Roles on Corporate and Public Innovation Communities: Understanding Personas to Reach New Frontiers

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Abstract. Innovation communities have been a focus of research over the last decade to foster and analyze how businesses and the public sector can engage customers or citizens to co-create products, strategies or services. While an applied and professional community management is seen as key, most initiators still do not understand the different personas and characters about their communities to adjust their management on an individual level and to embrace further potentials. In this paper, we analyzed 64 communities to pinpoint 11 different personas, which can be found repeatedly on either public or industry driven innovation communities. Based on our findings about their characteristics, motivation triggers and behavior on innovation communities, we offer managerial implications to enhance strategies and community management systems of innovation communities.

Keywords: Community management · Community roles · Open innovation · Open government · Innovation communities · Crowdsourcing · Public participation · Motivation and participation

1 Introduction

Scholars, public institutions and corporations alike have done extensive work analyzing, testing and implementing innovation communities. Online communities or social media platforms are used strategically to integrate customer voices [1], to listen to citizens and their opinions, to collaboratively work on products or policies [2] and more. However, recent publications as well as the experience of international brands and influential governmental organizations show that the potential of Open Innovation platforms still has not reached its limits and leaves different areas with high potential uncovered [3]. While the number of initiatives in the public and private sector and the level of professionalism is increasing, still many innovation communities are shut down, the implementation rate is inefficient, or the efforts are not seen as sustainable worthwhile compared with the

outcome [4]. The reasons for a partial unproductive use can be explained several different ways, including the following:

Topic Progress: Innovation communities and their use through crowdsourcing to filter trends, share experiences and submit ideas have been part of the corporate and public world for over a decade. The quantity of initiatives has led to a numbing effect within the recipients, picking merely the most interesting initiatives with the highest rewards - intrinsic and/or extrinsic - to participate. Therefore, a decrease in quality and quantity of contributions can be detected - at least within those initiatives, which processes have not changed over the years. Innovative approaches like using a social crowd just to give feedback overnight or within sprints to spice up the challenge (gamification, shorter run-time, short descriptions) can increase the time participants spend in the community and make week-long interactions on simple idea contests as well as evaluating each other's concepts more attractive [5].

Implementation Process: Organizations have always struggled with Open Innovation projects and especially in crowd-based initiatives to evaluate, prioritize and eventually implement the gathered insights for final products, strategies, concepts or policies [6]. The progression of cultural change, adoption of lean management and Open Innovation frameworks have cut deeply into all kinds of organizations and leave the responsible managers in sheer desperation of how to transfer and adopt citizen or consumer centric perspective into the innovation process. Innovation communities and their insights are no exception as their management and processes within the organizations are usually decoupled from the innovation management process which leads unwillingly to an implementation gap.

Community Management: The success of innovation communities has always been linked to the management of the communities and consequently to the handling of individual profiles, personas and the social behavior of the crowd within a given framework [7–9]. While many publications use cases and practitioners have highlighted the importance and explained tools to deliver professional community management, the exact roles and recurring personas within communities have not been understood holistically. By analyzing existing research and executed projects, it becomes evident that organizations - private and public alike - have focused on a professional, but mainly generalist community management; an in-depth understanding of the individual behavior of the crowd is still missing. The community is a fragile social environment, mirroring needs, behavioral patterns but also moods of society-at-large. To deliver customized community management, motivation, dynamics and behavior of the recurring characters (personas) is key.

The aforementioned frontiers of innovation communities are significant bottlenecks and therefore a matter deemed worthy of analysis. As a starting point and focus of this research, we want to give a broad coverage by diving deep into the latter frontier, namely the challenge of how to deliver customized community management for individual personas and profiles to engage in a more sustainable way and to get the maximum out of community-based innovation initiatives.

Firstly, we cluster and explain the different existing roles and personas on social media collaboration platforms driven through crowdsourcing. We show clusters as well as patterns of behavior of 11 different roles and personas. Additionally, we compare those in the scope of the public and the private sector to deliver insights about potential learnings from each other's sectors and to derive management implications for stakeholders from the practical field on how to handle and manage communities. This improves the outcome and chances of implementation by specifically understanding the personas and roles of the participants.

