

Promoting Hospitals' Reputation through Social Media and Artificial Intelligence

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Abstract

Cancer hospitals resort to social media platforms to make their corporate communication initiatives more dynamic and this way better satisfy their stakeholders' needs in terms of medical information and emotional support. Nevertheless, these organizations also face different barriers such as new patients' medical demands, legal issues, privacy or the difficulty to disseminate scientific content. To overcome these barriers, more and more hospitals integrate social media platforms and artificial intelligence-based tools into different medical protocols, and this way they proposed to patients a unique medical service, which positively impacts on patients' satisfaction and the hospital's corporate reputation. This literature review paper aims to analyze how artificial intelligence and social media platforms used in an integrated way help cancer hospitals to implement more efficient corporate communication initiatives in order to build a more reputed brand. To do that, we conducted a literature review about cancer hospitals' corporate communication strategies, social media platforms and artificial intelligence in cancer hospitals; and then, we proposed ten managerial implications for helping cancer hospitals use both insights (social media and artificial intelligence tools) for building a reputed brand.

Key words

Cancer Hospitals; Corporate Communication; Artificial Intelligence; Social Media; Reputation.

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1. Introduction

Cancer hospitals face different challenges related to patients' treatments, medical research, business models, and communication strategies. Most of them have implemented a Corporate Communication Department that is in charge of different activities such as publishing websites and magazines, organizing internal events or implementing advertising campaigns. On the other hand, during these last years, most cancer hospitals have integrated social media platforms for communication purposes (health education, online consultations), as well as some artificial intelligence-oriented initiatives to improve patients' care. Nevertheless, both activities are implemented in a nonintegrated way and focus especially on medical aspects. This literature review paper aims to analyze how cancer hospitals' Corporate Communication Department could use artificial intelligence and social media platforms in an integrated way to improve the company's brand reputation. To do that, we conducted a literature review about corporate communication strategies used by cancer hospitals, the role of social media on those strategies, and the impact of artificial intelligence on cancer hospital's services; and then, we proposed ten managerial implications that cancer hospitals could implement to improve their reputation thanks to social media and artificial intelligence-oriented initiatives.

2. Cancer Hospitals' Corporate Communication Strategies

Cancer hospitals deal with patients suffering from physical diseases and psychological stress, which makes it more difficult for them to efficiently communicate with doctors (Moore, Rivera, Bravo-Soto, Olivares & Lawrie, 2018). These relations before, during and after their consultations at the hospital determine cancer patients' perceptions about doctors and hospitals (Beesley, Goodfellow, Hocombe & Salmon, 2016). That is why, most cancer hospitals implement collective decision-making processes to improve relations with patients (Peterson et al., 2016; Salmon & Bridget, 2017). Thanks to this initiative, health professionals interact with cancer patients in a more efficient way, which positively influences on patients' medical outcomes (Brand, Fasciano & Mack, 2017).

Nevertheless, these professionals need to reinforce their emotional and social skills in order to better communicate with cancer patients, and this way help them from a medical and emotional point of view (Salmon & Bridget, 2017). Their skills in interpersonal communication allow also doctors to adapt their behaviour to different kind of patients, such as elderly people, children or violent patients (Moore et al., 2018). Doctors and cancer patients focus their communication relations on six main topics: managing uncertainty, responding to emotions, making decisions,

fostering healing relationships, enabling self-management and exchanging information (Blanch-Hartigan et al., 2016). These communication relations are essential to reinforce the mutual trust between patients and doctors, but also to build the hospital's brand in a collective and credible way (Falisi et al., 2017).

Besides interpersonal communication initiatives, cancer hospitals also implement internal and external communication activities to interact with internal and external stakeholders, such as employees, public authorities or media companies (Medina Aguerrebere, Gonzalez Pacanowski & Medina, 2020). In hospitals, internal communication initiatives determine many different aspects, such as the internal functioning, employees' performance or doctors-patients' relations (Rodrigues, Azevedo & Calvo, 2016; Pelitti, 2016). Thanks to internal communication, hospitals implement customer relationship management programs that allow them to enhance added value services proposed to patients (Medina Aguerrebere, 2018), reinforce employees' skills to adapt to change situations and this way achieve all organizational goals (Rodrigues et al., 2016), and promote a corporate culture allowing employees to work in unique way and build a credible brand (Helfert, Lugmayr, Heimgärtner & Holzinger, 2013).

