Do Municipal Facebook Performance and Citizen Satisfaction go Hand in Hand?

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Abstract: This paper examines the relation between municipalities' social media performance and citizen satisfaction with the municipality. An observational study was conducted, based on four different Swedish national public data sources. The study shows that municipalities' Facebook performance is correlated to citizens' satisfaction with living in the municipality and with satisfaction with municipal service provision. There was however no significant relationship between Facebook performance and satisfaction with transparency and influence from a citizen perspective. In conclusion, one important implication of the study is that citizen perception regarding whether a municipality is a good place to live in or not is related to the use of social media for promoting the municipality. Furthermore, a relation between satisfaction and citizen perception of government service performance implies that social media could be valuable for interaction and co-creation. Finally, an implication is that usage of social media and the potential relationship to trust, influence and transparency must be further elaborated and studied. Overall, our recommendation is that municipalities and their citizens may benefit from well thought-out strategies of how to use social media for marketing, interaction and co-creating.

Keywords: Social media, Facebook, Municipality, E-government, Performance, Citizen satisfaction

1. Introduction

Digitalization of municipalities is expected to increase administrative effectiveness as well as bring benefits such as promotion of democratic values and inclusion of citizens (e.g. Bannister and Connolly, 2014; Cordella and Bonina, 2012). Furthermore, digitalization has the potential to improve the quality of public service, and success factors for its implementation have been articulated (e.g. Bernhard, 2020; Gil-García and Pardo, 2005; Yun and Opheim, 2010; Norström, 2019). One of the latest initiatives is the use of social media by municipalities for information and communication with citizens, which has become increasingly popular (e.g. Norström, Bernhard and Lundh Snis, 2019; Bonsón, Royo and Ratkai, 2015; Mergel, 2013). Social media differs from previous technology in the sense that it is focused on user-generated content, enabling a more bottom-up, citizen-centered approach (Yates and Paquette, 2011; Linders, 2012). The familiarity of commonly used platforms such as Facebook also makes it convenient for citizens who can follow feeds of news and conversations without "going over to" the government (Ellison and Hardey, 2013; Hanna, Rohm and Crittenden, 2011). Using platforms that people like and already use decreases the distance to the municipal administration. Thus, social media is ideally a promising resource for constructing public discussion, encouraging knowledge exchange, and enabling informed citizens. As such, social media could be a part of a transformational process of government going from a top-down managed e-government to a responsive, bottom-up and citizen-initiated "we-government" (Linders, 2012).

Digitalization, especially the use of social media, clearly has potential. However, despite the growing literature on social media management there is still little known about and scarce empirical evidence of the effect of government social media use from a citizen perspective (Medaglia and Zheng, 2016; Medaglia and Zhu, 2017). Hence, we don't know if citizens are aware of the potential described above and how they value their municipality in relation to aspects of quality of life (cf. OECD, 2013), e.g., whether the municipality is a good place to live regarding employment, housing, leisure, culture, safety and high quality services, and if it enables participation in the development of facilities and services. We also know that quality of life is frequently neglected when new innovative digital services are being implemented (Fischer, 2018). Consequently, increased understanding of citizen satisfaction is important as well as studies of municipalities' service performance and of factors related to how citizens perceive this service performance.

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Municipalities still tend to focus on one-way communication of public services to citizens, retaining an approach which is not innovative and may fail to meet current and future societal challenges (Fischer, 2018; Susskind and Susskind, 2015). Remarkably, to our knowledge there are almost no large and rigorous published studies focusing on the relationship between digitalization, especially social media use, and citizens' perception of service performance. One possible approach for measuring perceived satisfaction is to adopt concepts from quality management, where quality is defined as a service capability to fulfill or even exceed expectations (Deming, 1993). Adopting quality management principles originally developed for private industry, must however be adjusted when applied in the public sector, and account must be taken e.g. for rights, access, and equality (Elg, Wihlborg and Örnerheim, 2017).

Sweden is a forerunner regarding Internet access and social media, dominated by Facebook, which is commonly used by municipalities. Furthermore, Sweden has a long history of measuring citizen satisfaction and the instrument for measuring satisfaction was developed already in 1992 (Fornell, 1992). Consequently, Swedish municipalities constitute an adequate choice of study objects for evaluating correlation between digitalization and satisfaction. A previous study in Sweden shows that a high degree of digitalization in municipalities correlates with satisfaction with service performance, when adjusting for other essential factors related to citizens' satisfaction with the service performance of the municipality (Bernhard et al., 2018). Thus, there is some empirical evidence that municipal digitalization may be beneficial from a service performance perspective. The digital technology in the study by Bernhard et al. (2018) was however limited to e-services, websites and apps, and not specifically social media. As pointed out above, social media may be an even more important resource in the development of a more participative government due to the bottom-up character of such media and since a majority of citizens are familiar with social media. Because Facebook is the dominant social media platform used by Swedish municipalities, our study is limited to only studying this platform.

