Social Media Teams of Hospitals as Mediators in Digital Health Ecosystems

In this paper, we elaborate relevant theoretical and empirical foundations from the literature and prepare a conceptual framework on how social media teams of hospitals can act as mediators of various parties in their surrounding digital health ecosystem. The paper is on research in progress from the initial phase of a project on strategic use of social media in hospitals started in April 2018. Its regional focus is on Austria, Germany and Switzerland, where we conduct empirical studies on the research questions. We focus mainly on social media channels hospitals operate themselves, and conducted already several workshops with social media teams of hospitals to get detailed insights on relevant strategies, processes and structures applied in practice.

Status quo is that most hospitals use their official social media channels mainly as a general marketing and public relations tool (e.g. Kordzadeh and Young 2015; Wong et al. 2016). Like many other organizations (except brand marketing), hospitals still show significant challenges to apply social media in a strategic manner to pursue concrete purposes for their organization or the surrounding digital health ecosystem (Beier and Wagner 2016). However, we see significant potential for a more active role of hospitals' social media teams as mediators between different parties and domains in digital health ecosystems. Therefore, we focus in our research project on the following questions:

- What is the status quo in strategic social media applications of hospitals?
- How are formal structures and processes of social media application designed in hospitals? What informal structures and processes complement these?
- What are potentials and challenges of social media teams in hospitals to mediate between various parties inside and outside the hospital?

Digital Health Ecosystems

A **Digital ecosystem** is "… an open, loosely coupled, domain clustered, demand-driven, self-organizing agents' environment, where each specie is proactive and responsive for its own benefit or profit." (Chang and West 2006, p. 6). With their characteristics of openness, self-organization and distributed swarms of autonomous agents, digital ecosystems obtain several similarities to Collaborative Innovation Networks (COINs). However, there also are significant differences: COINs are defined as "virtual communities interacting on a global scale … made up of self motivated people who share a common vision, meeting on the web to exchange ideas, knowledge, experiences and to work in a collaborative way to achieve a common goal" (Demaggio et al. 2009, 6). Although, digital ecosystems are open and

self-organized communities, which are mediated and complemented by digital applications, they do not have to be coordinated by a shared vision or a common goal (Dong et al. 2011). In fact, they are much more diverse in the purposes different parties pursue. Whereas in COINs the focal purpose is to collaborate on a new idea or an innovation (Gloor et al. 2003), all agents in digital ecosystems are free to pursue their individual objectives including strategic positioning or sheer profit maximization (Chang and West 2006).

In recent years, concepts of digital ecosystems have been applied increasingly to the health sector (Dong et al. 2011). **Digital Health Ecosystems** have some specific characteristics enhancing the general concepts. First, in many fields of the health sector digital health ecosystems have a strong focus on IT-systems (hard- and software) and their interoperability. Topics like electronic health records and integrated healthcare information systems shifted the focus mainly on health and medical informatics as well as IT-architectures (Serbanati et al. 2011). This is especially true for hospitals with their high investments in information technology and their multitudes of running applications (Mettler and Pinto 2018). In contrast, more fundamental perspectives of social networks, societal ecosystems and variety of domain cultures have received far less attention (Beier and Semrau 2008). Second, the health sector is specific in its very high requirements on security and privacy. Compliance officers as well as most members of organizations in the health sector pay particular attention to privacy and data security laws and regulations (Warkentin et al. 2011). Therefore, a special focus in digital health ecosystems lies on the security of data and information exchange in its networks (Iyawa et al. 2016). Correspondingly, in digital health ecosystems the openness of communication and interaction as known from collaborative networks as well as from digital ecosystems in general is considerably limited in many ways. Third, several regional aspects influence and structure digital health ecosystems. For instance, national or multinational institutions design the general health system and its regulations (Thomson et al. 2015). Furthermore, participation, interaction and information behavior of agents in digital health ecosystems are influenced by national and regional culture, for instance in the context of health literacy (Batterham et al. 2016). In addition, many medical services and institutions have a regional focus in their service provision. In this regard, hospitals obtain a central role in their respective digital health ecosystems (Serbanati et al. 2011).