With respect to external communication initiatives, hospitals resort to them to influence external stakeholders' perceptions, attitudes and expectations (Becerra, Reina & Victoria, 2015). When cancer hospitals design their external communication strategy, they consider five main aspects : a) consistency, hospitals implement and monitor an annual communication plan that respects the company's brand architecture and its main goals (Moreno, Wiesenbergl & Verčič, 2016); b) public health approach, hospitals focus on pedagogical inputs that help patients improve their expertise on treatments and diseases (Fischer, 2014) ; c) opinions and attitudes, external communication campaigns aim to influence stakeholders' perceptions about the hospital' services but not to promote medical treatments (Robinson et al., 2014) ; d) research, hospitals carry out different research initiatives in order to gather data allowing them to reduce the risk when taking strategic decisions about the brand (Medina Aguerrebere, 2018) and ; e) evaluation, hospitals evaluate in a quantitative way the impact of each campaign in the hospital's brand and reputation (Zerfass & Viertmann, 2017).

Hospitals implement corporate communication initiatives to reinforce their strategic positioning in the health market (Mazzei, 2014). They integrate an in-house communication department whose main objective consists of managing internal and external stakeholders, building a reputed brand and reinforcing the hospital's business strategies (Esposito, 2017). Corporate communication initiatives are a strategic issue for cancer hospitals because, on the one hand, it leads patients to engage in social support initiatives allowing them to learn how to communicate with doctors (Badr, Carmack & Diefenbach, 2015; De Vries et al., 2018) ; and on the other hand, it helps cancer hospitals adapt to internal and external changes and, this way, build a dynamic, credible brand (Kemp, Jillapalli & Becerra, 2014).

3. Cancer Hospitals' Corporate Communication Strategies on Social Media

Using social media platforms as a corporate communication tool constitutes a true challenge for many cancer hospitals: fake news published about cancer related issues, patients' mistrust on these platforms as a source of medical information, legal and cultural constraints (Attai et al., 2016). To face this situation, cancer hospitals base their corporate communication initiatives on two main values: trust and social support (Namkoong, Nah, Record & Van Stee, 2017). This way, they can engage with different stakeholder, improve some internal processes and enhance the hospital's reputation (Costa-Sánchez & Míguez-González, 2018).

Social media have become a true corporate communication tool able to make cancer hospital brands more dynamic and credible (Medina Aguerrebere, 2018). Five reasons led us to claim that. First, thanks to social media, cancer hospitals can implement different initiatives to reinforce patients' social networks and this way influence their decisions to adhere to treatments (Prochaska, Coughlin & Lyons, 2017). Second, using social media help these organizations to successfully implement public health campaigns focused on prevention, healthy habits and medical education, which positively influences on patients' perceptions about the hospital's brand (Vraga et al., 2018). Third, oncologists can integrate social media platforms in their internal protocols in order to improve patients' satisfaction with medical services (Sedrak et al., 2017). Fourth, thanks to social media, cancer hospitals can launch different public relations campaigns allowing them to become a meaningful brand for stakeholders (Costa-Sánchez & Míguez-González, 2018). And fifth, thanks to these platforms, cancer hospitals can establish long-term relations with patients before, during and after their consultations at the hospital, which positively influences on the hospital's public image (Yang et al., 2018).

