest over time, they can leverage their valuable knowledge base while engaging in specific interest domains, thereby reducing knowledge distance variety. They can assess their contributions' creativity.

Hypothesis 2: *A change from high to low ambidextrous interest increases the creation of more valuable and novel knowledge contributions.*

Methods

Sample and data

We followed previous studies and analyzed a collection of Q&A forums hosted by *Stack Exchange* (Stack Exchange 2023) to achieve our research objective (Mukherjee and Jain 2022; Safadi et al. 2021; Smirnova et al. 2022). The communities focus on questions answered jointly by experts, enthusiasts, and hobbyists. Communities are places of knowledge generation where individuals seek help, creative solutions, or new ideas. *Stack Exchange* started with the famous programming forum *stack overflow* but expanded into different domains relating to topics like science, technology, philosophy, everyday life, languages, and business. The structure of each forum is identical and supports interaction. Individuals can express their knowledge and create solutions through social interaction with peers.

In principle, the forums consist of hundreds to thousands of question threads, each focusing on a specific question a user posted. Based on that question, individuals engage with each other to provide an answer. They can answer the questions directly or comment on previous contributions, discussing the provided knowledge. They can share external links as an explanation, write texts, or mark related discussions in the forum. If a user provides a sufficient answer, the individual initially stating the question can mark the answer as *accepted answer,* meaning that their problem is solved. Other users can also rate contributions by using upvotes or downvotes, which indicate the quality of contributions. This voting behavior fosters a self-regulating community (Bauer et al. 2016). Contributions that lack evidence, contain false information, or do not generate value for the community are quickly exposed. The community moderates knowledge generation by encouraging interesting topics and highlighting the most promising path.

Based on archival data regularly published from the hosting platform, we empirically analyzed the contributions of 8,120 active users in 15 communities. We downloaded the archival data in January of 2023 containing a comprehensive set of user, contribution, and vote history, which enabled us to restructure the thread and user history. We collected the complete dataset of each community from its beginning until the point of data collection. Table 1 displays the age of each community. Following Safadi et al. (2021), we excluded forums in beta status made for moderation (meta forums), as well as math and foreign linguistic forums. As we analyze texts to investigate the exchanged knowledge and the interests of individuals, math and linguistic forums would inhibit the comparability of results. We assessed the remaining forums and evaluated whether the communities focused on idea development and argumentation rather than exchanging facts and chose 15 communities for our primary analyses. However, since our analysis does not focus on community effects, we rule out the effects of community differences by including user-fixed effects. We also analyzed arbitrarily drawn communities as control and found no community-specific differences. Table 1 provides an overview of included online communities.

We aggregate each user's time-stamped contributions to investigate the effects of changing interest in the knowledge generation process. We opt for a quarter-year time window to aggregate users' contributions (Safadi et al. 2021). This procedure strikes a balance between having sufficient data for analysis and minimizing confounding factors (Zaheer et al. 1999). A detailed descriptive analysis of longer or shorter time windows can be found in the online appendix of Safadi et al. (2021). Hence, our unit of observation is

a user's contributions per quarter, and each quarter may encompass multiple contributions. We focus on active users contributing two quarters in a row to enable a longitudinal analysis. We require a minimum of three contributions in a quarter to observe interest variance for the analysis. This criterion ensures that we only include users who actively shape the community and engage with others, excluding inactive or self-oriented users who only seek information for their own needs (commonly known as lurkers). In total, our dataset comprises 8,120 users across 41,497 quarters.

Measurement

Data aggregation and evaluation. We utilize text data from threads to capture users' knowledge and the novelty of their contributions. We converted the text data of each contribution for all communities to vector embeddings. To calculate the similarity between various contributions, we employ natural language processing to assess differences in interest, contributions, and knowledge (Aceves and Evans 2023). Specifically, we applied the transformer model S-BERT (Sentence Bidirectional Encoder Representations from Transformers) to calculate the text embeddings (Reimers & Gurevych, 2019). Unlike traditional bag-of-word algorithms like LDA (latent Dirichlet allocation), which focus on word frequency or occurrence (Blei et al. 2003), the transformer model S-Bert encodes text into vectors based on both semantics and contextual information. Semantic models perform better than conventional bag-of-word models in text classification (Kusner et al. 2015). However, contextual models like S-BERT surpass semantic models by considering contextual information. Transformer-based models such as BERT use deep learning to create embeddings and are trained on big datasets. S-BERT optimizes previous BERT models and creates embeddings for short texts, such as posts. We use the pretrained model "all-MiniLM-L6-v2," which employs several online sources as training data, for example, Wikipedia, Reddit comments, yahoo answers, or *Stack Exchange*, which served as the database for this paper (Huggingface 2023). Therefore, this model is explicitly optimized for Q&A forums. We calculate the embedding of every contribution in the observed forums. The result is a vector embedding for every contribution in the analyzed forums representing the context of each post. As the model is trained on full-text data and considers contextual information, it does not require extensive text preprocessing (e.g., Just et al. 2023). Consequently, before applying the model, we only excluded non-readable text (mainly links) and usernames.

