Conceptualizing Design Parameters of Online Neighborhood Social Networks

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Abstract. Online neighborhood social networks (ONSNs) represent an emerging phenomenon among a growing number of niche social networks. These platforms afford users the ability to engage in activities such social interaction with neighbors, sharing of information on local issues or neighborhood volunteering and exhibit promising effects, including improved relationships between neighbors and an increase in neighborly communication. Despite the mounting popularity of platforms such as Nextdoor or nebenan, extant research on ONSNs remains scarce. In this paper, we aim to alleviate this research gap by developing a conceptually and empirically validated taxonomy of ONSNs with a particular focus on their differentiating design properties. We further leverage this taxonomy to derive four distinct archetypes of ONSNs based on a cluster analysis. With our research we provide a first and structured overview on the domain of ONSNs and support researchers and practitioners in analyzing, designing and selecting ONSNs.

Keywords: online neighborhood social networks, local social networks, social media, taxonomy research, cluster analysis

1 Introduction

Social network sites (SNS) are ubiquitous in our everyday use of information technology. More than forty percent of the world's population and more than seventy percent of all internet users are active on social media [1]. Besides the continuous growth of behemoths such as Facebook [2], there is an increasing number of niche social networks which enjoy rising popularity. These SNS cater to specific audiences, ranging from academics (ResearchGate, Academia) to designers (Behance, Dribble) or athletes (Runtastic, Strava), among others, and offer thematic features, focus as well as a community of likeminded individuals. Specialized sub-communities can also be observed on traditional SNS, for example in the form of Facebook groups, evoked by segmentive and negative network effects [3]. Online neighborhood social networks (ONSNs) represent a type of social network which affords users the ability to engage in activities such social interaction with neighbors, sharing of information on local issues and neighborhood volunteering [4]. Among niche social networks, they are unique not only in their topical focus on neighborhood-related issues but also because

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they consist of several sub-communities, each representing the inhabitants of a delimited geographic area. Previous research has demonstrated promising effects of ONSNs such as improved relationships between neighbors or an increase in neighborly communication and activities [5]. With 236,000 registered neighborhoods [6], San Francisco-based Nextdoor is the largest among these platforms. In Europe, Berlin-based nebenan has recently surpassed the one million user mark [7]. Despite this increasing popularity, extant research on ONSNs remains scarce. While some studies investigate ONSNs and related issues [4, 8, 9], academic literature lacks a comprehensive framework for their classification. We aim to contribute to closing this research gap by providing a systematic overview of the domain of ONSNs. As we observe a lack of design knowledge on ONSNs, we focus on principal differences in their design, i.e. their differentiating design properties. We formulate the following research question:

RQ: What are the conceptually and empirically validated design parameters of neighborhood social networks?

To answer this research question, we develop a taxonomy of ONSNs based on the methodology for taxonomy development presented by Nickerson et al [10]. Taxonomies are particularly useful to shed light on emerging phenomena [11] such as ONSNs. In line with previous taxonomy research in information systems (IS) [12, 13], we further leverage our developed taxonomy to derive a set of archetypes which represent repeating patterns of platforms among ONSNs. In the course of our research, we develop a first and comprehensive taxonomy of ONSNs, identify four distinct clusters of platforms and derive implications regarding the design of ONSNs. The contribution of our research is twofold. We support researchers and practitioners in the fields of social media, community and neighborhood research as well as smart cities and communities in analyzing, designing and selecting ONSNs. Our research sheds light on the quickly evolving topic of niche social networks and OSNS which have received little attention in previous research on social media. In the following Section 2, we present related work on ONSNs as well as taxonomy research in IS. Section 3 details our methodology, including taxonomy development and cluster analysis. In Section 4, we present our taxonomy and describe its dimensions and characteristics. We define archetypes of ONSNs in Section 5. Finally, we discuss theoretical and practical implications of our research in Section 6 and conclude with a summary and limitations of our work in Section 7.