Cancer hospitals resort to different social media platforms, such as Facebook, Twitter, and Youtube. Facebook helps patients to interact with oncologists and gather credible information about treatments and diseases, which determines patients' perceptions about the hospital's brand (Attai et al., 2016). Thanks to Facebook, patients can meet other patients, as well as health professionals, and this way create their own emotional support network (Gage-Bouchard, La Valley, Mollica & Beaupin, 2017). Moreover, this platform allows hospitals to gather different data about patients' expectations and behaviours, and this way implement customized communication campaigns (Kotsenas, Aase, Arce & Timimi, 2018). As to Twitter, three reasons led cancer hospitals to use this platform as a corporate communication tool : first, cancer hospitals can launch and promote cancer-specific online communities that integrate doctors, patients, policy makers and public authorities (Park, Reber & Chon, 2016) ; second, using Twitter allows cancer hospitals to enhance patients' understanding about different issues such as treatments or diseases (Basch, Basch, Hillyer & Reeves, 2015) ; and third, thanks to this platform, some patients, such as for example those suffering from lung cancer, can communicate with doctors about cancer risk factors and cancer prevention methods in a more efficient way (Sutton et al., 2018). Finally, with respect to Youtube, cancer hospitals resort to this platform to disseminate visual content useful for patients, health professionals and schools of medicine' students (Huang, 2013). This visual information is especially important for some patients, such as those suffering from breast cancer, who prioritize videos focused on prevention and early detection, produced by health organizations

and showcasing some elements about other patients' experiences (Míguez Gonzalez, Garcia Crespo & Ramahí Garcia, 2019).

Using social media platforms in a professional way for disseminating meaningful content for stakeholders helps cancer hospitals to build a reputed brand (Medina Aguerrebere et al., 2020). These communication initiatives should be based on scientific evidence, which means that experts in communication should collaborate with health professionals to disseminate an accurate content (Sedrak et al., 2017). Social media play a crucial role when health professionals explain to cancer patients different scientific contents, that is why hospitals should integrate these platforms in their medical protocols (Yeob et al., 2017). This way, patients can reinforce their empowerment, and hospitals can enhance their own reputation (Salmon & Bridget, 2017).

4. Cancer Hospitals' Initiatives on Artificial Intelligence

Artificial intelligence-based initiatives are shaping health professionals' habits and skills, as well as those of students in Schools of Medicine all over the world. Both hospitals and Schools of Medicine are facing a crisis driven by 2 compelling forces: on the one hand, growing externalization of available medical knowledge outside the minds of physicians, and on the other hand a true stress-induced mental illness among students in both organizations (Wartman & Combs, 2019). To face this situation, some Schools of Medicine are implementing artificial intelligence-oriented initiatives to reinforce the medical curriculum and recruiting new educators from different disciplines such as mathematics, ethnography, engineering, computer sciences and economics (Paranjape, Schinkel, Nannan, Rishi & Nanayakkara, 2019). Thanks to this new approach, students will be able to attend curricular and extracurricular courses allowing them to reinforce their skills in the clinical usage, technical limitations and ethical implications of artificial intelligence tools in medical settings (McCoy et al., 2020). Medical educators should be ready to integrate artificial intelligence in most of their courses and this way propose a most useful, creative content for students (Master, 2019) allowing them to understand the overall context, future needs and main constraints of medicine during next years (Master, 2020).

Health professionals working in cancer hospitals should accept a fundamental change in their professional identity which involves, on the one hand, integrating tools from big data, information sciences and engineering in their daily work; and on the other hand, accepting their new role of advisors to help patients understand this new technological context (Rampton, Mittelman & Goldhahn, 2020). According to different authors, such as Valikodath et al. (2021), there is a gap between oncologists' understanding of artificial intelligence, and the true potential of these tools in medical contexts, that is why it is important for hospitals to assign more resources to develop this area. For example, thanks to artificial intelligence-based tools, oncologists can construct dynamic patient profiles from disparate data sources and organize vast literature for relevance to a specific patient (Simon et al., 2019). Nevertheless, oncologist should also integrate in this technological context their human skills such as their clinical intuition, ineffable perceptions, empathy and professionalism (Van der Niet & Bleakley, 2020).