Community	Description – Q&A for people...	Active Users	Ques-tions	Contrib-utions	Time
Sustainable Living	...living without depleting available resources	122	2k	16k	2013.Q1-2023.Q1
Lifehacks	...looking to bypass life's everyday problems	280	2.9k	32.9k	2015.Q1-2023.Q1
Woodworking	... woodworkering	157	3.6k	34.3k	2015.Q2-2023.Q1
Expatriates	...living abroad on a long-term basis	241	7k	41.2k	2014.Q2-2023.Q1
Homebrewing	...brewing	305	6.1k	43.1k	2010.Q1-2023.Q1
The Great Outdoors	...being outdoors and learning on equipment	404	5.8k	61.8k	2012.Q1-2023.Q1
Parenting	...with a parenting role	657	6.6k	79.6k	2011.Q1-2023.Q1
Gardening	...gardening and landscaping	426	16k	96k	2011.Q1-2023.Q1
Pets	...pet owners, breeders, veterinarians, and trainers	299	78k	114k	2013.Q4-2023.Q1
Politics	...interested in governments and policies	1318	14k	201k	2013.Q1-2023.Q1
Bicycles	...who repair bicycles, train cycling, or commute	926	18k	207k	2010.Q4-2023.Q1
Puzzling	...who create, solve, and study puzzles	1,500	24k	309k	2014.Q3-2023.Q1
Travel Answers	...road warriors and seasoned travelers	1,864	44k	386k	2011.Q3-2023.Q1
Academia	...academics and those enrolled in higher education	88	38k	453k	2012.Q2-2023.Q1
Home Improvement	...tinkering and serious DIY	2,043	69k	550k	2010.Q3-2023.Q1

Table 1. Description of Included Communities

Dependent variables. To measure *knowledge contribution value*, we use the established measure of Safadi et al. (2021) and use the number of accepted answers as conceptualization. As the measure is highly skewed, we apply a logarithmic transformation to it, adding 1 beforehand to avoid zero values. We argue that *knowledge contribution novelty* is high when it is distant from previous contributions in a discussion. Users who contribute distant contextual knowledge to a discussion add new impulses and directions of argumentation that represent novel knowledge. To quantify novelty, we use vector embeddings for each contribution in a question thread. We then calculate the cosine distance (negative cosine similarity) between the vector embedding of the analyzed user's contribution to other users" contributions within a question thread beforehand (similar to Haas et al. 2014). As a quarter can contain multiple contributions, we build lists of distance values per quarter and use the average for aggregation.

Independent variables. To evaluate individuals' changing interests, we rely on vector embeddings of the contributions an individual has made in a quarter and calculate the cosine similarity between all individual contributions (Aceves and Evans 2023; Haas et al. 2014). The result is a distribution of similarity values between all user contributions. To calculate *knowledge distance*, we use the mean of the negative similarity distribution, which represents an individual's level of interest. To conceptualize *ambidextrous interest*, we examine the variance within this similarity distribution. The measure describes the interest variance between local and distant knowledge. Understanding exploration and exploitation as two sides of a continuous scale (Ghosh and Wu 2021), each engagement of an individual with the community describes a more or less explorative interest exposure of the individual compared with their previous engagements. The variance of all distances between an individual's quarterly contributions explains the diversity between exploration and exploitation (based on Aceves and Evans 2023). In our regression analysis, we account for changes in these variables by including both the first lag value and the time difference between two consecutive quarters in the regression. The lag value describes the absolute level previous to the observed period (*knowledge distance/ ambidextrous interest*). It shows whether the variable predicts valuable or novel knowledge contributions on an absolute level. The difference between the current (*t*) and the previous period (*t-1*) is the variable of interest in the regression (*changing knowledge distance/ changing ambidextrous interest*). This difference describes whether changes over time are related to valuable or novel knowledge contributions. A negative relationship between changing knowledge distance and ambidextrous interest with the dependent variables supports the tension-based view, while a positive relationship supports the foundational view.