2 Related Work

2.1 Online Neighborhood Social Networks

Connecting neighborhoods via the internet has a long tradition in the form of community informatics, 'the application of information and communications technology (ICT) to empower community processes' [14, p. 11]. Projects such as the Blacksburg Electronic Village provided neighbors with functionality for chat, email lists, discussion boards and local business listings as early as 1993 [15]. These

artifacts were able to overcome spatial, temporal and social barriers to communication and enabled civic engagement among neighbors. Today's SNS harbor significant potential for increasing neighborliness through localized usage [16]. On SNSs such as Facebook, cumulative and segmentive network effects have resulted in the organic formation of city and neighborhood-level communities in the form of groups [3]. These groups can serve as grounds for discussion of local issues while restricted access groups enable neighbors to establish communities of trust among themselves [17].

ONSNs aim to provide a dedicated space for these neighborhood-centric communities. As to avoid confusion between ONSNs and the existing term of neighborhood social networks used in the social sciences, we choose online *neighborhood social networks* as a suitable term to describe the focal phenomenon. ONSNs can be classified as a private and local type of SNS [18]. They are private in that they restrict access to a specific group of individuals - neighbors - and are not open to the general public. They are local as they relate to a spatially delimited area or place, the neighborhood. The term neighborhood can be defined from various perspectives based on criteria such as administrative boundaries, an area's history or characteristics and perceptions of its inhabitants [19, 20]. We define an ONSN as a social network site whose intended audience comprises the inhabitants of one or more neighborhoods and whose thematic focus lies on neighborhood-related issues. Most ONSNs seem to share a common set of features and traits. They are free-to-use but often require users to verify their address to confirm their neighbor status. Each neighborhood represents a separate sub-community, limiting user-generated content to an audience of neighbors. Users possess a profile page and can access a directory of neighbors, exchange information on local issues, request and provide recommendations regarding local service providers as well as offer goods and services on a marketplace. However, literature on ONSNs remains scarce. Vogel et al. [4] propose an age-friendly digital neighborhood platform which aims at increasing social connectedness of the elderly. Masden et al. [8] analyze the ONSN Nextdoor and attest potential for fostering community connectedness. Further studies on ONSNs propose an app-based platform for fostering co-production in the neighborhood and a cross-generational neighborhood network [9, 21].

2.2 Taxonomy Research in Information Systems

Taxonomies, defined as 'conceptually or empirically derived groupings of dimensions and characteristics' [11, p. 13], enable researchers and practitioners to structure and analyze complex domains and the ordering of disorderly concepts [10]. While the IS discipline lacked thematic methodological guidance for taxonomy development for a long time, Nickerson et al. [10] presented a method for taxonomy development for IS research. They base their methodology on existing approaches from information systems, computer science and business research. Widespread use of this method can be observed, including cases in the context of social media research. Notable examples include taxonomies of organizational social media use [22], and social reading platforms [12]. Nickerson et al. [10] define a taxonomy as a set of dimensions each consisting of a set of mutually exclusive and collectively exhaustive characteristics that sufficiently describes objects in a specific domain of interest. Characteristics are considered mutually exclusive and collectively exhaustive if each object has one and only one characteristic in each dimension. Development kicks off by determining a meta-characteristic as a foundation for all other characteristics in the taxonomy. Next, ending conditions for the taxonomy development are to be determined. Nickerson et al. [10] provide a set of subjective and objective ending conditions. Characteristics and dimensions are determined iteratively using a conceptual-to-empirical or empirical-conceptual approach. The conceptual-toempirical approach entails the deduction of characteristics based on a researcher's notions regarding a particular domain, supported for example by extant literature. In the empirical-to-conceptual approach, a set of objects is selected and common characteristics among these objects are identified based on the meta-characteristic. The combination of conceptual and empirical phases suits our case of ONSNs where extant literature remains scarce. These characteristics can in turn be grouped, leading to the formation of new or revision of existing taxonomy dimensions. The taxonomy development concludes once all ending conditions are met.