In summary, using social media in municipalities has promising potential, but there is a lack of empirical evidence that the hoped-for benefits of social media usage are fulfilled, especially from a citizen perspective. We want to contribute to filling this research gap, and the aim of this study is therefore to investigate the relationship between municipalities' social media use and citizen satisfaction.

2. Background and Hypotheses

Municipalities are undergoing a digital transformation that affects the organization, the individuals working there as well as citizens and other stakeholders, and social media has become an important part of that transformation. The transformation is driven by at least three different actors, each of which has their own agenda: social media platform providers (e.g. Facebook), citizens and municipalities. When these actors merge in processes of interaction on social media platforms they potentially affect the service performance of municipalities' social media use and citizens' perception of the municipality (Norström, 2019).

2.1 Social Media Platforms

Social media platforms differ from previous technology used in government in the sense that they are not government owned or designed for a certain government purpose. Instead they are external, private, or corporate platforms that allow users to create services, applications, and content, by themselves, independent of system designers and direct contact with service providers (Islind, 2018; Norström, 2019).

Partly because of this easy access to information and connections, social media platforms have become an everyday place to go for socializing (Davidsson, Palm and Melin Mandre, 2018) and subsequently potentially interesting spaces for civic participation and engagement efforts (Bonsón, Royo and Ratkai, 2015). The platforms can be understood as online communities of undefined groups of people where participants are seen as co-producers of knowledge (Konsti-Laakso, 2017). In this way social media platforms support processes of collective action by helping to "discover and attract members with shared interests; exchange information; make group decisions at a larger scale; integrate individual contributions; supervise a group with less need for hierarchy; and manage group logistics due to elimination of time and space constraints" (Amichai-Hamburger, 2008; Linders, 2012, p. 447). Social media platforms have thereby been ascribed with the potential to support citizen participation and engagement (cf. Bonsón, Royo and Ratkai, 2015; Bonsón et al., 2012; Mergel, 2013).

Despite the co-creating and participatory character of social media platforms, concerns can be raised regarding issues related to privacy and power relationships, which may affect social media performance by the munici-

pality and citizens' satisfaction with the municipality. Social media providers have their own agenda driven by business interests constituted by the idea to collect, extract and analyze user data which is then used for improvement of the service (Zuboff, 2019). According to Zuboff (2019; 2015), platform providers profit from people's willingness to share their social lives online and from people's ignorance about what the digital footprints they leave may be used for. The author further points to the asymmetric relationship that emerges between platform providers and their users based on the fact that: 1) the social media platform providers know more about people than people using the platforms know about themselves; 2) people have little, if any, insight into what the social media platform providers do with their data; and 3) people are dependent on social media services. The sharing of data has become part of people's "everydayness," hence, it is something people do to make their everyday lives work (Kallinikos, 2012). Users have built up a dependency on social media platforms that makes it difficult for citizens to criticize the service providers' data production and use (Zuboff, 2015). From a government interest perspective, this asymmetry related to lack of transparency and freedom of alternative platforms may be problematic when social media platforms are used by municipalities.

2.2 Citizens and Municipalities

Citizens are valuable partners in processes of development of public administration (Konsti-Laakso, 2017). They are the experts in the interaction with the municipalities because of their insight into culture and local affairs (Thapa et al., 2015). They also demand responsiveness from the municipalities to help their lives run efficiently, which forces municipalities to deliver information and service in a timely way (Bertot Jaeger and Hansen, 2012;, 2012; Bernhard, 2014; Medaglia and Zheng, 2016). This expertise and these demands are of great importance for the municipalities in order to build up legitimacy (Gustafsson and Wihlborg, 2013) and to innovate public services (Norström, 2019; Konsti-Laakso, 2017; Lampe et al., 2014). People have always participated and engaged collectively in civic issues and co-produced resources such as time, effort, and expertise, for example through neighborhood watching and as school crossing guards, teaching aides, etc. However, social media scales up this co-production (Linders, 2012) and challenges the municipalities to expand beyond defined boundaries and learn how to create valuable relationships to citizens (Norström and Hattinger, 2016).