Control variables. To ensure the validity of our results, we control for several variables. First, we control for time-variant user characteristics. *Tenure* is measured as the number of quarters since a user first became active. The tenure of individuals reveals their expertise in and with the community. The user's experience might help articulate more novel or valuable knowledge. *Positive sentiment* indicates whether a user tends to formulate contributions in a positive or negative manner. Users may assess the contributions of an individual with a positive attitude as more constructive and are more willing to accept positively formulated knowledge. We assess positive sentiment with the pre-trained BERT model *pysentimento* classifying texts from positive (1.0) to negative (-1.0) sentiments (Pérez et al. 2021). In addition, the social exposition of users is an enabler for creative behavior (Mukherjee and Jain 2022; Resch and Kock 2021; Singh and Phelps 2012). Specifically, exposure to different groups with different knowledge bases may inspire users to make more valuable or novel contributions. Thus, we control for *brokerage* measured as betweenness centrality (Burt 2004; Resch and Kock 2021). Betweenness centrality is the number of shortest communication paths passing an individual (i.e., the value is high if a user takes a position between multiple groups). We calculate a social network for every quarter and every community with users as nodes and thread interaction as an indicator for a relationship (tie) and assess the centrality of each user. Second, in addition to user peculiarities, we control for the contributions' quality based on *links per post*, *mentions per post*, and *readability of posts*. The average number of links to external websites or related posts is referred to as *links per post*. Users use links to substantiate their answers or point to related knowledge for further reading, which signals the quality of a contribution. Similarly, mentions per post are the average number of links to other users and show active engagement in a discussion. Another explanation for a positive relationship is that including other users might provide new experiences and knowledge. Next, the higher the post's readability, the better other users can understand the contributor's message. To assess readability, we use the Flesch–Kincaid index (FKI), which denotes the level of education required to understand the text. An FKI of 6.3 means a person in the 6th grade can understand the text. The FKI considers information on sentence length and the number of syllables and is one of the most well-established readability measures (McClure 1987). We use the median value to aggregate the readability scores for all contributions in each quarter. Ultimately, we control for the average *comments* and *answers rank*. The difference between up- and downvotes defines the rank of a contribution. The community encourages or discourages others with likes. High-ranked users submit high-quality contributions, ultimately leading to valuable or novel contributions. Third, from a methodological perspective, users' activity level varies each quarter. To account for this variability, we include the number of contributions as variable for quarter-specific activities.

Variables	μ	σ	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Knowledge contribution value	0.53	0.81	0	5.16	1											
(2) Knowledge contribution novelty	-0.31	0.08	-0.84	-0.12	0.05	1										
(3) Tenure	1.38	1.87	0	16	-0.32	0	1									
(4) Positive sentiment	0.04	0.09	0	0.99	-0.09	-0.07	0.07	1								
(5) Brokerage	0.19	1.41	-0.2	16.22	0.36	0.05	-0.09	-0.03	1							
(6) Links	0.02	0.07	0	3.25	-0.07	-0.06	-0.03	0.02	-0.02	1						
(7) Mentions	0.2	0.22	0	10	-0.08	0.2	0.05	-0.04	0	-0.02	1					
(8) Readability	7.78	2.43	-1.9	106.8	0.02	0	0.08	-0.11	-0.01	-0.02	0.16	1				
(9) Answer rank	3.47	7.07	-12	288	0.12	0.05	-0.07	-0.04	0	-0.04	0.07	0.11	1			
(10) Comment rank	0.52	1.44	0	131	-0.08	0.02	0.11	-0.01	-0.03	-0.03	0.03	0.13	0.1	1		
(11) Number of contributions	31	72.98	3	1789	0.63	0.1	-0.24	-0.06	0.73	-0.03	0	-0.03	0.01	-0.08	1	
(12) Knowledge distance	-0.15	0.08	-0.82	0.12	0.17	0.24	-0.12	-0.08	0.08	-0.1	-0.03	-0.1	0.05	0.02	0.16	1
(13) Ambidextrous interest	0.02	0.01	0	0.29	-0.14	-0.11	0.08	0.03	-0.05	0.06	0.06	0.08	-0.02	0	-0.12	-0.34