3 Methodology

3.1 Research Design

Our overall research design consists of (1) a literature review on ONSNs, (2) the identification of real-world ONSNs, (3) the development of a taxonomy of ONSNs and finally (4) the definition of archetypes of ONSNs via cluster analysis (see Figure 1). In the following sections, we provide a description of our conducted research steps.



Figure 1. Overall research design

3.2 Literature Review

We conduct a structured literature review on ONSNs in order to gain an understanding of the subject and as input for the taxonomy development process. We follow guidance by vom Brocke et al. [23] and search citation indexing services (Google Scholar, Scopus, Web of Science) and bibliographic databases (ACM Digital Library, AISeL, Business Source Complete, IEEE Xplore, ProQuest ABI Inform and Springer Link), limiting our search to peer-reviewed results where possible. After a cursory search, we choose combinations of *neighborhood, community, social media*,

social network and *platform* as the most productive terms. Articles included in our review analyze or implement artifacts fitting our definition of ONSNs presented in Section 2.1. Including backward and forward search and excluding duplicates, we identify 8 relevant articles (see also Section 3.4). The final iteration of our review was conducted in July 2019.

3.3 Platform Identification

In order to identify relevant objects for classification in our taxonomy, we perform a criteria-based search using online databases and the Google search engine. We search the crunchbase (crunchbase.com) and CB Insights (cbinsights.com) company databases as well as the iOS App Store and Google Play Store. We utilize combinations of the search terms neighborhood, community, local, social media, social network. For each identified platform we also perform a web search for corresponding competitors. We shortlist platforms which (1) fit our definition of ONSNs as presented in Section 2.1 and (2) are in operation at the time of analysis. We thereby exclude platforms which have a neighborhood focus but do not fit our definition of ONSNs (e.g. security-only platforms such as Neighbors by Ring) and local social networks without a specific neighborhood focus (e.g. local shopping apps such as Wiva). Where possible, we create user accounts and make direct observations. We supplement this data by analyzing the platforms' knowledge databases, FAQs as well as publicly available materials such as presentations and media reports. Based on these criteria, we identify a total of fifteen ONSNs which are listed as part of our description of ONSN archetypes in Section 5.

3.4 Taxonomy Development

Following the methodology presented by Nickerson et al. [10] as well as recommendations made by Oberländer et al. [11], we aim to provide a comprehensive account of our rigorous taxonomy development process. Figure 2 displays an overview of the evolution of our taxonomy of ONSNs across its five iterations. Initially, we define *design properties of online neighborhood social networks* as the meta-characteristic for our taxonomy as it is aimed at researchers and practitioners who intend to analyze, design or use ONSNs. We adopt both the objective and subjective ending conditions proposed by Nickerson et al. [10]. We commence the taxonomy development process by using the conceptual-to-empirical approach and leverage the results of our previously conducted literature review to determine an initial set of dimensions.

We extract the dimensions *neighborhood delimitation* [4], *local facilitation* [4, 5, 9, 15, 24, 25], *identity verification* [4, 9], *real-name policy* [4, 8, 9, 21], *sub-communities* [5, 8, 9, 15, 21, 24] and *channels* [4, 9]. Subsequently, we analyze our sample of ONSNs using the empirical-to-conceptual approach. In the second iteration, we analyze the largest ONSNs based on number of users, Nextdoor and nebenan. By contrasting these ONSNs with each other and the artifacts described in literature, we can identify several differentiating characteristics and group them into the dimensions

availability, ownership, neighborhood formation and *invitation mechanism*. In both the third and fourth iteration, we include the entirety of our identified platforms in the analysis. We are able to define *monetization, intra-platform audiences, user-to-user relationships* and *extra-platform visibility* as novel dimensions as they provide differentiating characteristics for our taxonomy. In the fifth and last iteration, all ending conditions were met and we therefore concluded the taxonomy development process.