Basis for our discussed insights is a data set from 64 innovation communities from political and public institutions as well as from companies around the world. The research team has accompanied each one of those (Participatory Action Research) during recent years and conducted various interviews with stakeholders, citizens and customers. To summarize, all cases have been fundamentally analyzed and are a fruitful source of data to answer our research questions:

1) Which roles and personas are existing on social media collaboration platforms?
2) What is their primary motivation to participate?
3) What differences exist between public and industry led innovation communities regarding those roles and personas and the frequency of their appearance?

As we have already indicated in the introduction, many other frontiers can be listed. Consequently, we desire to provide a longer-term perspective concerning further research efforts and potential follow-up analysis about this topic after highlighting first managerial implications in the scope of our findings.

2 Theoretical Background

Online communities are used to generate innovation for several years now. In the private sector they are used to create new products and services or to solve problems [10, 11]. The public sector also has been using innovation communities for a while now for different purposes like policy creation and party programs or even entire constitutions [12, 13]. While this approach works very well in an open setting involving customers and external experts, communities are also used within organizations to connect employees virtually and create innovations [14]. Literature is using a variety of names to describe these internal and external as well as private and public sector communities. In the scope of this research study, we will use the term innovation communities to describe communities where people join an online platform with Web 2.0 functionalities to submit, discuss and evaluate ideas. Other terms that may be used in this context in a similar manner include crowdsourcing contests, social media collaboration platforms, call for ideas, innovation contest, crowdsourcing, E-Participation, Open Government or Open Innovation communities.

The framework in which the community is established (i.e. internal vs. external, public vs. private sector) also determines the kind of participants attracted to participate and hence, the results that can be generated within the different communities. The community members of the different initiatives are also motivated by varying factors which results in different measures to be taken in order to manage and motivate the community [15]. Some research has already been done to identify different roles in communities.

Hutter et al. [9] have shown, there are four major kinds of participants (competitors, communititors, observers, co-opeators) active in industry innovation communities. However, only limited suggestions on how to manage them was provided. In the public sector, the knowledge about the different user groups is limited to so-called lurkers (i.e. inactive participants) [15]. A major trigger for their participation is their underlying motivation. Research indicates different results for the motivation of participation when looking into specific communities [16–18]. There are various motives why people participate in innovation communities and often times, it is a combination of different factors that lead to participation. These can be divided into extrinsic and intrinsic factors [19]. Some love to solve problems, participate in order to learn, want to have a positive impact on others or be part of a community and are therefore driven by intrinsic motivation [20]. At the same time, also extrinsic motivation factors like the chance to win prizes, to use the new product or service or to get recognized, play an important role [16, 21]. In contrast, in the public sector the motivation may differ. Most participants are motivated intrinsically by political interest [22] or to meet one's own needs [23] as prize money is rarely offered to incentivize participation [24].

Besides the motivation for participation, other factors may also influence how participants behave in the community. Group norms and the social identity of group members have an influence on their participation behavior [25]. At the same time, the dynamics within groups may have an influence on the behavior [8] leading to a great variety of different types of community members. In software product development, the issue of addressing the needs of specific groups is done through personas which provide a better understanding of the characteristics, needs and values of different user types [26, 27]. In communities, the value does not lay in the right features but rather how it is managed to provide the desired outcome for the initiators [28]. Combining the concepts of personas and community management leads to the need of a persona-specific management of innovation communities.

3   Methodological Approach

To gain an in-depth understanding about potential roles on innovation communities and how they differ between private sector and public sector, we use the Participatory Action Research Approach (PAR) [29]. In PAR, the researchers become active participants in the cases they want to study, thereby leveraging the full potential of the case study method [30]. Through the deep immersion into the topic they gain valuable insights and get a better understanding of the focus topic. This qualitative method allows approaches to new research fields in an exploratory manner. In this research project, the research team has been managing the innovation communities for or with the public or private entities mostly in the scope of project work. In addition, interviews with users have been conducted to get a better understanding of the underlying motives for their participation and action/in-action within the communities. Besides and fundamentally this qualitative approach is backed by a large data set as 64 innovation communities have been accompanied by the researchers. The number of innovation activities (e.g. contests) is even higher as the researcher accompanied different activities in several of the communities. While 29 of them were hosted by public entities, 35 of them were hosted by companies. These

communities can further be distinguished as 23 internal (with own employees or specific group) and 41 external driven initiatives (innovation communities) (see Table 1). Due to the lower market acceptance and penetration for internal communities in the public sector as well as more difficult access to internal industry communities, the number of cases is lower in these areas.