Table 2. Descriptive Statistics and Correlations

Results

We use fixed-effects linear regression on a panel dataset, grouped by community members and temporally defined by quarters. This approach allows us to model the knowledge generation process among community members and observe the effects of changes between quarters. Time-invariant effects (e.g., community or personal characteristics) are controlled for by using fixed effects. Table 2 provides the descriptive statistics of the considered variables. Table 3 presents the results of our primary analyses. We first analyze the control variables (models 1 & 6), then the direct effects of the lag values of the variables of interest (models 1, 3, 6, and 8) and, lastly, the impact of interest changes (models 2, 4, 7, and 9). Models 1–5 show the effects for the dependent variable valuable knowledge contribution, and 6–10 for novel contribution.

Consistent with our argumentation for the control variables, answer rank (model 1, b=.005, p<.001; model 6, b=.000, p=.001) and the number of contributions (model 1, b=.005, p<.001; model 6, b=.000, p<.001) show positive effects on the value and novelty of knowledge contributions. By contrast, positive sentiment (model 1, b=-.190, p<.001; model 6, b=-.021, p<.001) and links (model 1, b=-.118, p=.004; model 6, b=-.028, p<.001) show negative effects on both value and novelty. These effects can be negative because other users demand a comprehensive and neutrally formulated answer, not including links readers perceive as spam or potentially subjective enthusiasm. Surprisingly, tenure decreases the likelihood of valuable contributions (model 1, b=-.070, p<.001), which seems counterintuitive. One plausible explanation is that individuals become disengaged over time, leading to them spending less time on crafting knowledge for the community. Additionally, comment rank negatively affects the value of knowledge contributions (model 1, b=-.007, p<.001). Individuals with a high comment rank might initially be unable to provide a sufficient answer in their posts. Still, they clarify their ideas through comments, which the community appreciates more than the initial answer. Brokerage has varying effects on value (model 1, b=.054, p<.001) and novelty (model 6, b=-.001, p=.013). Individuals who bridge groups are more likely to produce accepted answers than to introduce new arguments. This finding might be specific to our sample: Brokers might better fit their answers to the distinct groups and, therefore, focus on targeted arguments rather than novel contributions (Mukherjee and Jain 2022). Mentions of others show different relationships for value (model 1, b=-.030, p=.045) and novelty (model 6, b=.024, p<.001). Mentions indicate direct interaction and communication with other users. Individuals can incorporate new ideas into existing arguments from others for novelty, while valuable knowledge might need self-efficient elaboration. Similarly, readability positively correlates with value (model 1, b=.006, p<.001). Conversely, it has a negative relationship with the novelty of contributions" (model 6, b=-.001, p<.001) as novel answers are more complex to express, potentially leading to information overload (e.g., Jones et al.

2004). The absolute level of knowledge distance in the previous period demonstrates a positive relationship with value (model 1, b=.101, p=.001) but not with novelty (model 6, b=.003, p=.402). Individuals contribute more effectively when they engage in distant knowledge domains rather than locally. Ambidextrous interest has a negative relationship with value (model 3, b=-.467, p=.015) but no significant effect on novelty (model 8, b=.034, p=.174). A high variance between distant and local interests hampers valuable contributions.