Figure 2. Evolution of taxonomy dimensions (adapted from [13])

3.5 Archetype Development

Archetypes represent typical or ideal configurations of object characteristics [26], in our case the design properties of ONSNs. In the last step of our research process, we

empirically determine archetypes of ONSNs by performing a cluster analysis using our developed taxonomy. Via cluster analysis, a set of objects is grouped in a way so that objects in the same cluster are more similar to each other than to objects in other clusters [27]. We first calculate the Euclidian distance between our ONSNs to determine their similarly. Subsequently, we apply hierarchical clustering using Ward's method in order to ascertain an appropriate cluster count by observing the resulting cluster dendrogram. Additionally, we inspect the silhouette scores for various potential cluster counts in a preliminary k-means [28] clustering. Based on this pre-analysis, we choose four clusters as the most promising cluster count and perform our final k-means clustering using the k-means++ algorithm [29], resulting in the clusters presented in Section 5. We performed all data analysis actions using the Orange Data Science Toolkit.

4 Taxonomy of Online Neighborhood Social Networks

Our taxonomy consists of forty-one mutually exclusive and collectively exhaustive characteristics grouped into fourteen dimensions (see Table 1). We further induce the four overlying meta-categories *Operating model*, *Neighborhood*, *Trust & identity* and *User & content* from the final set of dimensions. In the following, we provide a description of each of our defined taxonomy dimensions.

 D_1 Availability – ONSNs in our sample pursue varying approaches regarding their availability. While some platforms are available only in selected neighborhoods, other platforms have a national or multi-national presence. A small number of platforms possesses no restrictions regarding availability and is available globally.

 D_2 Ownership – Our analyzed ONSNs are either owned and operated by a private, for-profit company or by a public organization or institution.

 D_3 Monetization – Monetizing SNSs represents a complex challenge with ONSNs being no exception [30]. While most analyzed platforms are either nonprofit or funded by venture capital, endeavors towards monetization can be observed. These include advertising in the form of sponsored posts, paid listings (e.g. real estate listings), subscriptions for local businesses and neighbors or combinations of these options.

 D_4 Neighborhood formation – New neighborhoods are initialized on the initiative of either neighbors or platform providers. Most platforms initialize a new neighborhood only on the request of a neighbor located outside of the boundaries of all preexisting neighborhoods. Other ONSNs proactively initialize neighborhoods themselves and subsequently engage neighbors in order to generate interest in the platform.

 D_5 Neighborhood delimitation – We observe a variety of neighborhood delimitation strategies. A number of platforms relies on neighbor's contextual knowledge on neighborhood boundaries and entrusts them with the task of delimiting new neighborhoods. Other platforms arbitrarily define neighborhood boundaries without neighbor input based on considerations such as population density or simply

follow municipal boundaries. The remaining platforms in our dataset provide each neighbor with an individual, radius-based neighborhood.

 D_6 Local Facilitation – Local facilitation can take the form of marketing activities, neighbor-onboarding or community management. Some ONSNs institute a key user concept of 'Founding Members' or 'Leads' in each neighborhood to perform the aforementioned tasks. Others are tightly integrated with professional neighborhood management services which provide local facilitation.

 D_7 Identity verification – ONSNs may require users to verify their identity (name and address) as a precondition for sign-up. Self-service options include verification by submitting a copy of a photo ID or a copy of an official invoice, sharing one's device location, entering a code provided via a mailed letter or postcard and other options. Some platforms offer in-person verification by providing government ID in a local neighborhood management office.