In that way, the work with social media in municipalities challenges the role of public administration. New opportunities to inform and communicate put professionals in situations where they have to balance what they believe is a proper action as a public servant with what is possible to achieve with social media, often in relation to citizen participation and legitimacy (Norström, Bernhard and Lundh Snis (2019); Vallo Hult, Islind and Norström, 2018). Only following the business logic of social media platforms and promoting topics and connections that are easily liked and shared in social media, may for example not be in line with the purpose of using social media for increased transparency of municipal activities. The challenge of using social media therefore lies in the tension between social media platform logics, government rationales and the willingness of citizens to participate. Social media platforms, citizens and municipalities are therefore all important actors in the creation of better public service (Norström, 2019).

2.3 Research Hypotheses

First, the quality of living in a municipality depends on access to crucial ingredients in our daily lives: access to workplaces, education, housing, communication, commercial premises, recreation and cultural events and public safety issues. We believe that a precondition for taking advantage of facilities, e.g. leisure activities and cultural events, is that citizens really are aware of and informed about these possibilities. Thus, the overall perceived satisfaction among citizens with the *municipality as a place to live* depends on awareness of access to important elements in daily life. Social media enables the possibility to inform and educate citizens about what it is like to live in the municipality, i.e., increase awareness. Research studies show that the topics most frequently posted by municipalities on their Facebook page are related to leisure activities such as "cultural activities and sports" and "city promotion and tourism" (Bonsón, Royo and Ratkai, 2015; Hofmann et al., 2013). Both these types of topics are also to some extent marketing related, which indicates that local governments first and foremost use Facebook for marketing purposes (Bellström et al., 2016). Previous research indicates that as much as nearly 70% (46/67) of posts from the municipality serve a marketing promoting purpose (Magnusson, Bellström and Thorén, 2012). In all, it is obvious that Facebook could serve the aim to portray the municipality as a good place to live and thereby influence citizen perception of what it is like to live in the municipality regarding several crucial elements in daily life. A conclusion from previous results is that the degree of digitalization in general in a municipality is related to how satisfied citizens are with living in the municipality (Bernhard et al., 2018). Since social media (Facebook) is a part of the overall digitalization with a focus on marketing the municipality as a good place to live, it is reasonable to expect a relationship between

social media and citizen perception. Moreover, as pointed out above, social media enables bottom-up, citizen-initiated "we-government" (Linders, 2012), which means that citizens could contribute understanding of what it is like to live in the municipality, find valued facilities, and also suggest improvements.In other words, our first hypothesis is:

H1: Social media performance is related to how satisfied citizens are with the *municipality as a place to live in*.

Second, the quality of daily living in a municipality is not only dependent on access to important elements, but also on the quality of these elements and services delivered by the municipality, e.g. schools, elderly and social care, emergency services, road maintenance, water and sewage services, environmental work, leisure, sport and cultural premises and communication. The citizens' overall perceived satisfaction with the *municipality's service performance* depends on awareness and perceived quality of these products and services.

In general, we are getting used to convenient online services for shopping, tax declaration, buying tickets, finding information, and nowadays more or less expect services with 24-hour online access. Citizens expect municipalities to be available when needed, which makes accessibility and efficiency an important aspect of social media. Having information flows and conversations constantly open and ongoing by using social media can help governments to be relevant and responsive and shape their tactics to enable efficient interactions with citizens (Mergel, 2013). The municipality could also use social media as an easy access forum for "fostering" citizens regarding specific services, e.g. how to recycle, which may lead to improved functionality and usage. Using a familiar platform such as Facebook decreases the distance between citizens and public servants, as pros and cons with municipal services could be discussed in a convenient well-known forum without "going over" to the government.

Thus, social media have the potential to increase awareness, allow citizens to discuss pros and cons of services, and have the municipality be responsive and act quickly when needed. Therefore, our second hypothesis is:

H2: Social media performance is related to how satisfied citizens are with the *municipality's performance regarding delivered services.*

Third, in order to improve quality and fulfill expectations it is vital that the local government has a close relationship and interaction with its citizens. This includes offering transparent and easily accessible information, making it easy to contact the municipality, giving the possibility to influence, having one's voice heard and building political trust. These factors are related to citizens' perceived satisfaction *with transparency and influence*. Social media is believed to increase transparency, participation and collaboration with the aim to generate trustworthiness and accountability and to enable deliberation and community building (Mergel, 2013). Furthermore, as mentioned above, using a well-known platform decreases the distance between citizens (Linders, 2012). Thus, social media has the potential to increase transparency and support "we-government," and therefore our third hypothesis is:

H3: Social media performance is related to how satisfied citizens are with the *transparency* and the *influence* they have on their local government.