The change in knowledge distance increases the likelihood of both valuable (model 2, b=.199, p<.001) and novel knowledge contributions (model 7, b=.162, p<.001), leading us to reject our initial Hypothesis 1. On average, creative individuals change their interest from local to distant knowledge. This result aligns with the foundational view, which advocates for building expertise before recombining distant fields (focus before inspiration). Ambidextrous interest follows the other theoretical approach. Changing ambidextrous interest affects value (model 4, b=-1.507, p<.001) and novelty negatively (model 9, b=-.268, p<.001), supporting Hypothesis 2. Individuals need to focus their interests: While high variance between distant and local interest in the former period is beneficial, the second period needs low variance of interest in local and distant knowledge for valuable and novel contributions. These results back the tension-based view, which prioritizes inspiration before focus.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Knowledge contribution value					Knowledge contribution novelty				
Tenure	-.07**	-.07**	-.07**	-.07**	-.07**	0	.001**	0	0	.001**
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pos. sentiment	-.19**	-.18**	-.19**	-.19**	-.18**	-.021**	-.017**	-.021**	-.021**	-.017**
	(.03)	(.03)	(.03)	(.03)	(.03)	(.004)	(.004)	(.004)	(.004)	(.004)
Brokerage	.05**	.05**	.05**	.05**	.05**	-.001*	-.001**	-.001*	-.001*	-.001**
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Links	-.12**	-.11**	-.12**	-.11**	-.11**	-.029**	-.023**	-.029**	-.028**	-.023**
	(.04)	(.04)	(.04)	(.04)	(.04)	(.005)	(.005)	(.005)	(.005)	(.005)
Mentions	-.03*	-.03+	-.03*	-.02	-.02	.024**	.026**	.024**	.025**	.026**
	(.02)	(.02)	(.02)	(.02)	(.02)	(.002)	(.002)	(.002)	(.002)	(.002)
Readability	.01**	.01**	.01**	.01**	.01**	-.001**	0	-.001**	-.001**	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Answer rank	.01**	.01**	.01**	.01**	.01**	0**	0**	0**	0**	0**
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Comment rank	-.01**	-.01**	-.01**	-.01**	-.01**	0	-.001*	0	0	-.001*
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Contributions	.01**	.01**	.01**	.01**	.01**	0**	0**	0**	0**	0**
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Knowledge distance	.10**	.31**			.22**	.003	.169**			.166**
	(.03)	(.05)			(.05)	(.004)	(.006)			(.007)
Change know. distance		.20**			.12**		.162**			.159**
		(.04)			(.04)		(.005)			(.005)
Ambidextrous interest			-.47*	-2.1**	-1.84**			.034	-.257**	-.02
			(.19)	(.28)	(.29)			(.025)	(.036)	(.037)
Change amb. interest				-1.51**	-1.33**				-.268**	-.052*
				(.19)	(.2)				(.024)	(.025)
Constant	.42**	.44**	.42**	.44**	.46**	-.309**	-.293**	-.31**	-.306**	-.293**
F	1,809	1,648	1,808	1,653	1,401	31	127	31	39	108
R^2 within	.351	.352	.351	.352	.353	.009	.040	.009	.013	.040
R^2 between	.434	.439	.432	.435	.439	.078	.142	.071	.087	.142
R^2 overall	.464	.466	.464	.466	.467	.060	.102	.057	.070	.102

*Standard errors are in parentheses; ** p<.01, * p<.05, + p<.1; Number of users = 8,120, Number of observations = 41,497*

Table 3. Regression Results for Knowledge Contribution Value and Novelty

We also use alternative variable operationalizations to assess the robustness of our findings (Table 4). First, we use upvotes as an alternative dependent variable for value. While the knowledge distance change does not have significant effects, the ambidextrous interest change still has a positive effect. Second, instead of using the current phase (t) to assess the value and novelty of contributions, we also use the following period (t+1) to assess the contributions. This approach may offer stronger causal evidence, although its effects may not significantly influence subsequent periods. The results are consistent for the relationship between ambidextrous interest and valuable knowledge contribution. Last, we assess knowledge distance and ambidextrous interest with a different text base (*btwn*). Rather than comparing an individual's contributions within a quarter, we calculate text distances between quarters. The results are consistent with our initial analysis.

In conclusion, the first hypothesis posits that the benefits of theories may vary in terms of novel vs. valuable knowledge contributions for changes in knowledge distance. The findings do not show any differences between value and novelty. Consequently, changes in knowledge generation do not differ for creative outcomes. Thus, and in contrast to other researchers (Ghosh and Wu 2021; Kaplan and Vakili 2015), we do not find any differences in the capabilities required to build creative solutions. Although novel and valuable contributions are unequal (correlation $\rho = 0.05$), we find neither compensating nor weakening effects. The capabilities for generating both contribution types are aligned. Hypothesis 2 argues that the prevailing view of knowledge generation – that is, either foundational or tension-based – depends on the type of interest. Therefore, we examine the average knowledge distance of interest and an individual's ability to engage in both local and distant knowledge, termed *ambidextrous interest*. We propose that the tension-based view is dominant for ambidextrous interest, increasing valuable and novel contributions instead of changing knowledge distance according to the tension-based and foundational view. Indeed, the two constructs have different effects and surpass the expected differences: ambidextrous interest supports the tension-based view, while knowledge distance supports the foundational view of knowledge generation. Interpreting these findings, creative individuals increase their distance in commenting behavior and recombine in diverse knowledge domains, but they need to focus on a more narrow field of distances. However, the results of the robustness analysis reveal that the absolute level of knowledge distance does not affect knowledge generation. Therefore, shifts in ambidextrous interest can also occur when individuals focus on local knowledge domains and reduce explorative activities.