	Dimensions	Characteristics							
Operating model	D ₁ Availability	Global	Multi- country		Single- country	Selected cities		Selected neighborhoods	
	D ₂ Ownership	Private company			Public organization				
	D ₃ Monetization	Advertising Adisub		Adv sub	vertising + scriptions	ng + Advertisi ons paid listi		No monetiza- tion/nonprofit	
Neighborhood	D ₄ Neighborhood formation	Platform-initiat			ted	Neight		or-initiated	
	D ₅ Neighborhood delimitation	Municipal Ar boundaries d		bitrarily eighbor- lefined	Arbitrarily platform- defined		Radius-based		
	D ₆ Local facilitation	Key user concept			Neigh manager	Neighborhood anagement service		None	
Trust & identity	D7 Identity verification	Self-service		Self-service + in- person			None		
	D ₈ Invitation mechanism	Online		Online + offline		None			
	D ₉ Real-name policy	Enforced		Encouraged			None		
User & content	D ₁₀ Extra-platform visibility	Fully platform-exclusive			lusive	Optionally semi-public			
	D ₁₁ Intra-platform audiences	Own + bordering neighborhoods			ng s	Own neighborhood only			
	D ₁₂ User-to-user relationships	Available			Not available				
	D ₁₃ Sub-communities	Gr	Groups		Groups + building- level communities		None		
	D14 Channels	We	ebsite		Mobile app		Website + mobile app		

Table 1. Taxonomy of online neighborhood social networks

 D_8 Invitation mechanism – Some ONSNs offer verified users the ability to invite neighbors onto the platform, sometimes circumventing the need for identity verification for the new user. While most platforms offer a simple online invitation mechanism via sharing a customized link (e.g. via email or instant messenger), more sophisticated mechanisms include printable flyers which can be distributed by users in their building or neighborhood as well as an automated dispatch of postcards to specific neighbors.

D₉ **Real-name policy** – There are a number of tradeoffs between anonymity and identifiability on SNS. While anonymous usage may provide a sense of privacy and encourage users to freely and honestly express their views, being identifiable on SNS may lead to stronger social connections, allows for reputation building and serves as a trust-enhancing factor between peers [31]. ONSNs which require identity verification (see D_7) automatically implement a real-name policy. Platforms which are more lenient regarding identity verification typically lack the means to enforce a real-name policy although some encourage usage of one's real-name in their community guidelines and reserve the right to remove accounts with false names. A third group of platforms explicitly has no real-name policy and remains neutral towards name usage.

 D_{10} Extra-platform visibility –Some analyzed platforms allow neighbors to optionally expose their user-generated content to the general public, for example via link-sharing or by rendering the content traceable on search engines. This allows users to share for example event invitation with contacts which are not registered on the ONSN. In case of this extra-platform sharing, privacy-sensitive information such as the identities of users who liked a submission are not visible outside of the ONSN.

 D_{11} Intra-platform audiences – A number of analyzed platforms pursue a concept of 'bordering neighborhoods'. Neighbors can optionally scale the audience of their submissions to include neighbors in bordering neighborhoods on the same platform, for example when trying to reach a larger audience when promoting an event with cross-neighborhood relevance.

 D_{12} User-to-user relationships – Although user-to-user relationships and the resulting traversable social network are principal in the definition of SNSs [18], the functionality for establishing direct, one-to-one relationships by for example adding neighbors as contacts, friends or by following neighbors is not available in all ONSNs.

 D_{13} Sub-communities – Most ONSNs enable neighbors to create sub-communities in the form of groups which provide a public or private space related to specific topics of interest. A number of ONSNs automatically creates a sub-communities for all registered neighbors living inside of the same building.

 D_{14} Channel – The majority of platforms in our sample provides both a website and mobile app as means of access, however we observe some instances in which platforms are website or app-only.

5 Archetypes of Online Neighborhood Social Networks

Based on our cluster analysis described in Section 3.5, we identify four archetypes amongst our fifteen analyzed objects. The crosstab analysis presented in Table 2 illustrates the incidence of characteristics inside each cluster.