3. Research Design

The methodology is to a large extent similar to the approach used in a previous study (Bernhard et al., 2018) and is a cross-sectional study based on official Swedish statistics regarding Swedish municipalities. The following data sources have been used:

1. Citizen Satisfaction Survey, 2014–16, (SCB, Statistics Sweden, 2016)
2. A study of Facebook use in Swedish municipalities, 2015 (SALAR, The Swedish Association of Local Authorities and Regions, 2017)
3. Survey: "E-services and apps," 2014 (SALAR, 2014)
4. National Survey on Democracy, 2012 (SCB, Statistics Sweden, 2013)

The data from the four official statistics sources given above were pooled into one database. To ensure that the pooling associated the correct data for each municipality, both the official number for each municipality

and the name of the municipality were used when merging all the data. Thus, the final database includes data from all sources above for each municipality.

Our aim was to study the relationship between municipalities' social media performance and citizens' satisfaction with the municipalities' service performance. Since we are using available data sources, our definition of citizen perception of service performance is limited to the measures of satisfaction and the dimensions of the citizen satisfaction survey (data source i), which is described in the next section.

We regard citizen satisfaction as the dependent variable and social media use as one independent variable. Furthermore, a number of variables are considered as potential confounders, e.g. employment rate, income and health, and are taken into account in the analyses.

3.1 Research Setting – Swedish Municipalities

The Swedish multi-level government system is based on national, regional, and local/municipal levels. Local government is the level of government closest to citizens in terms of public services, and together with regions and counties accounts for about 70% of all citizen contacts (SALAR, 2011). There are 290 municipalities in Sweden with strong constitutional autonomy (Montin and Granberg, 2013). This aims to relate democracy and public administration to local distinctiveness and the interests and ideas of citizens. Trust in local government is promoted by being inclusive, open, accessible and anchored in the local culture (Erlingsson and Ödalen, 2013; Montin and Granberg, 2013). In recent years, access to the Internet among Swedish inhabitants has been stable and high, almost 100% for citizens age 16-25 and 98% for citizens age 56–65 in 2018. However, even if the digital divide has been reduced, about 500,000 Swedes do not use the Internet at all (Davidsson, Palm and Melin Mandre, 2018). Most of these are elderly, although other reasons not to use the Internet are lack of interest and complicated technology. The use of social media among citizens continues to grow from already high levels, the largest being Facebook, but varies among the generations and is 84% for those born in the 1970s (Davidsson, Palm and Melin Mandre, 2018). Among the 290 municipalities, 217 (75%) used Facebook in 2015, based on one of the sources described below (iv), making it the most commonly used social media platform by local governments. In Europe, 66% of South European local governments have a Facebook page, 85% of Nordic local governments have a Facebook page, and 90% of Anglo-Saxon (Bonsón, Royo and Ratkai, 2015). Facebook is also the social media platform that the majority of the world population is familiar with (Pew Research Center, 2017).

3.2 Measuring Citizen Satisfaction

A national survey of citizen satisfaction with the municipality is performed twice annually by Statistics Sweden. The number of randomly selected individuals per municipality is usually 600 in smaller municipalities and 1200 in larger municipalities. The survey normally includes around 130 municipalities out of the 290 municipalities in Sweden. Some municipalities participate nearly every year, while other municipalities never participate. We gathered data from all the surveys conducted in 2015, and if a municipality did not participate that year, we included the survey from 2016 as the second choice and 2014 as a third, final choice. Altogether we included 184 municipalities from this survey, 111 from 2015 (60%), 60 from 2016 (33%) and 13 (7%) from 2014. The survey is comprehensive and includes a large number of questions. The complete survey and the underlying model is based on research developed by the marketing authority Claes Fornell, who developed the Swedish Customer Satisfaction Index (Fornell, 1992) and the widely used American Customer Satisfaction Index (Fornell et al., 1996). This model is inspired to a large extent by general theory for quality measurement and includes measures of citizens' perception of fulfilled expectations as described in 3.1.1.

The well-established model adopted by Statistics Sweden (SCB, 2017) for measuring perceived satisfaction with local government service performance consists of three different dimensions which matches the hypotheses presented above and is presented in detail below. This model has been used in previous research studying satisfaction with local government (Bernhard et al., 2018).