	(11) Upvotes	(12) Accepted (t+1)	(13) Novelty (t+1)	(14) Accepted	(15) Novelty
Tenure	-1.58**	-.06**	0***	-.069**	.001**
	(.18)	(0)	(0)	(.002)	(0)
Pos. sentiment	-4.39	-.04	-.02***	-.186**	-.017**
	(3.68)	(.05)	(.01)	(.033)	(.004)
Brokerage	1.77**	.03**	0**	.054**	-.001**
	(.39)	(0)	(0)	(.004)	(0)
Links	19.27**	-.02	-.01	-.11**	-.023**
	(4.57)	(.06)	(.01)	(.041)	(.005)
Mentions	4.71**	-.06**	.01***	-.022	.026**
	(1.66)	(.02)	(0)	(.015)	(.002)
Readability	.14	0	0	.007**	0
	(.16)	(0)	(0)	(.001)	(0)
Answer rank	1.25**	0**	0	.006**	0**
	(.04)	(0)	(0)	(0)	(0)
Comment rank	.02	0	0	-.007**	-.001*
	(.21)	(0)	(0)	(.002)	(0)
Contributions	.91**	0**	0***	.005**	0**
	(.01)	(0)	(0)	(0)	(0)
Knowledge distance	12.27*	.1	0		
	(5.71)	(.07)	(.01)		
Change know. distance	3.98	.08	.01		
	(4.43)	(.06)	(.01)		
Ambidextrous interest	-123.88**	-2.03**	-.08		
	(31.84)	(.41)	(.05)		
Change amb. interst	-83.67**	-1.22**	.01		
	(21.78)	(.28)	(.04)		
Knowledge distance btwn				.067	.168**
				(.079)	(.01)
Change know. distance btwn				.134**	.156**
				(.042)	(.005)
Ambidextrous interest btwn				-1.22*	.094
				(.491)	(.062)
Change amb. interest btwn				-1.284**	-.066**
				(.2)	(.025)
Constant	13.03***	.57***	-.32***	.432**	-.294**
F	2177	321	5	1,398	108
R² within	.459	.132	.002	.353	.040
R² between	.546	.324	.063	.439	.139
R² overall	.509	.352	.040	.466	.100

*Standard errors are in parentheses; ** p<.01, * p<.05, + p<.1*
Model (11), (14): Number of users = 8,120, Number of observations = 41,497
Model (12), (13): Number of users = 7,199, Number of observations = 34,639

Table 4. Regression Results for Additional Analysis

Discussion

This research investigates how changes between inspiration and focus affect individuals" knowledge contributions. Specifically, we analyze which mode (i.e., *inspiration before focus* or *focus before inspiration*) describes creative knowledge generation. We propose that both modes have advantages for creative behavior and suggest explanations due to the outcome and the nature of interest. To date, no quantitative study has taken a dynamic perspective on knowledge generation in online communities (Dane 2010; Faraj et al. 2016; Sundararajan et al. 2013). We analyze 15 Q&A forums focusing on ideas and solutions to follow this research objective. We use the latest achievements in language processing to assess the interest of individuals and take an explorative approach to investigate the validity of the foundational versus the tension-based view of knowledge generation (Aceves and Evans 2023). We find that changes in knowledge distance follow the foundational view. Conversely, changes of ambidextrous interest, which involves simultaneous interest in both distant and local knowledge, adhere to the tension-based view.