Table 1. Distribution of the sample according to sector and target group

	Industry	Public	Total
Internal	13	10	23
External	22	19	41
Total	35	29	64

The innovation communities span a variety of different topics, but the technical functions of the underlying software platforms were almost identically. In internal innovation communities, only employees of the respective companies could participate and could log in with their company accounts. For the external innovation communities, users could create an account on their own and there was no pre-selection of the participants. All participants were then able to submit own ideas, comment on other participants' contributions and evaluate these. Ideas could be text only or include further attachments like images or PDF files. On the platforms, all submissions were visible to all users who could get inspiration from the content that has already been submitted. Each user had a personal profile where they were able to share some basic personal information. In most cases, the participants also had a pin wall on which other participants could leave personal messages separated from idea contributions.

The innovation communities displayed in Table 1 show some examples of the cases that have been used as the basis for this analysis. Their explanation provides a better understanding of the research subjects. Further organizations that are part of the study are for example the Wirtschaftskammer Tirol (chamber of commerce Tyrol), the German ministry of economics or the Austrian ministry of finance in the public sector and companies like BMW, Lufthansa, Intel or P&G in the private sector (Table 2).

Table 2. Exemplary selection from different fields of cases used in the research project

	Industry	Public
Internal	Zodiac Aerospace	CSU
External	Vodafone	ÖVP

Zodiac Aerospace - Open Innovation Challenge: The Open Innovation Challenge was a community that was built by the French aerospace company Zodiac Aerospace to leverage the creative power of their employees regarding the airplane interior of the

future. The participants were free to submit any idea regarding the cabin interior of commercial aircrafts. The platform was open to all Zodiac Aerospace employees worldwide. Prizes for the participation were two Apple Watches. Within the contest, 2,746 employees registered on the platform. They submitted 610 ideas and 2,051 comments.

Vodafone - Connected X Challenge: The Connected X Challenge was a community that was built by the telecommunication provider Vodafone in Germany to find new use cases for an existing technology that had been developed by Vodafone. On the platform, the participants were asked to submit ideas about new use cases for Vodafone's new Narrowband IoT hardware platform. The platform was globally open to everyone who was interested in the topic. Prizes for the participants included money, a visit to a trade fair where the winners were awarded and non-monetary prizes like smartphones. In the scope of the contest, 556 participants registered in the community and submitted a total of 406 ideas, 1,254 comments and 1,300 evaluations.

ÖVP - Ideenwand: The Ideenwand platform and community was built by the Austrian people's party ÖVP to gather ideas and opinions to build the basis for their new party program within their Evoluation Volkspartei initiative. On the platform, participants were asked to submit ideas and discuss political topics that were relevant to them. The platform was initially open to everyone. In a second voting phase, only party members could vote to determine a certain short list of guidelines for the program. During the campaign, 5,337 citizens registered, submitted 2,949 ideas, wrote 6,537 comments and evaluated almost 12,000 likes and dislikes.

CSU - WikoNet: The WikoNet was a community that was built by the Christian Social Union (CSU) in Bavaria to connect experts from politics, economics and scientific experts within the political party. On the platform, participants could submit own ideas and discuss the presented content. The platform was only open to party members of the CSU, who discussed the future of their economic strategy. Over 100 submissions by 52 selected experts where discussed several hundred times.

4   Findings and Discussion: Community Roles and Comparative Insights on Patterns and Motivation Within Internal/External as Well as Public/Industry Collaboration Platforms

After analyzing 64 internal and external organized initiatives with close connection to the project sponsors/initiators and users/employees (e.g. through interviews), we could identify clear and recurring behaviors as well as patterns which we clustered in 11 different roles and personas. In the following paragraphs we present them in detail by highlighting their characteristics, uncovering their motivation for participation and by illustrating the major differences between public and industry led innovation communities targeting an internal and external audience:

Community Managers are responsible for leading and operating the platform as well as activating the community regarding idea generation. They are the binding element between organizations and the virtual group. In this role, they are communicating and

de-escalating with the main purpose to keep the community values and netiquette. Every community should have multiple and professional community managers, as they usually also review the content, forward ideas to experts within the organization and track the data, movements and dynamics on the platform for potential counteracting. The number and efforts of community managers varies from case to case, being tightly correlated to topic, number of employees, recruiting efforts or fan base; ergo, to the size of the (expected) community. By accompanying and evaluating the different initiatives in this paper, we found that political external driven communities need the highest amount of community managers (max. value: crowdsourcing political party program of the ÖVP in Austria with up to 15 community managers), while internal platforms (industry and public) and external collaboration platforms in the private sector level out at three to maximum five community managers (thumb rule each with 2 h efforts a day besides their daily jobs). If quality and quantity is missing on that end, it usually results in sustainable deterioration.