3.2.1 Satisfaction with Living in the Municipality

For studying this dimension the respondents were first asked to respond to a number of rather specific questions regarding access to a workplace at a reasonable distance, access to education, access to housing, communications, variety of restaurants, cafes and shops, possibilities of leisure activities and public safety. After responding to these detailed questions, the respondent is asked to give an overall opinion of satisfaction with

living in this municipality by raising the following three more general questions (each response on a scale from 1–10):

1. Overall how satisfied are you with living in this municipality?
2. How well have your expectations about living in this municipality been fulfilled?
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality is?

Thereafter the average score of these three questions is calculated. Finally, this average is transformed into an index on a scale from 0–100, according to the following:

Score	1	2	3	4	5	6	7	8	9	10
Index	0	11.1	22.2	33.3	44.4	55.6	66.7	77.8	88.9	100

For instance, scores of 4, 5 and 6 would give an average of 5 and thus an index equal to 44.4. This index will henceforth be referred to as the Satisfaction with Living Index (SL).

3.2.2 Satisfaction with Performance of Government Services

This dimension starts with a number of detailed questions concerning the quality of delivered services ("judge how well this service functions on a scale from 1 to 10"), e.g. preschool, elementary school, upper secondary school, elderly care, social service for persons with extra needs, emergency service, maintenance of roads and walking/cycling paths, sport establishments (arenas, etc.), cultural establishments (library, theater, etc.), efforts for supporting environmentally sound behavior, refuse collection, water and sewage. After responding to these rather detailed questions, the following three more general questions are addressed:

1. Overall, how satisfied are you with the performance of government services?
2. How well have your expectations about performance been fulfilled?
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality performs?

These three general questions are then used for constructing an index. This index will hereafter be referred to as: Satisfaction with Performance Index (SP) and is calculated in exactly the same manner as SL.

3.2.3 Satisfaction with Transparency and Influence

This dimension starts with a number of detailed question concerning, e.g., how easy it is to contact civil servants, managers or politicians, and their personal treatment, access to and clarity of information, possibility to make your voice heard and trust. These detailed questions are followed by the following more general questions (each response on a scale from 1–10):

1. Overall, how satisfied are you with the transparency and influence you have as a citizen in this municipality?
2. How well are your expectations about transparency and influence fulfilled?
3. Imagine the ideal municipality. How close to such an ideal do you think your municipality is regarding these attributes?

These three general questions are then used to construct an index which will be referred to below as Satisfaction with Transparency and Influence Index (STI). It is calculated in exactly the same manner as SL and SP.

3.3 Measuring Social Media Performance

Our primary variable for measuring Facebook performance is a *Facebook Performance Index (FBP)* developed by Smampion (smampion.se), a company hired by SALAR to study Facebook performance in Swedish municipalities (data source ii). The index was developed through an algorithm that considered the size of the page and was based on the basic Facebook page key performance indicators "followers," "page growth," "number of posts per day," "posts by others to the page per day" and "response rate and response time," as well as the following sub-indices: "engagement level," "dialogues" and "spread," described below.

Engagement level measures the average engagement relative to other Facebook pages, in percentage in relation to the size of the page, i.e., number of followers. This metric was based on the former Facebook value "People talking about this." It shows the number of interactions a page has had with unique Facebook users per week. An interaction with a page was when the user: liked a page; wrote a post on the page wall; liked a post; commented on a post; shared a post (including all further likes, shares and comments on the shared post); replied to a question; replied to a page event; mentioned the page in a post; tagged the page in a photo;

checked in on the page; wrote a recommendation; or took part in a page like or offering. This measures the average engagement relative to other Facebook pages, in percentage in relation to the size of the page. "Dialogues" measures the percentage of possible dialogues the page took part in. A possible dialogue starts when a post is commented on by a user. If the page replies to the comment the page is considered as taking part in the possible dialogue. Spread or "virality" is a value between 0–100 based on the average spread of posts during one year. It measures number of interactions such as likes, comments and shares. Since a page with many followers gets a higher level of spread than a page with few followers, the size of the page is considered in the final score.