In general, we contribute to discussions about online communities as a source of innovative ideas by exploring knowledge generation in online communities. Such digital organizations are often incorporated into open innovation approaches of companies, and community members freely reveal their knowledge in these organizations, making them highly attractive (Faraj et al. 2016; Hippel and Krogh 2003). The behavior that enables community members to generate promising knowledge and ideas is, therefore, of high interest (Afuah and Tucci 2012; Bayus 2013; Hwang et al. 2019). We add a dynamic understanding of interest by investigating the effect on valuable and creative behavior. More explicitly, previous research shows that the interest of individuals is a significant driver of knowledge generation (Haas et al. 2014; Hwang et al. 2019): Distant and local knowledge have independent effects (Hwang et al. 2019; Katila and Ahuja 2002), and several contingency factors determine the advantageousness of both interests (e.g., Mannucci and Yong 2018; Resch and Kock 2021; Safadi et al. 2021). We build on these studies and extend their findings by suggesting a dynamic explanation of changes between interest and focus on creativity (Faraj et al. 2016). Our findings indicate that community members who engage with more distant knowledge over time but focus their interest ambidexterity on a narrower field will generate more valuable and novel contributions. Our study extends the current understanding of interest by showing that engaging with either distant or local knowledge is a continuous process that individuals adopt in online communities. Additionally, we include ideas of ambidexterity research into knowledge generation in online communities. We also highlight the independent effects of local and distant knowledge and the advantages of individuals who can navigate both. Translating these insights to the organizational level, our research affirms the idea of online communities as dynamic organizations (Faraj et al. 2011). Changes in individuals' interests have an impact on the vibrancy of the community. If individuals can change their interests, they provide more creative contributions determining a community's attractiveness.

Our findings build upon and elaborate on the theory of creativity and innovation, specifically regarding the contrasting views of distant knowledge facilitating recombination vs. expertise enabling domain-specific opportunities. On the one hand, researchers argue that distant knowledge facilitates recombination (Afuah and Tucci 2012; Fleming 2001; Stanko 2016). On the other hand, expertise enables the identification of anomalies or opportunities in a specific domain (Dane 2010; Weisberg 1999). Perry-Smith and Mannucci (2017) propose that different social and knowledge needs resolve the seemingly contradicting arguments. We extend these ideas from the creativity literature to knowledge generation in online communities and theoretically derive the modes of *inspiration before focus* (tension-based view) and *focus before inspiration* (foundational view), building on the initial ideas introduced by Kaplan and Vakili (2015). Both the tension-based view and the foundational view offer advantages for creative behavior. By offering the first empirical study of these conceptual works, we transfer the primarily social argumentations to a knowledge level and shed light on the actual mechanisms (Brennecke et al. 2022; Mannucci and Perry-Smith 2022; Soda et al. 2021; Ter Wal et al. 2023). We could not identify differences regarding the novelty vs. the value of knowledge contributions, revealing no change in the outcome of the knowledge generation process. However, the nature of interest dictates the advantages of one mode of change over the other. Consequently, we find support for both theories and contribute to both the foundational view (Dane 2010; Kaplan and Vakili 2015; Weisberg 1999) and the tension-based view (Perry-Smith and Mannucci 2017). In this analysis, we introduce "ambidextrous interest" as an individual behavior in knowledge generation, suggesting that solely investigating knowledge distance might be too narrow. Individuals' interest is more complex: Knowledge distance affects creative behavior in multiple ways, and individuals adjust their interests over

time. While decreasing ambidextrous interest facilitates novel and valuable contributions, suggesting inspiration before focus, the knowledge distance should increase, which indicates focus before inspiration. As a result, creative individuals balance their interactions and interests over time, similar to how organizations operate (Luger et al. 2018).

The findings have practical implications for community management. First, online communities can leverage these results to optimize their organization and incentivize promising individuals. They can nurture the development of local knowledge among new community members, thereby increasing the likelihood of better contributions. New members' motivation rises when the community appreciates their contributions (Zhu et al. 2019). Second, by considering both knowledge distance and interest ambidexterity, we introduce two constructs that can guide community organization. Individuals generate novel or valuable knowledge when the community provides access to information according to the current knowledge generation phase (Bayus 2013; McLure Wasko and Faraj 2000). Consequently, online communities can use knowledge distance to assess posts instead of randomly showing others' posts. Based on interest ambidexterity, they can also optimize the search behavior of individuals. If a community senses that a community member actively engages with local knowledge, it can provide distant knowledge in search requests and vice versa. Third, online communities need to acknowledge the dynamic nature of information needs across different phases. For the generation of novel and valuable knowledge, creative individuals change their interest toward more distant knowledge while reducing the variety between distant and local knowledge – a phenomenon we call ambidextrous interest. Communities need to facilitate change. Currently, online community algorithms, much like those in social media, mostly aim to keeping individuals in their peer bubbles. This approach hampers creative behavior as individuals must adjust their interests.