Artificial intelligence-oriented tools have radically changed cancer patients' care. Five examples allow us to justify this statement. First, big data helps oncologists to better understand and predict different insights (patient age, cancer stage, impact of previous therapies, etc.), which improves the implementation of precision medicine (Aikemu et al., 2021). Second, machine learning algorithms allow cancer hospital to monitor patients, predict how cancer diseases can evolve (James, Wheelock & Woolliscroft, 2021) and improve drug-target activities and drug response predictions (Ziaurrehman, Vähä-Koskela & Tero, 2021). Third, artificial intelligence-based robots can be used for cancer surgery: they analyze information from the surgical field, recognise issues and implement the proper actions without the need for human intervention (Tătaru et al., 2021). Fourth, using artificial intelligence-based software to launch and update online support groups where cancer patients interact and share experiences, which decreased their psychological distress and improve their emotions (Adikari et al., 2020). And fifth, integrating artificial intelligence in pharmacy informatics to improve cancer patients' care (Grothen et al., 2020).

During next years, artificial intelligence-oriented tools will be essential to help cancer hospitals face different challenges such as predict optimal drug therapies based on the personalized molecular profiles of individual patient tumors (Huang et al., 2018), ensure data integrity and use artificial intelligence applications in a more efficient way (Chan & Zary, 2019), help health professional to become leaders in artificial intelligence and medicine (Kolachalama & Garg, 2018), reinforce legal procedures to make sure that cancer hospitals respect ethical issues (Shaban-Nejad, Michalowski & Buckeridge, 2018) and establish national and international laws concerning the information access through artificial intelligence applications (Lee & Yoon, 2021). To face all these challenges, health professionals need to work in an integrated way along with other professionals, such as engineers, mathematicians or anthropologists. Thanks to this new approach, cancer hospital will be able to launch different artificial intelligence-based initiatives that will positively impact on cancer patients' care. To do that, they should also consider some of the initiatives that have already been launched, such as those explained in Figure 1 below.

Figure 1

Current Artificial Intelligence Initiatives for Cancer Patients

Country	Company	Initiative	Purpose
USA	National Cancer Institute	NCI Intramural Research Program	Improving cancer screening in cervical and prostate cancer, and automatically detect precancerous cervical lesions from digital images. Source: https://www.cancer.gov/research/areas/diagnosis/artificial-intelligence
UK	The Institute of Cancer Research	Artificial Intelligence Program	Better understand cancer related diseases, discover new treatments and improve patients' experiences. Source: https://www.icr.ac.uk/our-research/about-our-research/research-themes/artificial-intelligence
USA	Massachusetts Institute of Technology	Artificial Intelligence Laboratory	Implementing an algorithm (<i>Mirai</i>) that helps doctors to produce predictions about which kind of patients will get cancer, considering different risk factors and different clinical environments. Source: https://news.mit.edu/2021/robust-artificial-intelligence-tools-predict-future-cancer-0128

UK	University of Cambridge	Research Project on Cancer and AI	Using the AI machine-learning technology to decipher the biological language of cancer, Alzheimer's and other neurodegenerative diseases. Source: https://www.joh.cam.ac.uk/artificial-intelligence-could-crack-language-cancer-and-alzheimers
USA	Hampshire Hospitals	PAIR-1 Study	Implementing Artificial Intelligence tools to identify prostate cancer, improve the screening process for diagnosis and deliver earlier detection and better treatments options. Source: https://www.digitalhealth.net/2021/09/hampshire-hospitals-lucida-medical-ai-prostate-cancer-study/
UK	Addenbrooke's Hospital, Microsoft	InnerEye Project	Using Artificial Intelligence technology to highlight tumors and healthy organs on patients' scans and this way improve survival rates for some cancers. Source: https://www.microsoft.com/en-us/research/project/medical-image-analysis/
Australia	Saint Vincent's Hospital Melbourne	Academic Research	Implementing Artificial Intelligence tools to transform breast cancer screening, improve detection, lower harm, reduce cost and cause less stress for women undergoing a mammogram. Source: https://www.svhm.org.au/newsroom/news/beating-breast-cancer-with-artificial-intelligence
USA	Chicago Medicine	Academic Research	Resorting to Artificial Intelligence tools and deep learning models to analyze digital images of tumor biopsy samples, predict prognosis and guide a course of treatment for the patient. Source: https://www.nature.com/articles/s41467-021-24698-1
USA	American Society of Clinical Oncology	Academic Research	Developing an artificial intelligence-based smartphone app to reduce severity of patients suffering metastatic solid tumors, as well as hospital admission. Source: https://www.asco.org/about-asco/press-center/news-releases/artificial-intelligence-smartphone-app-significantly-reduced
USA	Pathai	Pathai	Integrating a machine learning technology to assist oncologists in making more accurate diagnoses, reducing errors and developing methods for individualized medical treatments. Source: https://www.pathai.com/
USA	Stanford Center for Health Education	Online Program in AI and Healthcare	Reinforcing doctors and technology professionals' understanding about the potential of AI for improving patients' outcomes. Source: https://online.stanford.edu/programs/artificial-intelligence-healthcare
USA	Accuray	Accuray Cyberknife System	Robots integrating AI tools and 6D motion-sensing technology to treat cancerous tumors all over the body through surgeries. Source: https://www accuray.com/
USA	BioExcel Therapeutics	BioExcel Therapeutics	Using AI to identify and develop new medicines in the fields of immune-oncology and find new applications for existing drugs or to identify new patients. Source: https://www.bioxceltherapeutics.com/
USA	Freenome	Freenome	Resorting to AI in screening, diagnostic tests and blood work to detect cancer in its earliest stages and develop new treatments accordingly. Source: https://www.freenome.com/
China	Icarbonx	Icarbonx	Using big data and AI to analyze human life characteristics and based on that classify symptoms, develop treatment options and get people healthier. Source: https://www.icarbonx.com/