Archetype A: Strong neighbor-integration, growth-oriented: ONSNs in this cluster employ advanced monetization strategies, including subscriptions for neighbors and businesses, paid advertising and paid listings for classifieds or real estate. They further exhibit a growth-orientation and leverage their registered neighbors in plentiful ways to this end: they enable neighbors to initialize new neighborhoods, to define neighborhood boundaries and employ a key user concept for local facilitation. Thereby, much of the effort required for growing the platform's audience is crowdsourced to neighbors. Numerous offline and online invitation mechanisms contribute further to this growth-orientation. They strike a compelling balance between user trust, privacy and content reach: they do require identity verification and enforce usage of real-names but also implement a bordering neighborhood concept and allow content to be published semi-publicly if desired. By doing so, neighbors can choose to address a wide audience inside the ONSN itself and also do not run the risk of locking their content to the platform with non-neighbors being unable to access it. ONSNs in this cluster: nebenan (nebenan.de), Neighbourly (neighbourly.co.nz) and Nextdoor (nextdoor.com).

	Dimension	Characteristic	Archetypes (# ONSNs)				
	Dimension	Characteristic	A (3)	B (3)	C (5)	D (4)	
Operating model	D1 Availability	Global	0%	0%	0%	25%	
		Multi-country	67%	0%	0%	25%	
		Single-country	33%	0%	100%	0%	
		Selected cities	0%	0%	0%	50%	
		Selected neighborhoods	0%	100%	0%	0%	
	D2 Ownership	Private company	100%	0%	100%	100%	
		Public organization	0%	100%	0%	0%	
	D ₃ Monetization	Advertising	0%	0%	20%	50%	
		Advertising + subscriptions	67%	0%	0%	0%	
		Advertising + paid listings	33%	0%	60%	0%	
		No monetization/Nonprofit	0%	100%	20%	50%	
	D ₄ Neighborhood formation	Platform-initiated	0%	100%	0%	50%	
		Neighbor-initiated	100%	0%	100%	50%	
po	D ₅ Neighborhood delimitation	Municipal boundaries	33%	0%	0%	100%	
rho		Arbitrarily neighbor-defined	100%	0%	0%	0%	
Neighbo		Arbitrarily platform-defined	0%	100%	20%	0%	
		Radius-based	0%	0%	80%	0%	
	D ₆ Local facilitation	Key user concept	100%	0%	0%	0%	
		Neighborhood management service	0%	100%	0%	0%	
		None	0%	0%	100%	100%	
st & ttity	D ₇ Identity verification	Self-service	100%	33%	80%	0%	
		Self-service + in-person	0%	67%	0%	0%	
ru. der		None	0%	0%	20%	100%	
I i	D ₈ Invitation	Online	0%	0%	60%	50%	

Table 2. Crosstab analysis results based on cluster analysis

	mechanism	Online + offline	100%	0%	0%	25%
		None	0%	100%	40%	25%
	D9 Real-name policy	Enforced	67%	100%	60%	0%
		Encouraged	33%	0%	20%	25%
		None	0%	0%	20%	75%
User & content	D ₁₀ Extra-platform	Fully platform-exclusive	0%	100%	80%	75%
	visibility	Optionally semi-public	100%	0%	20%	25%
	D ₁₁ Intra-platform	Own + bordering neighborhoods	100%	0%	20%	0%
	audiences	Own neighborhood only	0%	100%	80%	100%
	D12 User-to-user	Available	0%	0%	40%	25%
	relationships	Not available	100%	100%	60%	75%
	D ₁₃ Sub-communities	Groups	67%	0%	60%	75%
		Groups + building-level communities	33%	0%	20%	25%
		None	0%	100%	20%	0%
	D ₁₄ Channels	Website	0%	33%	60%	50%
		Mobile app	0%	33%	40%	25%
		Website + mobile app	100%	33%	0%	25%