Opinion Leaders have a great interest in the topic and are highly motivated (intrinsic). Next to their active engagement on the platform, they even support the community managers by fostering discussions, demonstrating values and motivating others (socially engaged). Usually those highly value-oriented participants can be found more on external public communities due to the strong correlation to intrinsic triggers of participation. Additionally, our analysis shows that there is also a difference within the public sector. They are more likely to engage in political party driven communities than on those initiated by ministries or public institutions. Interestingly, the sight of this persona on internal platforms is very rare, as questions would be raised about their enormous time spent on the platform on top of the core task, to submit ideas and discuss. In a way, they can be seen as entertainers, as they market the purpose and initiative through various channels (this is the case on internal and external communities). This starts f.i. with employees communicating their own ideas in meetings, coffee breaks, lunch breaks and phone calls (offline push regarding internal platforms) and continues with writing blog articles, sharing social media postings or fostering group discussions as external participant for vitalizing and energizing the community of their beloved brands (online push regarding external platforms).

Power Ideators are widely welcoming characters on a community as they generate a huge number of qualitative ideas or further develop already existing idea sparks and concepts. They usually engage in discussions, but mainly focus on their own contributions. This is due to their intrinsic but also extrinsic motivation to participate. They try to publish as many ideas as possible and in a very early stage to occupy whole topic fields. Other contributors can just enhance the ideas via comments but cannot publish similar ideas as this would seem to be simply copycats. They usually have a broad knowledge across industry, so they simply apply ideas from other industrial areas and adjust them to the use case of the innovation community. Regarding this role we see a significant difference between the two sectors, not in frequency of their appearance, but for reasons of their motivation. Public communities are inclined to attract those power ideators who are driven by a far more intrinsic calling to change the status quo than those participating in communities across industry who usually share this high number of ideas to raise their chances to win prizes or to get acknowledged by the initiators to gain improved access

and connections. However, the number of power ideators is very small in general, but even in thin quantity (under 20 power ideators on average on the analyzed communities) they can be accountable for more than 40% of all the submitted ideas in a single innovation community. At least that has been the result in more than 25% of all the analyzed communities. Internal communities show even lower numbers of power users due to the lack of expertise of emerging technologies (many internal 'call for ideas' are based around those topics), lack of time (users on external communities use their free time, employees usually use their work time as technological access to the platform is limited to the workplace) or simply due to missing incentives.

Supporters are driven by intrinsic interests and join the community to promote a certain topic. They actively engage and promote the ideas of others with constructive comments to take their input to the next level. Most winning ideas are usually reworked several times during a contribution phase as comments and critics as well as evaluation push the ideator to react and enhance the idea continuously. Interestingly, supporters predominantly do not have own ideas but try to share their expertise to push other contributions and to create value. Parallel to the reasons for the lack of power ideators on internal collaboration platforms, this support role is hardly found both for public and private organizations. Reading and commenting on other ideas is time intensive which means that regular work must get done later or even after the regular office hours. Most internal platforms can be accessed only through the companies' or organizational networks as remote accessibility is ranked as risky. Consequently, user focus on their own ideas and evaluations. This leads to an exciting finding, namely the significant lower number of exchange and discussions on internal communities compared to those with an external crowd, even though a homogenous and already familiar (and perceived saver) community and environment of employees seems to be more interactive than a community mixed with strangers across the globe. Moreover, our data shows that supporters on external platforms have declined in numbers over the past years, while this role can still be seen frequently on public communities. The main reasons for this development are the rising number of international brands using community-based approaches to foster customer voices and its consequence of a non-exclusive status, in simpler words - too much competition for interested users and ideators. In contrast, we have seen that the number of participants in general on internal platforms is usually higher than those on external ones (still depends on the size of the organization which initiates the community) even though the target group is limited as no outsiders are allowed. It seems that internal communication and CEO messages to the employees has a magnetic impact and is highly efficient for including the staff, while compared gathering a global crowd needs a lot more community building and communication efforts as well as channels.