Against this background, we understand digital health ecosystems as loosely coupled conglomerates of various domain clusters, in which some of them act as COINs working collectively on a new idea or pursuing to generate radically new innovation (Gloor et al. 2003), whereas other domain clusters and agents follow different objectives or individual purposes in their activities. Within these digital health ecosystems, hospitals are connected to many stakeholders of various parties on a regular but highly formalized basis.

Social Media in Hospitals

Social media represent all types of mobile and web-based applications that allow individuals and communities to create, share and modify user-generated content through highly interactive platforms (Kaplan and Haenlein 2010). Such informal platforms provide all participants features, to generate profiles, upload content and files as well as to see, read and comment the content of others (Beier and Wagner 2016). Social media started with high expectations on potential enhancements in health communication. However, until now several limitations of social media applications (e.g. quality concerns, information overload, assumed inappropriateness) limit an extensive realization of concrete benefits in the health sector (Moorhead et al. 2013). Against this background, social media teams of hospitals seem a valuable communicator in digital ecosystems. Hospitals are well-established institutions within digital health ecosystems and interact with many parties in the field on a regular basis. However, until know many hospitals use their official social media channels mainly for general marketing or public relations (e.g. Kordzadeh and Young 2015; Wong et al. 2016). Like many other organizations (except applications in brand marketing), hospitals still have considerable difficulties to apply social media in a strategic manner to pursue concrete purposes for their organization or the surrounding digital health ecosystem (Beier and Wagner 2016).

Research on applications of social media by hospitals, so far, remains at a rather superficial level (Moorhead et al. 2013). Mainly applying the open accessible data of hospitals' official social media channels, many studies focus on simple adoption and engagement metrics as well as hospital characteristics influencing these (e.g. Griffis et al. 2014; Martinez-Millana et al. 2017; Richter et al. 2014). Only few studies apply qualitative and mixed methods to analyze how hospitals use their social media channels in detail. For instance, one study observes that US children's hospitals post 35% general health information and 35% commercials for their services in their social media channels (Wong et al. 2016). A qualitative analysis of hospitals' social media posts finds that hospitals only purely follow their own content strategies and that they mainly post superficial trivia and commercials for their own services (Kordzadeh and Young 2015). Social media recruitment and employer branding of hospitals is one of few concrete application purposes, researchers already investigated more extensively (e.g. Carpentier et al. 2017).

Overall, much more studies analyze risks of hospitals' social media applications than studies investigate potentials and difficulties of their strategic use (Richter et al. 2014). On the one hand, this could be due to the high requirements and regulations on security and privacy in digital health ecosystems. On the other hand, hospitals may lack strategies to generate benefits out of their official social media applications. Without a clear understanding and a certain expectancy of such benefits, hospitals are not motivated to apply their official social media channels seriously as means of substantial stakeholder interaction or service provision (Bermúdez-Tamayo et al. 2013). In contrast, they often participate rather symbolically as they assume social media presence as signal of their innovativeness for the broad public.

Social Media Teams as Mediators in Digital Health Ecosystems

In this section, we briefly outline how hospitals could upgrade their social media applications to strategic tools within the complex networks of the surrounding digital health ecosystem. This enhancement will support hospitals to pursue economic objectives (e.g. service quality, cost reduction, market shares, revenues, specialization) as well as to better fulfill their general service mandate in the healthcare system. To be able to realize such ambitious applications a hospital's social media team should obtain a boundary spanning network position combining adequate relationships and interactions with internal stakeholders in the focal hospital as well as bidirectional social media communication with external stakeholders outside the hospital (see figure 1).
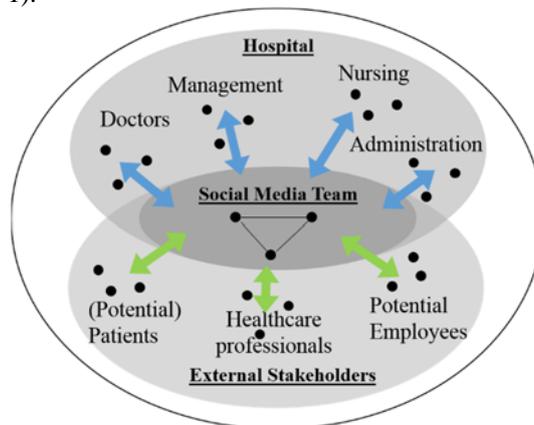