For companies, we identify two opportunities for leveraging these results. First, companies can optimize their online communities, idea platforms, or hackathons in a manner similar to those previously described. Several companies run their own feedback and idea platforms. Building artifacts that foster dynamic engagement with distant or local knowledge can boost the appeal of community content and, eventually, the community. Although our sample focuses on the Q&A platforms, we see similarities in the argumentation and mechanisms of company-owned online communities, so the transferability of this study's results is promising. Second, tracking changes in members' interests could help identify promising individuals for internal product development. Changes in the interests of community members indicate their potential to generate novel and valuable knowledge. Consequently, companies can assess these interests to identify promising individuals for inclusion in their internal development processes.

Limitations and Future Research

Using 15 Q&A online communities sourced from a single provider in our study presents certain limitations. The communities could share underlying platform characteristics, moderation policies, or user-interface features, which could lead to potential biases in the observed behaviors and patterns. This homogeneity could affect the findings' generalizability to other online communities, which may have other platform dynamics, user bases, and community cultures. Moreover, the selection of communities may exclude niche areas of interest, limiting our understanding of how knowledge distances are navigated in a range of topics. Future research could benefit from including other communities in the analysis to enhance the robustness.

While applying NLP techniques (i.e., S-BERT) in our study provides an advanced way to calculate text embeddings and measure knowledge distance, we acknowledge some limitations. While S-Bert is adept at encoding semantics and contextual information, it may not capture all nuanced relationships or specialized terminology that are prevalent in certain domains or communities. This mismatch can lead to inaccuracies in assessing knowledge distance. In addition, the focus on short-text embeddings may overlook broader thematic connections and discourse structures that are vital for understanding knowledge relationships. Moreover, while S-BERT can reduce the need for extensive preprocessing, excluding non-readable text, such as links and usernames, may inadvertently omit valuable context or information.

Besides these limitations, we see opportunities for future research on dynamic effects in online communities. Our study is one of the first to investigate these effects quantitatively, showing that changing interest is important for valuable and novel knowledge contributions. It is interesting to investigate the factors that lead individuals to change their behavior. Looking at the antecedences helps us understand how to incentivize the interest changes and optimize the organization of online communities. One potential

explanation is a changing social network position, like the centralization of an individual's position in the overarching social network structure. If community members start to identify more with the community and engage with more people, they might shift their interest. Additionally, this social perspective has the potential to explore team-level processes. Changing a team's focus can leverage its members' interests, enabling creative behavior. Furthermore, individual motivation can explain changing interests. Individuals engage in online communities for various reasons (Chen et al. 2018; Lakhani and Wolf 2003). Different motivations can provide insights into the knowledge generation process. Some individuals tend to change their interests because of their motivation. For example, people participating out of pure joy may be more likely to change than people who want to engage in a singular topic. This question provides an opportunity for qualitative research to understand individual behavior.

The sequence of multiple changes might impact knowledge generation (Ter Wal et al. 2023). Bayus (2013) shows in the context of online crowdsourcing campaigns that serial ideators tend to propose more valuable ideas than first-time innovators but are unable to repeat their previous success. This study presents two avenues for exploring knowledge generation: how multiple interest changes affect individuals and how breakthroughs impact knowledge generation. For the first question, sequential changes provide experience to the individuals, potentially increasing the creative output. By contrast, more changes can weaken the benefits of such interest changes over time. For the second question, breakthroughs can lead to changes in new or distant knowledge domains as the breakthrough can solve the initial problem of the individual or satisfy their knowledge needs. Additionally, breakthroughs can impact motivation, and individuals may intensify their engagement. Consequently, it is interesting to investigate the sequence of changes and how past outcomes (e.g., breakthroughs) impact later knowledge generation.

Last, we follow Safadi et al. (2021) and assume a quarterly segmentation of contributions in the online community as an appropriate time window to assess individual knowledge generation. Although the descriptive statistics support the reasonability of this decision, we want to question whether this time window is appropriate for different kinds of knowledge or ideas. Following this argument, future research can analyze the optimal period when interest should change depending on different objectives. Additionally, we assume an equal length of an inspiration and focus phase. Future research can investigate the optimal length of each phase (inspiration and focus) and the point at which a change in interest is required.

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