Experts are actual luminaries for the field in demand. With their background knowledge, they make a valuable contribution to the community and their specialist knowledge provide high-quality ideas and comments. The involvement of experts is one of the main goals for external communities as variously and often quoted in innovation, 'most of the smartest people work for someone else' and outside-in perspective is the main reason for pushing forward Open Innovation programs. The acquisition and recruitment of those high-end contributors is difficult and elaborate, albeit critical for the qualitative input. Simply described - the more external experts the merrier. On the contrary,

regarding internal platforms we can summarize through our data that experts are usually also feedback providers for the whole community and part of the respective department running the topic/call for ideas on the platform. Here, the number of experts is usually low (around 5–10 on average), but their part is key as they drive the evaluation and prioritization process by picking out the best ideas which will be further worked on for implementation.

Profit-oriented participants are also submitting ideas (more than discussing them as ideas submissions are usually better incentivized), especially on external platforms. The reason for the engagement is more extrinsic than intrinsic, as they usually have a certain goal. In most cases analyzed, they simply try to win the offered prize money or other exclusive prizes by sharing their thoughts and ideas. But not all motivation is triggered by monetary elements, many professionals also seek a possibility to get connections to the organizer of the community and convince them about their expertise as they are on the hunt for a new job. While this persona is very common in the industry, public participants usually try to profit in a different way as in most of all cases, public organizations do not give away material or monetary prizes anyways. Here, the citizens - if motivated extrinsically - rather hope for political influence, being part of the decision-making process or access certain networks. This phenomenon is pretty much mirrored within internal communities. Corporations tend to give away phones, extra vacation days, or very exclusive prizes for ideators, wherefore the penetration of participation is usually higher than in the public sphere, where no incentives at all is common. Furthermore, and not surprising, we analyzed that in both areas many profit-oriented driven users hope for leaving a 'digital business card' to apply for a better or new job through their online performance.

Disturbers are mainly characterized by negative input, such as provocative comments and bad evaluations about other ideas. In doing so, they cause damage in content and attempt to develop conflict within the community. However, our research has shown that this is usually not happening for simple reasons to hijack the community and spread harm within the social collaboration platform (the number of cases of competition hijacking the community to damage the brand or political organization is very low with under 5% of the disturber cases in general). In fact those personas usually cast a negative shadow over other ideas (worse evaluation) to spotlight their own contributions for extrinsic reasons (in many analyzed cases they even asked other community members to down-vote ideas, so their average score is better and gets more attention from the initiator). Moreover, this phenomenon can be detected mainly on external public communities (especially from political parties) and sometimes bigger brands but is nearly non-existing on internal platforms. The explanation is simple as no individual would risk his job by neglecting the netiquette and wider purpose of the initiative of his or her employer and leave a negative image.

Idea-Thieves who are driven by an egoistic motivation are rare. They are characterized by copying existing ideas and simply describe them in other words or 'restructure' them but not really improving or develop them any further. This means that they try to find the easiest way to receive incentives or other extrinsic elements (contacts to brands etc.) and frustrate the actual idea provider. This is a double-edged sword as people can also do it unwillingly. Especially within internal communities from organizations or

companies, people post ideas which have already been submitted without knowing as no research on other ideas have been made so far (such would not be tolerated internally and is easily trackable). It often ends in a dispute on who was first and community managers must de-escalate. Thieves are mainly active on external communities in the private sector, while stealing ideas on political and socially driven platforms would not make much sense as extrinsic incentives are usually not provided as well as manifold opinions are more emotionally driven and therefore not an interesting subject to copy.

Explorers join a community because they are interested in the topic and would like to learn from the community. Even if they do not bring much expertise, they try to get involved partially (more through evaluations and comments than ideas). On internal platforms, this role is typically taken by interns, working students and young professionals to broaden their horizons or to find interesting topics they can identify and maybe later work on. On external platforms (especially industry), many students, trainees or apprentices register and take their chances to connect with their favorite or interesting brands, to get in touch with experts from that brand and to learn more about its strategy and purpose. Public communities are usually not a place for those kind of explorers, as interested and younger people tend to engage more actively and share their ideas and opinions and follow a different kind of intrinsic motivation (in this case more power ideator, supporter or passive member).