Fig. 1. . Boundary Spanning Network Structure of Social Media Teams

As described above, current research provides first fundamentals on social media communication of hospitals with various groups of external stakeholders (e.g. (potential) patients, healthcare professionals and potential employees). However, most empirical findings show that hospitals mainly communicate only unidirectional with these groups (Vanzetta et al. 2014). Cases on how hospitals could use feedback from social media channels are already known from network analyses in medical research (e.g. Gloor et al. 2016). Such analyses can also provide useful insights relevant for other internal stakeholders in hospitals. However, such measures are mainly implemented only by specific units within hospitals (often for scientific research), but are not organized and integrated on the level of the whole organization.

We see the key for hospitals to implement their social media teams as mediators in the surrounding digital health ecosystem in the realization of adequate internal processes and structures supporting and complementing external interactions. Organizational network development theory shows that agents' successful boundary spanning activities to establish and maintain external relationships necessitate sufficient internal relations and support processes within an organization (Semrau and Beier 2016). In a concrete manner, we already observed this in one hospital in our

workshops where the social media team is well connected to a diverse set of internal stakeholders in the hospital (especially administration, doctors, management, and nursing). Only this internal relationship network allows the team to react in a proper and timely manner on external requests via their social media channels. However, research on internal structures and processes to support external social media communication is still in its infancy.

Conclusion and Outlook

This paper gives a compact overview of our conceptual framework how social media teams of hospitals can act as mediators of various parties in their surrounding digital health ecosystem. In our ongoing empirical research, we particularly focus on the interplay between internal relations (connecting social media teams of hospitals with relevant intra-organizational stakeholders) and their bi-directional interactions with external stakeholders. We hope that a better understanding of internal and external networks of relationships and interactions will help to enhance the benefits of hospitals' social media activities. In addition, we see such social media practices as a promising opportunity to complement highly formalized information interchange in digital health ecosystems by more social, open and informal communication between various stakeholders.

References

Batterham, R. W., Hawkins, M., Collins, P. A., Buchbinder, R., & Osborne, R. H. (2016). Health Literacy: Applying Current Concepts to Improve Health Services and Reduce Health Inequalities. In *Public Health*, 132, 3-12.

Beier, M., & Semrau, T. (2008). Collaborative Networks. A Beneficial Perspective on Health Care in Developing Countries. In P. A. Cholewka, & M. M. Motlagh (Eds.), *Health Capital and Sustainable Socioeconomic Development*, (pp. 33-48). Boca Raton: Taylor Francis Group.

Beier, M., & Wagner, K. (2016). Social Media Adoption: Barriers to the Strategic Use of Social Media in SMEs. In *Proceedings of the 24th European Conference on Information Systems (ECIS), Istanbul, Turkey.*

Bermúdez-Tamayo, C., Alba-Ruiz, R., Jiménez-Pernett, J., García Gutiérrez, J. F., Traver-Salcedo, V., & Yubraham-Sánchez, D. (2013). Use of Social Media by Spanish Hospitals: Perceptions, Difficulties, and Success Factors. In *Telemedicine and e-Health*, 19(2), 137-145.

Carpentier, M., Van Hoye, G., Stockman, S., Schollaert, E., Van Theemsche, B., & Jacobs, G. (2017). Recruiting Nurses through Social Media: Effects on Employer Brand and Attractiveness. In *Journal of Advanced Nursing*, 10.1111/jan.13336.

Chang E., & West M. (2006). Digital Ecosystems A Next Generation of the Collaborative Environment. In *Proceedings of the Eighth International Conference on Information Integration and Web-based Applications (WAS), Yogyakarta*, 3-23.

De Maggio, M., Gloor, P. A., & Passiante, G. (2009). Collaborative Innovation Networks, Virtual Communities and Geographical Clustering. In *International Journal of Innovation and Regional Development*, 1(4), 387-404.

6

Dong, H., Hussain, F. K., & Chang, E. (2011). A Framework for Discovering and Classifying Ubiquitous Services in Digital Health Ecosystems. In *Journal of Computer and System Sciences,* 77(4), 687-704.

Ems, L., & Gonzales, A.L. (2016). Subculture-Centered Public Health Communication: A Social Media Strategy. In *New Media & Society*, 18(8), 1750-1767.