Source: Own elaboration.

5. Managerial Implications for Cancer Hospitals' Corporate Communication Strategies

Artificial intelligence-oriented tools and social media platforms have radically changed cancer hospitals' medical services. Thanks to these initiatives, health professionals work in a more efficient way, and hospitals optimize their human and economic resources. Besides, patients improve their medical outcomes and feel more satisfied with treatments and services. From a medical and business point of view, artificial intelligence and social media platforms are essential to improve cancer hospital's performance. Nevertheless, these organizations should also capitalize on both elements (social media platforms and artificial intelligence initiatives) for making their corporate communication strategies more dynamic and this way improve their brand reputation. To do that, we propose ten managerial implication for any cancer hospital all over the world.

- *Corporate Communication Department.* Cancer hospitals should implement a Corporate Communication Department employing different kinds of employees, such as journalists, experts in public relations, designers, copywriters, but also engineers, mathematicians, experts in big data, health professionals and experts in public health. All of them work in an integrated way in order to use artificial intelligence and social media initiatives as a main corporate communication tool allowing the hospital to improve its brand reputation. This department is led by the Corporate Communication Director, who directly reports to the hospital's CEO.
- *Corporate communication approach.* This department should focus all its initiatives on reinforcing the hospital's scientific credibility as a provider of medical information for different stakeholders, such as patients, media companies or public authorities. Elaborating and disseminating meaningful scientific content for each stakeholder will help these organizations to evolve from a journalism approach, based on publishing promotional magazines and press releases about the hospital's medical services, to a corporate communication approach focused on satisfying stakeholders' needs in terms of information, medical education and emotional support. And, to do that, cancer hospitals resort to social media platforms and artificial intelligence tools.
- *Joint ventures with external companies.* Some cancer hospitals cannot develop and integrate different artificial intelligence tools because they lack economic and human resources. The Corporate Communication Department, on the one hand, should develop business plans (fundraising, donors, etc.) to help the hospital obtain the economic funds necessary for every project; and, on the other hand, should actively collaborate with the hospital to find the best providers (technological companies, start up, etc.) for implementing every initiative. Experts in communication must transform cancer hospitals from a business, medical and communication point of view.
- *Medical protocols.* The Corporate Communication Director, along with other employees such as the Medical Director and the hospital's CEO, must design plans to integrate social media platforms and artificial intelligence-oriented initiatives into different medical protocols in order to improve the hospital's performance and the patient's satisfaction. These new medical protocols allow cancer hospitals to efficiently implement a digital

transformation, which positively influences on their stakeholders' perceptions about the hospital, its brand, employees and services.

