

The Map of Healthtech in Indonesia as Database for Future Research

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Abstract - The Covid-19 pandemic causes a lack of interaction among people. This situation forces digital transformation in many aspects of living, including health care. Healthtech then becomes a choice. This study explores Healthtech in Indonesia with situation and organization analysis and provides a database for future research. A qualitative approach with secondary digital data is applied. The result shows that there are twelve Healthcare with different care focus in Indonesia. They inform their service online through the official website and social media. Social media is also a means to build engagement with the audience, customer, and target market. Therefore, social media has become a marketing and public relations channel. Furthermore, there is a concern about data security regarding digital trace that opens in big data. Healthtech are called to take measures to ensure transparency and security of the data collected, and to respect the privacy of users. The protection of personal data produced and collected in this context must be ensured. Users must therefore be informed of the security procedures. By doing so, firms can develop a positive image and can build positive reputation. These tools can generate inequalities in treatment between the most advantaged people and others.

Keywords: Communication; digital; health; healthtech; ethics

Introduction

In disrupting face-to-face interaction, the Covid-19 pandemic pushed people to physical distancing and accelerated digital transformation in most human activities. Communication, based on digital networking, has occupied an important place. Concerned about their safety, people relied on digital services to search for health information, contact their doctors, follow their treatments, and inform about SARS-CoV-2 and the symptoms of Covid-19 and the progress of vaccination process. Health technology services turned in several mandatory contexts, all while medical institutions heavily mobilised their staff members. In-person visits became the second, third, or even last option for meeting patient needs. At the expense of our body language and social representation, digitalisation of medical data became the norm. The regular medical appointment, characterised by the interaction between medical staff (especially the doctor) and the patient (body, culture, state of mind), was another victim of the pandemic's distancing measures. It gave way to data management instead of face-to-face interaction. "Sign-traces" (Galinon-Méléneq, 2012), that the doctor observes and searches for to understand his/her patient's symptoms beyond the results of their medical exams suddenly transformed to digital traces that require strategies to search for, verify, analyse and understand. Referring to works of Bourdieu on "habitus" and Barthes on the "sign" and works of other academicians from various

disciplines, Béatrice Galinon-Méléneć proposed the paradigm of "sign-trace" to explain the interpersonal communication situation. According to her, the association of the terms "sign" and "trace" aims to signify that: (1) the process that produced the sign is present within the sign; (2) to examine the interpretation given to a sign implies acknowledging that an assumption exists that brings attention to one sign rather than another; (3) the interpretation itself is a sign-trace, in that it contains within itself the implicit acceptance of an interpretive system; and that; (4) there is a circular and continuous process from the trace to the sign and the sign to the trace.

Are we facing an anthropological change in the definition and understanding of traces and digital traceability? Digital trace is a new entity, unlike the one we knew before the digital era. It is separated from its history and does not have a meaning in itself. When it is gathered with other traces and combined in a context, it can be calculated, analysed and it gains a signification. According to Merzeau (2008), digital traces can no longer be analysed in terms of signs or speech. It initiates interfacing and profiling procedures which we must think of as an organisation. Hence, we call upon this newly digitised health technology to rethink the challenges that traceability brings, especially on communicational and ethical levels.

Experiencing a well-growth during 2017, it was reported that in 2018 was predicted as the peak development of Healthtech in Asia Pacific. Related to investment, Galen Growth Asia (2018) release a report that the growth reached \$3.3 billion in the first semester in 2018. Such value positioned Asia in the 2nd rank for ecosystem in perspective of transaction value, although the transaction in 2018 decreased into 32% compared to 2017. Up to now, China and India dominate the Healthtech landscape in Asia (Galen Growth Asia, 2020).



Figure 1. Categories of Healthtech Services in Asia
Source: Galen Growth Asia, 2018

The World Health Organization defines the health technology (or Healthtech) as "the application of organised knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives". Therefore, we use digital information and modern communication technologies to preserve and improve users' mental and physical health. Healthtech emerges as "massive databases" and as "decision-making aid tools" to connect medical services and computing with the needs of care, health care professionals, and patients. Some of these technologies refer to Big Data and seem to meet the objectives of medical diagnosis.