Passive Members register in the community and are highly interested in the topic, yet they do not share their own input or participate in discussions. Rather, they let themselves be inspired by the content and comments of others or try to learn something new by just reading them. As this is still connected to a semi-active part (registering, logging in again and reading of contributions) they still invest plenty of time. This applies especially for communities focusing on emerging technologies, where a limited amount of knowledge has yet been gathered in general and major learnings can be achieved through connecting with the experts on the community. In parallel, political and social driven communities spread opinions, provide information and exchange comments with a local, federal or national perceived importance for the individual. The invested time is shared by participants from internal communities (industry and public alike), however, daily work is omnipresent and hinders employees to participate even if it is just passive. Hereby, their frequency is usually a bit lower than on external innovation communities. The tendency shows that whenever employees find the time to register and log-in, they usually try to engage actively. On the contrary to external initiatives they also cannot expect insights and knowledge from outside of the organizational boundaries, which is one of the most important reasons for external members to participate by just reading completely different perspectives from a crowd across the globe.

Lurkers are usually the vast majority of internal and external platforms due to time limitations, fading interest due to the goals and purpose of the initiator, social dynamics, unsatisfying feedback, other work etc. Most of the visitors of the platform stay lurkers and do not become active. Now, one could state that non-active members are not a part of the community, which is only partially correct. However, a substantial number of quantitative traffic (clicks) are coming from users, who do not contribute in any way and who often just visit the platform once or register and visit the platform rarely without taking any actions. Those statistics are used to market and back the success of

the initiative (internal: in front of the board to get more funding for further and similar projects; or external: to show how many people have been included in a public decision process/strategy as well as to show client centricity and relationship) (Table 3).

Table 3. Identified community characters clustered by tendencies of motivation and engagement

	Active	Passive
Intrinsic Motivation	Community manager Opinion leader Power ideator Supporter Expert	Explorer Passive member Lurker
Extrinsic motivation	Power ideator Profit-oriented Disturber Idea thief	

The probability of occurrence of the identified characteristics, varies in the different sectors (public vs. industry). In addition, the frequency of the characters is very different between internal and external platforms. Based on our experience, we give an estimate below (scale from 0 to 3) of how likely it is that the respective character will be encountered on the various platforms. The probabilities of occurrence are dummy variables coded in the following way: 0 means that these characters are not encountered, 1 means rare occurrences, 2 sometimes present and 3 that these characters occur (Table 4).

5   Managerial Conclusions and Further Research

In each community, different characters interact with various motivation drivers, intentions, interests and thus different engagements. In the public sector, many participants have an actual interest in the development of certain topics and thus act intrinsically, open innovation participants in the industry sector are more extrinsically driven. A community is only as good as its management. To reach the most constructive discussions and qualitative output, it is necessary to manage these different characters on the platform and deal with their wide-range of characteristics.

In this research, we have shown our analysis and findings about the different roles and behaviors of personas on internal and external innovation communities initiated by both - public and industry - players. Even more, we have shown differences between those patterns and projects as well as highlighted the primary motivation triggers for each persona. Those findings should be of major value for managers and decision makers in the public and private field, driving innovation communities in the present and the future, as many conclusions and derivations can thrive from it. Furthermore, we believe this paper should be viewed as a starting point for going beyond the qualitative data and backing the findings with further quantitative insights to answer correlation questions between

Table 4. Overview of community characters and their occurrence

	Internal Platforms		External Platforms	
	Public Sector	Industry Sector	Public Sector	Industry Sector
Community manager	3	3	3	3
Opinion leader	1	1	2	1
Power ideator	1	2	3	3
Supporter	1	1	3	2
Expert	1	1	3	3
Profit-oriented	1	2	2	3
Disturber	0	0	3	2
Idea thief	1	1	1	2
Explorer	2	2	1	3
Passive member	2	2	3	3
Lurker	3	3	3	3

users and different types of initiated innovation communities. Of interest is also a deeper evaluation of the current development of concepts and processes of communities which was stated as one of the reasons for the declining participation in general at the beginning of this paper. Formats like overnight feedback, sprints or digital community twins are spreading but are rarely analyzed. An open question is also how communities should evolve technologically, thinking about the users' demands, the continuous change in features as well as in emerging and possible enhancements.