3.4 Measuring the Degree of Digitalization

In a previous research project, we studied the potential relationship between degree of digitalization (DoD) and citizen satisfaction. In that study we developed an index for measuring DoD (details in Bernhard et al., 2018). This index was based on the data sources iii-iv presented above. The information in data source iii was dominant, but some data was also used from data source iv. By using these sources four different sub-indices were created. The first one ("E-strategy") included questions like: "Does the municipality have a formal strategy for digitalization?"; "A responsible manager?"; "Is it highly prioritized?" The second index ("E-services") was mainly based on the number of e-services on the web and mobile apps. The third index ("E-information/transparency") focuses on one-way communication of important information, meeting notes and broadcasting meetings. The last index ("E-interaction") included questions regarding two-way communication, e.g. "Is there a discussion forum on the web?" All these four sub-indices were transformed to statistical standard points (mean 0 and standard deviation 1) and the overall index DoD was calculated by taking the mean of these four sub-indices, giving equal weight to the four different perspectives (strategy, services, one-way communication and two-way communication). In this study, we recalculated the DoD index but excluded the sub-index "E-interaction." Since FB is the dominant social media tool for two-way interaction we believe that the e-interaction index used previously measures the same phenomena but with lower precision than the more specific and comprehensive FBP index. Using both indices would give a risk of multicollinearity and we argue that FB performance has higher validity for measuring interaction via social media. Thus, our revised index DoD measures the general degree of digitalization (strategy, e-services and one-way information), while FBP measures the performance in social media.

3.5 Statistical Methods - Analytical Considerations

As an exploration of whether the sample of municipalities could be considered representative or not, we analyzed response rate (achieved by the organizations making the surveys) in municipalities with different regional characteristics. To do this we used a classification of municipalities suggested by the Swedish Agency for Economic and Regional Growth Analysis (2014). The classification into different groups of municipalities is based on a typology used by Eurostat and the OECD and can therefore enable international comparisons. The basic classification contains three types of municipalities: rural, intermediate and urban. This division into three municipal categories correlates to a large extent with regional characteristics such as income, unemployment and education level, income distribution, median income and tax rate. The main variables (satisfaction indices and FBP) are summarized with mean and median as measures of location, by type of municipality.

Naturally, citizen satisfaction with a municipality is potentially affected by a number of other variables, such as population density, proportion of immigrants, proportion in employment, educational level, median income, Gini coefficient (distribution of income, values between 0 and 100, where 0 = totally equal distribution and 100 = totally unequal distribution), and sickness rate (the total amount of days with sick pay divided by the population aged 16–64). As a measure of education level we use the proportion of people with at least post-secondary education (three years or more). We also added tax rate for each municipality, since we believe that satisfaction may be related to the perceived value for the taxes being paid. All these variables were found in national data repositories for 2015 and were included in our database. As pointed out above, these variables are also closely related to the three categories of municipalities. Several of these variables may also be related to FBP. For instance, a wealthy municipality may have more money for e-investments and at the same time wealthy municipalities are likely to have more satisfied citizens than less wealthy municipalities.

Consequently, due to the confounding factor situation described above, we calculated partial correlation coefficients as a measure for the relationship between FBP and satisfaction, holding the other variables constant (Freund, Wilson and Mohr, 2010). We present standard Pearson correlation coefficient (r) and partial correlation coefficient (partial) in adjacent columns, allowing comparison of correlation both with and without ad-

justment, treating the partial correlations as the primary outcome. Correlations around 0.1 are considered as small, 0.3 as medium and 0.5 as large (Cohen, 2013). Due to the fact that the distribution of the type of municipality differed somewhat from the national distribution, i.e., intermediate municipalities were over-represented and rural municipalities were under-represented, we also explored potential interaction effects between type of municipality and FBP and the relation to satisfaction. However, none of these interactions was significant, supporting that the estimated correlations would be the same even with a perfectly representative sample. Generally, 5% was used as significance level.

4. Results

4.1 Primary Variables – Descriptive Statistics

As seen in Table 1, the distribution of participating municipalities for each individual study does not differ significantly from the overall distribution in Sweden. There was however a significant difference in distribution considering the municipalities that are included in all studies (p=0.001). Rural municipalities are underrepresented (representing 44.8% of all municipalities in Sweden but 33.3% of all municipalities included in this study), while intermediate and urban municipalities are overrepresented.