It was stated in the research (Galen Growth Asia, 2020) that at least, there are six Healthtech categories as the most interesting. Among other are services for health study (14 investments), online marketplace (12 investments), genomic and related application (12 investments), medical data and analysis (10 investments), IoT (5 investments) until health diagnosis (3 investments). Referring to such survey it can be concluded that the most dominant category reflected the change occurred in the society that public to get used to do buying until ordering by online.

The survey mentioned above states that Indonesia is included as a country in Asia facing the investment deal, but it is beyond the significant focus compared with present total value. As the whole

within first semester in 2018 it was noted that investment fund for Healthtech services in Asia reached \$109 million. Such value decreased in compared with the first semester in 2017.

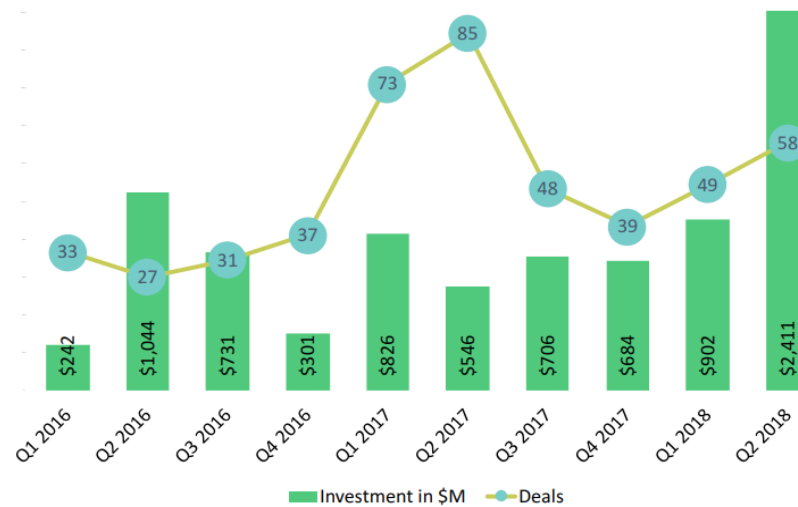


Figure 2. Development of healthtech investment value in Asia
Source: Galen Growth Asia, 2018

Related with share volume based on market during first semester in 2018, Indonesia was in the last position with the Philippines. Such value decreased in compared with 2017 that Indonesia reached percentage of 7%. However, Indonesia is one of the countries in Asia that shows the development of digital health services growth. The least optimal health services distribution causes the potency of Healthtech to combine with the present vertical industry. The high number of Indonesian population makes the country interesting for Healthtech services.

During the Covid-19 pandemic, most of the population felt reluctant to visit hospitals. People were afraid of catching the SARS-CoV-2. And due to the advance of digital technology, several health start-ups (Healthtech) multiplied and developed, such as *klikdokter*, *halodoc* and others. They encouraged and facilitate the health communication between patients and medical stuff.

Based on the above-mentioned description, our research is aimed to conduct analysis on situation and organisation of Healthtech in Indonesia to forward availability-map of services, usage, content completeness, and performance. A situation analysis is a part of formative research. In complete, formative research consists of situation analysis, public analysis, and organisation analysis. This research is limited on situation analysis and organisation analysis in which the result can be used as preliminary data to propose future research and strategic plan of communication program, particularly health communication in several contexts and the perspective of communication.

Theoretical Framework

Understanding the Situation

This research is conducted based on the thought of Smith (2020) concerning the process of strategic communication planning. Such process consists of 9 steps which are grouped into 4 steps.

The research is focused on the first step which is formative research within the step of analysing the situation. Phase of formative research is formative research, which is conducted before starting a program. A research program is conducted to gain additional information needed which is directed for decision-making within a plan. Within this phase are needed three steps i.e. analyzing the situation, analyzing the organization, and analysing the public.