Finally, we also see a major benefit in transferring the detected insights into guidelines for practitioners on how to handle and successfully enhance existing and future communities (practical how-to manual with managerial implications). Consequently, and as a final outlook, we would like to start by giving a quick overview and sneak-peak on the latter, meaning that we would highlight some selected managerial implications from our findings.

Get inspired Outside of Your Own Sphere: We have seen that users' behavior differs not just between public and industry led initiatives, but also strongly between internal and external communities. So far, many can say that is no surprise. However, we give proof that really all defined personas are existing on each platform, just excluding the role of the disturber on internal initiatives. Prior hypotheses might have headed in the opposite direction, suggesting that especially between public and industry different roles and personas might exist. Managers should not just investigate similar innovation communities from the competition or potential industry partners, but really look beyond the industries, including the public sector. In the scope of co-creation and innovation ecosystems, meeting with potential cooperation partners or, simply a sparring partner would be helpful prior to the kick-off of a project to learn from others' mistakes and gain

important insights. Responsible managers might raise the question, why other companies or organizations should meet up and help with their time when they cannot deliver anything in return. The answer is rather easy: share your insights after the project as well, so they can improve their already existing platform and its management. Thinking about doing this with multiple partners also for other problems or questions gives a perfect starting point for a cross industrial network (or innovation community) for co-creation in an open innovation ecosystem. A shared community initiative with joined forces and multiple questions for the customers/citizens is also an option (e.g. in the smart city context municipality areas and local business can work close together).

Individualize Your Community Management: Managers nowadays are aware of heterogeneity as well as social dynamics on online communities and consequently the efforts they must master in order to be successful. However, until today, still many under estimate how much work has and should go into a professional community management. Surely, you can 'survive' and go through an initial phase with limited resources, but every hour invested in the community means a reward in the form of more users, more ideas, more dynamics and a more healthy and vivid social community. Here, be aware that as our research has shown, different roles and personas are active. And like raising or treating your children, it is important to understand that users have different characters and should be managed in different and customized ways. As an example, we identified the issue of many internal driven communities dealing with 'stealing' ideas. Make sure your community management is de-escalating and bring the solution from the online to the offline world. Not every thief is one on purpose as stated above and you do not want to lose potential ideators; track the timing on the exact submission through the platform, ask if both might share and link the idea so they can work further in a team. If such cooperation is not desired, make sure the second in line (timewise) should have a clear improvement on the existing status. With our matrix shown in this paper you can already anticipate roughly what kind of personas are to be expected as well as in which ratio they usually appear (internal vs. extern; public vs. industry). Your incentive strategy (e.g. intrinsic vs. extrinsic), recruiting channels (e.g. online vs. offline), IP and legal strategy (e.g. exchange ideas for prizes vs. annex everything), evaluation process (e.g. pitching favorite ideas vs. jury voting) etc. should be adapted accordingly. Just to pick out one of those mentioned: if you see that many supporters are existing or more importantly missing on your platform, adjust your incentive structure. It is also important to ensure to incentivize valuable comments or enhancements of existing ideas through a community award or give away prizes for certain groups (e.g. student awards or internships if many of those personas are registered).

Adapt Your Technological Platform: Communities are technologically driven, but the importance of technology is reduced by the rising importance of social management and dynamics over time. However, evolving technology through the years and community initiatives can help to foster better ideas and attract different players and users. Many companies and organizations buy either out of the box solutions or on the contrary over engineered (usually by customizing) their platform without a sustainable effect. Make sure which features you really need for the expected fellowship on the community. Our matrix of personas on the different community levels should come in handy

to preselect the right features. For instance, make sure when including your employees on an internal platform that solutions are prioritized where people can also work on the way back to their homes (most participants with remote access did it during the public transportation time). Technology is only successful when the management behind is taking the appropriate decisions. So, make sure to guarantee free time for participating in internal platforms or combine it with gamification approaches like design thinking workshops or credits on the platform for good ideas which can be exchanged for spare time, lunch meals, etc. In addition, make sure to keep moving forward with your platform and do not stop the efforts even though the pilot project was not 100% satisfying. Alongside the evolvement of your platform comes the understanding of its management - and that takes time. With time, also more questions like internal policies, stakeholder management and KPIs will arise. Here, managerial implications of the data above can help to avoid mistakes and wrong directions - one reason more for us to publish further research on this topic.

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