Table 1: Distribution of municipalities in the different studies [1]

	Rural (n=130)	Intermediate (n=131)	Urban (n=29)	p-value
Respondents Facebook study (n=217)	40.1%	47.9%	12.0%	>0.20
Respondents Satisfaction (n=228)	38.6%	50.0%	11.4%	0.168
Respondents Digitalization (n=271)	43.2%	46.5%	10.3%	>0.20
All studies (n=177)	33.3%	53.7%	13.0%	0.001
Total (n=290)	44.8%	45.2%	10.0%	

Table 2: Basic descriptive statistics for the primary variables by municipality category

Primary variables		Rural (n=58)	Interm. (n=93)	Urban (n=23)	Total (n=174)	p-value
Satisfaction Living (SL)	Mean/Median	57.2/57.5	60.5/60.0	63.7/64.0	59.8/60.0	<0.001
Satisfaction Performance (SP)	Mean/Median	51.5/53.0	55.5/56.0	58.0/58.0	54.5/55.0	<0.001
Satisfaction Transparency/Influence (STI)	Mean/Median	39.1/39.5	40.2/40.0	42.3/40.0	40.1/40.0	0.054
Degree of digitalization (DoD)	Mean/Median	-0.28/-0.18	0.30/0.32	0.60/0.49	0.15/0.14	<0.001
Facebook performance (FBP)	Mean/Median	65.3/68.2	73.3/75.7	72.4/75.3	70.5/74.0	<0.001

As seen in Table 2, there was a significant difference in mean values between the different municipality types. The overall tendency is that mean values are higher in intermediate and urban municipalities compared to rural ones. Satisfaction was highest for Living, second highest for Performance and lowest for Transparency/Influence.

4.2 Main Analyses: Correlations between Facebook Performance and Satisfaction

In this section the results for each hypothesis will be presented consecutively. The correlations regarding the first hypothesis: "Social media performance is related to how satisfied citizens are with *the municipality as a place to live in*" are presented in Table 3 below.

[1] P-values based on ANOVA

Table 3: Correlations for Satisfaction with Living (SL).

Variable	r	Partial
Inhabitants/km^2	0.29**	0.04
Proportion immigrants	-0.22***	-0.45***
Education level	0.65***	0.27***
Proportion employed	0.39**	-0.07
Median income	0.57**	0.07
Gini coefficient	0.37*	0.03
Sickness rate	-0.58*	-0.10
Tax rate	-0.48**	-0.19*
Degree of digitalization (DoD)	0.36**	0.18*
Facebook performance (FBP)	0.32**	0.21**

*** Significant at the 0.001 level, ** Significant at the 0.01 level, * Significant at the 0.05 level

The partial correlations between FB performance and satisfaction (dimension: living), as well as between DoD and satisfaction (living), were of the same magnitude. These correlations were moderate in size, but approximately of the same magnitude (small to medium correlation) as other important factors like tax rate and educational level.

The correlations regarding the second hypothesis: "Social media performance is related to how satisfied citizens are with the *municipality's service performance* regarding delivered services" are given in Table 4 below.

Table 4: Correlations for Satisfaction with Service Performance (SP)

Independent variable	r	Partial
Inhabitants/km2	0.23**	-0.07
Proportion immigrants	0.01	-0.12
Education level	0.51**	0.19*
Proportion employed	0.20**	-0.15
Median income	0.43**	0.14
Gini coefficient	0.28**	-0.04
Sickness rate	-0.44**	0.02
Tax rate	-0.437**	-0.198*
DoD	0.36*	0.17*
FB performance	0.32*	0.17*

*** Significant at the 0.001 level, ** Significant at the 0.01 level, * Significant at the 0.05 level

The partial correlations between FB performance and satisfaction (dimension: service performance), as well as between DoD and satisfaction (service performance), were of the same size. These correlations were small to medium, and of the same magnitude as the correlations for other important factors like tax rate and educational level.

The correlations regarding the third hypothesis: "Social media performance is related to how satisfied citizens are with the *transparency* and the *influence* they have on their local government" are given in Table 5 below.

Table 5: Correlations for Satisfaction with Transparency and Influence (STI)

Independent variable	r	Partial
Inhabitants/km^2	0,17*	-0,00
Proportion immigrants	-0,06	-0,18*
Education level	0,35*	0,04
Proportion employed	0,09	-0,22**
Median income	0,35**	0,18*
Gini coefficient	0,27**	0,03
Sickness rate	-0,34**	-0,03
Tax rate	-0,34**	-0,14
DoD	0,17*	0,06
FB performance	0,13	0,04

*** Significant at the 0.001 level, ** Significant at the 0.01 level, * Significant at the 0.05 level

The correlation between FB performance and satisfaction (transparency and influence) was not significant ($p>0.20$).