Archetype B: Publicly-owned, professional facilitation: ONSNs in this cluster are operated by public organizations or institutions such as city governments and universities. Consequently, no monetization strategy is pursued. Their availability is restricted to a handful of specifically selected and delimited neighborhoods. In case of these platforms, local facilitation is provided by professional neighborhood management services and the ONSN represents one element of a broader endeavor related to age-friendliness or smart cities and communities. Trust and privacy features are strictly implemented on these platforms, requiring self-service or in-person identity verification and usage of real-names. User-generated content is locked tightly into the ONSN, with no bordering neighborhood concept or optionally semi-public content being implemented. Included ONSNs: Meine Nachbarn (meinenachbarn.hamburg), Remishueb (remishueb.stadt.sg.ch), wirRauner (wirrauner.de).

Archetype C: Radius-based, country-specific: ONSNs in this cluster are active in only one specific country, oftentimes possessing country-specific naming and branding. They predominantly use a radius-based approach to delimit neighborhoods, resulting in individual neighborhood boundaries which do not correspond with any traditional neighborhood delimitation concepts such as municipal boundaries. They mostly require some form of identity verification and enforce or encourage usage of real-names. While they do initialize neighborhoods on request of neighbors, they do not implement any local facilitation concept, be it using key users or professional services. User-generated content is restricted to one's own neighborhood and cannot be made visible outside of the ONSN. Platforms in this cluster include FragNebenan (fragnebenan.com), fürenand.ch (fuerenand.ch), **JustMyNeighbors** (justmyneighbors.com), Nachbarschaft.net (nachbarschaft.net) and ScoopLoop (scooploop.com).

Archetype D: Open, municipal boundaries: ONSNs in this cluster are characterized by their high degree of openness and low neighbor-involvement. They implement low barriers for signup as they abstain from requiring identity verification and enforcing or encouraging real-name usage. While this choice makes it easy for new neighbors to create accounts, it may also fail to create a culture of trust among members of the online community. Furthermore, these ONSNs do not require neighbors to define the boundaries of neighborhoods themselves and instead opt for adopting municipal boundaries to delimit neighborhoods. ONSNs in this cluster include GoNeighbour.Org (goneighbour.org), kiekmo (kiekmo.hamburg), lokalportal (lokalportal.de) and Meet the Neighbors (meettheneighbors.org).

6 Discussion

Based on our taxonomy and identified clusters, we derive implications regarding the nature and design of ONSNs along the three central themes of *openness* of ONSNs as well as *neighbor empowerment* and *neighborhood delimitation* on ONSNs. We further discuss the differences between SNS and ONSNs and highlight the role of ONSNs as socio-technical artifacts.

In the context of ONSNs, *openness* characterizes the ease of access to a platform as well as how tightly user-generated content is restricted to one's own neighborhood and the platform itself. ONSNs need to find the right balance between encouraging users to join their platform and restricting access to real neighbors in order to build trust. This trust represents a major advantage for ONSNs over traditional SNS. As a consequence, functionality which is present on both traditional SNSs and ONSNs may receive additional value, for example in case of increased trust between sellers and buyers on a local online marketplace, increased trust in recommendations made by neighbors regarding local businesses or in an increased readiness to request and provide neighborly assistance.

Neighbor-empowerment plays a critical role in ONSN design and is used extensively by some of our analyzed platforms to crowdsource tasks such as marketing, user acquisition or community management to neighbors. While this strategy may enable high growth, it in turn requires platform providers to implement robust platform governance including rules, policies and procedures which ensure the retention of control over factors such as the scope of expansion and quality of content [32].

In this context, letting neighbors define the boundaries of neighborhoods may also improve the chance of capturing already existing offline-communities of neighbors which would otherwise be at risk of being split up in case of platform-defined boundaries. As is already apparent from the discussion of possible definitions of the term neighborhood presented in Section 2.1, *neighborhood delimitation* is not a trivial task. For ONSNs, delimiting or scoping neighborhoods represents a core competency. If neighbors find boundaries on an ONSN which do not correspond with their understanding of their real-life neighborhood for example by being too extensive or too confined, they may not be inclined to use the platform. This challenge is intensified by the need of ONSNs to find an automated or semi-automated way of delimiting new neighborhoods if they hope to achieve scale. Here, our taxonomy shows that platform providers have found a variety of solutions to deal with this issue ranging from neutral, radius-based systems, directly adapting municipal boundaries or letting users delimit their own neighborhood.