- *Lead the internal change.* Some health professionals, as well as other employees, refuse to leave their comfort zone and therefore, do not integrate social media and artificial intelligence tools into their daily work. The Corporate Communication Department have to implement internal communication campaigns, as well as training sessions with experts in both domains (social media and artificial intelligence) to tackle this situation and reinforce employees' engagement with the cancer hospital's digital transformation. To do that, they focus their communication campaigns on scientific and management facts about the hospital's performance, patients' satisfaction, economic impact on society, etc.
- *Human values.* Artificial intelligence and social media platforms should be used to reinforce the hospital's human values determining patients' trust on health professionals, such as the respect of ethics, medical intuition, emotional support or professionalism. The Corporate Communication Department must design and implement different protocols to help every employee understand how artificial intelligence and social media tools should be used to reinforce the hospital's engagement with human values. This digital, human transformation allows cancer hospital to implement a new medical setting in which patients' empowerment is as important as technological tools.
- *Collective branding initiatives.* Cancer hospitals cannot impose their brand architecture (identity, mission, vision, values and culture) to their stakeholders. They should work together with all of them (patients, employees, journalists, public authorities, suppliers, etc.) to implement a branding collective process allowing the cancer hospital to define its brand architecture in a collective way. To do that, social media platforms and artificial intelligence tools are essential, on the one hand, to communicate with different stakeholders, and on the other hand, to create a true meaningful brand based on scientific credibility and medical performance.
- *Fake news and health literacy.* Cancer hospitals should resort to artificial intelligence and social media platforms to implement different initiatives aiming to promote health literacy and reduce the number of fake news about cancer. This social engagement with medical information positively impacts on patients' safety, as well as cancer hospitals' corporate reputation. Promoting the truth, protecting patients' right to access a quality information and train patients on different medical issues (treatments, diseases, health habits, etc.) constitutes a true social engagement that cancer hospitals should promote.
- *Schools of Medicine.* Thanks to social media platforms and artificial intelligence tools, cancer hospitals produce and disseminate a unique content for patients and health professionals, but also for students in the Schools of Medicine and Nursing Schools all over the world. The Corporate Communication Department should invest time, resources and money to produce and disseminate professional content about diseases, treatments and healthy habits in order to improve students' skills in these domains. This social engagement with higher education institutions help cancer hospitals to improve their corporate reputation.
- *Social engagement.* The Corporate Communication Director have to explain to external stakeholders (media companies, public authorities, society) why and how the hospital's

engagement with social media and artificial intelligence tools positively impacts on the society's development. Promoting health education and reinforcing people's skills in artificial intelligence and social media in different contexts (hospitals, education institutions, public administration, etc.) helps cancer hospitals to justify their social role. Besides, hospitals also explain how they use these technologies to improve the health development in other countries, such as those suffering from poverty or humanitarian disasters.

6. Conclusions

Cancer hospitals play an essential role in society because they provide patients with treatments, medical education, emotional support and new therapies based on research that allow many of them to overcome their diseases. These last years, many cancer hospitals have integrated social media and artificial intelligence tools to improve patients' care. This literature review paper aimed to analyze how both initiatives (social media and artificial intelligence) help cancer hospitals to enhance their corporate communication initiatives and build a more reputed brand. In order to answer to this research question, we propose three last ideas. First, artificial intelligence and social media platforms cannot be considered as isolated technological initiatives, but as integrated activities that cancer hospital implement to digitally transform their organization, and propose a better medical, emotional service to patients. And this digital transformation should be led by the Corporate Communication Department because they are in charge of promoting internal changes in the organization, and because they are the only department able to integrate in this process all stakeholders' perspectives and interests. Second, cancer hospitals should resort to artificial intelligence and social media platforms to create and disseminate a meaningful content that influences stakeholders' perceptions about the hospital, its employees and services; in other words, both initiatives constitute the best weapon against the most important danger in health communication: becoming an empty brand. And third, oncologists should be trained by the Corporate Communication Department's employees to become brand ambassadors able to use social media platforms and artificial intelligence tools for efficiently disseminating medical content consistent with the hospital's brand architecture.

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