Gloor, P. A. (2006). Swarm Creativity: Competitive Advantage through Collaborative Innovation Networks. New York: Oxford University Press.

Gloor, P. A., Laubacher, R., Dynes, S. B., & Zhao, Y. (2003). Visualization of Communication Patterns in Collaborative Innovation Networks-Analysis of some W3C Working Groups. In *Proceedings of the Twelfth International Conference on Information and Knowledge Management (CIKM)*, New Orleans, 56-60.

Gloor, P. A., Maddali, H. T., & Margolis, P. A. (2016). Comparing Online Community Structure of Patients of Chronic Diseases. In *International Journal of Organisational Design and Engineering*, 4(1-2), 113-136.

Griffis, H.M., Kilaru, A.S., Werner, R.M., Asch, D.A., Hershey, J.C., Hill, S., Ha, Y.P., Sellers, A., Mahoney, K., & Merchant, R.M. (2014). Use of Social Media across US Hospitals: Descriptive Analysis of Adoption and Utilization. In *Journal of Medical Internet Research*, 16(11).

Iyawa, G. E., Herselman, M., & Botha, A. (2016). Digital Health Innovation Ecosystems: From Systematic Literature Review to Conceptual Framework. Procedia Computer Science, 100, 244-252.

Kaplan, A. M., & Haenlein, M. (2010). Users of the World, Unite! The Challenges and Opportunities of Social Media. In *Business Horizons*, 53(1), 59-63.

Kordzadeh, N., & Young, D. (2015). Understanding how Hospitals Use Social Media: An Exploratory Study of Facebook Posts. In *Proceedings of the 21st Americas Conference on Information Systems (AMCIS), Puerto Rico*.

Martinez-Millana, A., Fernandez-Llatas, C., Bilbao, I. B., Salcedo, M. T., & Salcedo, V. T. (2017). Evaluating the Social Media Performance of Hospitals in Spain: A Longitudinal and Comparative Study. In *Journal of Medical Internet Research*, 19(5), e181.

Mettler, T., & Pinto, R. (2018). Evolutionary Paths and Influencing Factors towards Digital Maturity: An Analysis of the Status Quo in Swiss Hospitals. In Technological Forecasting and Social Change. Forthcoming.

Moorhead, S. A., Hazlett, D. E., Harrison, L., Carroll, J. K., Irwin, A., & Hoving, C. (2013). A New Dimension of Health Care: Systematic Review of the Uses, Benefits, and Limitations of Social Media for Health Communication. In *Journal of Medical Internet Research*, 15(4).

Richter, J.P., Muhlestein, D.B., & Wilks, C.E. (2014). Social Media: How Hospitals Use it, and Opportunities for Future Use. In *Journal of Healthcare Management*, 59(6): 447-461.

Semrau, T., & Beier, M. (2015). How Specialised and Integrated Relationship Management Responsibilities Foster New Ventures' Network Development. In *International Journal of Entrepreneurial Venturing*, 7(1), 47-64.

Serbanati, L. D., Ricci, F. L., Mercurio, G., & Vasilateanu, A. (2011). Steps towards a Digital Health Ecosystem. In *Journal of Biomedical Informatics*, 44(4), 621-636.

Thomson, S., Figueras, J., Evetovits, T., Jowett, M., Mladovsky, P., Maresso, A., Maresso, A., Cylus, J., Karanikolos, M., & Kluge, H. (2015). *Economic Crisis, Health Systems and Health in Europe: Impact and Implications for Policy.* Copenhagen, Denmark: World Health Organization, Regional Office for Europe.

Vanzetta, M., Vellone, E., Dal Molin, A., Rocco, G., De Marinis, M. G., & Rosaria, A. (2014). Communication with the Public in the Health-Care System: A Descriptive Study of the Use of Social Media in Local Health Authorities and Public Hospitals in Italy. In *Annali dell'Istituto Superiore di Sanità*, 50(2), 163-170.

Warkentin, M., Johnston, A. C., & Shropshire, J. (2011). The Influence of the Informal Social Learning Environment on Information Privacy Policy Compliance Efficacy and Intention. In *European Journal of Information Systems*, 20(3), 267-284.