We are further able to identify two properties of ONSNs which differentiate them from traditional SNS. First, when comparing our analyzed ONSNs with each other and with traditional SNSs, we find that most high-level functionality (e.g. existence of a timeline, direct messaging, user profiles or events, etc.) does not vary significantly between platforms. Therefore, features on this level were not included in our taxonomy. In consequence, however, this means that the main feature differentiating ONSNs from SNSs is the creation of a community of trust in a limited local area, realized through a combination of identity verification, neighborhood delimitation and real-name policy. If this is indeed the core competency of ONSNs, a central goal when designing ONSNs should be the further exploitation of this trust and identity management, for example in the form of third-party integrations which allow neighbors to transfer their established community of trust to other contexts and services.

Second, as a further differentiator between ONSNs and SNSs, we find that most ONSNs do not implement direct user-to-user relationships such as "friends" or "contacts" which are a defining characteristic of traditional SNS [18]. As opposed to SNS, relationships between users on an ONSN are not primarily based on their social network but on the proximity of inhabiting a common neighborhood. A closed community of neighbors may simply have no need for user-to-user relationships. However, most ONSNs do enable users to create sub-communities such as groups, allowing a further segmentation of neighbors inside the closed neighborhood.

Among our defined archetypes, Archetype B demonstrates an interest of public organizations and institutions to implement their own platforms despite the availability of solutions offered by private companies. Most likely, this is a result of a distinct need to control platform design and development, concerns regarding data privacy and the wish for tighter integration of an ONSN with existing efforts regarding neighborhood development for example via professional neighborhood management services.

Our research highlights the role of ONSNs as socio-technical artifacts whose success is determined to a large extent by the way they are embedded in their environment [33]. Considering this ensemble view of technology, ONSN providers must adequately embed their platforms into the constantly evolving social and environmental context of the neighborhood. Therefore, while the design of an ONSN may be technically sound, it is equally important to consider factors such as local facilitation, integration of organizations and institutions as well as the delimitation of neighborhoods which affect contextual integration [34], which is supported by a multilevel perspective [35]. Our taxonomy serves as a starting point for these considerations.

With our research on ONSNs, we provide a first and comprehensive overview of an increasingly relevant domain within social media which has received little attention in previous research. Our research contributes to understanding the nature of these ONSNs and enables their differentiation based on a set of conceptually grounded and empirically validated design properties. Thereby, our taxonomy can facilitate the design of new as well as the analysis and selection of existing ONSNs for researchers and practitioners. ONSN providers can utilize our defined archetypes to classify and compare their own platform with competing or alternative operating concepts. With our taxonomy and derived archetypes, we provide a common understanding and shared language for the future scholarly discussion of ONSNs.

7 Conclusion

Motivated by the potential of ONSNs for improving neighborhood life, their increasing popularity and a lack of research in the field, we develop a conceptually and empirically validated taxonomy of ONSNs. We leverage this taxonomy to derive four archetypes of ONSNs via cluster analysis. Based on these results, we induce implications regarding the nature and design of ONSNs. Our research is faced with several limitations. Our sample of ONSNs used for taxonomy building is biased towards English and German-language platforms, as those were the languages our search was conducted in. Furthermore, despite our cluster analysis following established procedure by employing Ward's method and the k-means algorithm [12, 13], a different clustering approach may have produced slightly varying results. Future research can utilize our taxonomy as well as archetypes and aim to extend our taxonomy with additional characteristics and dimensions based on novel conceptual and empirical insights.

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