5. Discussion and Suggestions for Further Research

Two of the hypotheses were confirmed. There were significant relationships between municipalities' Facebook performance and citizen satisfaction with the municipality as a place to live in and satisfaction with delivered services. These findings are in line with previous research and our expectations in this study. The public servants frequently use Facebook for promoting good values with living in the municipality and creating awareness. It is important to bear in mind that the survey used measures the perceived satisfaction and not explicitly if the quality of living is changed in practice. Using FB as a marketing channel may increase the awareness of the good things about living in the municipality without changing how the citizens live their lives. But increased awareness could also have a direct effect on e.g. usage of sport facilities, leisure activities and cultural events, and in that sense change citizens' lives. From a public health perspective it would be interesting to perform classical marketing research where the effect of using FB for promotion is related to increase in usage of facilities, ticket sales for events in comparison to other advertising channels, regarding efficiency and target population. Another important issue to be addressed in forthcoming research is whether there might be negative effects from a constantly positive and polished image of the municipality, i.e., if this may influence trust or other factors.

Regarding the second hypothesis, concerning services, citizens often comment on services that are not functioning well. In such cases, the municipality has the opportunity to be responsive and create goodwill by acting quickly and solving problems, while on the other hand non-response could generate bad will (Bonsón, Royo and Ratkai, 2015). Problems commented on Facebook are possible top read for all Facebook members which makes problem solving and fast action much more vital than a problem communicated via e-mail or phone. The magnitude of the relationships between Facebook performance and satisfaction with the municipality as a place to live in and its services are modest, i.e., correlations around 0.2, but interestingly, these relationships are of the same magnitude as tax rate and educational level, which are considered important factors.

When it comes to transparency and influence, the third hypothesis, there was no correlation with municipality Facebook performance. This observation is also in line with recent research where we see that discussions on public government platforms are often polarized and deliberation traits are lacking among the participants in the interaction (Medaglia and Zhu, 2017). Since we do not see the same lack of interaction in private domain platforms, it is worth speculating that the government context may be shaping and limiting the interaction. Previous research shows difficulties in professionals' work practice related to tensions between what is possible to do with social media and what is proper professional behavior for a public servant (Bergquist et al., 2017). The uncertainty about what is proper action may hinder the professionals from fully following the logic of the platforms (Norström, 2019). Furthermore, several municipalities offer other forums, e.g. online forums for citizen dialogue, especially aiming at deeper political and development discussions. This may perhaps be another explanation for why there was no significant relationship between Facebook performance and transparency and influence. As Linders claims, there is a transformation going on towards a government where citizens and government co-create resources (Linders, 2012) and where responsibility to engage and provide input for the development of municipal services is partly distributed from the municipality to citizens and other stakeholders (Konsti-Laakso, 2017). This transformation demands new competences both by municipal civic servants and by citizens (Norström et al., 2019; Norström, 2019). The changing role of civil servants and citizens when social media is used in the municipality may be an important issue to address in forthcoming research. The lack of significance may also be explained by the fact that transparency and influence are more abstract variables and more difficult to model.

Since the study only includes municipalities in Sweden, the internal validity is restricted to this population, which is a limitation of this study. Furthermore, we decided to aggregate data from three years in order to increase sample size. An alternative would be to study the progression over three years, i.e. a longitudinal analysis, but the number of municipalities with data from all time points was judged to be too low for this approach. One could speculate that several of the studied elements (access to workplaces, education and housing) are universally important elements for quality of life. Furthermore, social media could be used for marketing and co-production in other countries. However, since there is a lack of similar quantitative studies in other countries, it is simply not possible to give a valid generalization of the results from this study to other countries.

It is worth pointing out that this study uses data on an aggregated level, i.e., with municipalities as objects. This means that the data represents the average situation in each municipality. Naturally, there could be variations within a municipality due to variation in socio-demographic variables. An important aspect is how digitalization could be used to increase equality and reach its full potential in vulnerable socio-demographic areas within a municipality. One important strength of the study is that digitalization is related to citizens' satisfaction with municipalities, a variable known to be related to quality of life, which is perhaps the most important endpoint, even though frequently neglected, when evaluating effects of digitalization (Fischer, 2018). Another strength is the amount of data, including the vast majority of Swedish municipalities, pooling several important and reliable official data sources.

6. Conclusions - Implications

In conclusion, one important implication of the study is that citizen perceptions regarding whether a municipality is a good place to live in or not is related to the use of social media for promoting the municipality. Furthermore, a relation between satisfaction and citizen perception of government service performance implies that social media could be valuable for interaction and co-creation. Finally, an implication is that usage of social media and the potential relationship to trust, influence and transparency must be further elaborated and studied. Overall, our recommendation is that municipalities and their citizens may benefit from well thought-out strategies of how to use social media for marketing, interaction and co-creating.

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