Analysing the situation as the research focus is a step to understand both internal and external organisation. Such situation can be positive or negative. This situation can be identified as opportunity or challenges. Even though a company in a crisis situation, a challenge can be considered as an opportunity if the problem occurred from external company. In analysing the situation, it is better for us to understand 'issues management'. It is a process of organisation to anticipate and to respond important issue. In case of neglecting issue, the condition can become 'crisis management'. The second

focus is analysing the organisation which means to analyse the strength and weakness as well as opportunity and challenges faced by the organisation i.e. internal environment, public perception, and external environment. This research doesn't include public perception.



Figure 3. The landscape of healthtech in Indonesia
Source: Medium.com

It also questions the transition in the communication of medical process between patient and doctor from face-to-face interaction to a collection of traces in the digital environments. It interrogates technology uses and digital traces in this new domain of e-health services referring to works of French School on Trace and examines challenges related to privacy and data security.

Digital Trace and Big Data

With the privatization of the Internet, numerous artefacts flourished in the form of digital environments, tools, connected objects, clouds, and other services in various domains. Governments and private firms extended their activities in public health and clinical medicine to the Internet. Public health serves the entire population. Clinical medicine concerns the patient, as an individual in the care relationship (doctor-patient) with all health personnel. The ease and freeness of connecting online multiply health services, and generated health databases, health data hub, and health knowledge hub.

The notion of "trace" gained visibility recently in various disciplines because of the digital. Digital culture is, in reality, the sum of the consequences that the generalization of computing techniques has on our societies, reconstituted and redesigned by traces.

The Process of Strategic Communication Planning



Sumber: Smith, 2020

Figure 4. The 9 steps of Strategic Communication Planning
Source: Smith, 2020

According to Cardon (2019), the term digital designates in an encompassing way and a little vague everything that touches communication, the Internet network, the software, and the associated services. French School of Trace, which regroups a group of Professors and researchers who organized academic events and published works on trace in France, enriched the scientific debate on traceability problems. In these works, "trace" appears as a polysemic notion with multiple definitions and uses.

By analyzing face-to-face communication in terms of sign traces, Galinon-Méléneć gives a triple meaning of the trace: that of the "presence of the past in its absence from the present" (Jeanneret, 2011); the "projection of the sign-trace in the interpretative process – unconscious or conscious – of the received sign-trace"; and of "communication as the interaction of sign-traces".

For Merzeau, digital trace assigns an invisible signature to an informational behavior. Detached from the person they identify, traces are open to endless remakes and reinventions depending on strategies and needs. Digital trace differs from those we knew in the pre-digital era. Digital traceability operates by cutting, indexing, and migrating units subject to incessant crossings, calculations, and reinterpretations (Merzeau, 2014). In their treatments, it does not matter whether the traces are intentional or not; it is the number that makes sense.

For Mille (2013), the observation is, therefore, a cognitive process for distinguishing the imprint as a trace of something that can make sense. A trace is the product of the sequence of observations collected from an initial imprint (beginning of the trace) to a final imprint (end of the trace). The front and the end of a trace must be recognised explicitly so that only one trace exists (for example login and logout).

In this approach, all activities undertaken by a user who logged in to one of the e-health platforms are imprints. The trace becomes the series of these imprints from the instant of logging in until the moment of logging out. Therefore, observing and analysing activity traces requires aggregation of imprints in a specific context.

Referring to data analysis and security requires a definition of the Big data. According to Marr (2015), Big Data comprises 5 V: (1) Volume; (2) Velocity; (3) Variety; (4) Veracity; and (5) Value. The first V refers to the volume of data collected, which is essential in determining the amount of data to be analysed. The second V alludes to the speed of transferring data from its sources to supercomputers to explore, use, and process them in decision-making processes. As for variety, it refers to the various sources from which data is produced. Each data structure is different from the other according to its origin. Many of the data are unorganised and complicated to be readily available for processing.

The fourth V refers to the Veracity of the data, which implies the credibility and reliability of data and how they can be used to solve a specific problem. The fifth V concerns the value of big data. Having access to Big Data is useless if we cannot profit from it. It must be ensured that the data collected will benefit the organisation or not. And finally, the life cycle of big data can be divided into four phases: (1) collection; (2) compilation and consolidation; (3) analysis; and (4) use.

The collection of a massive volume of data enables firms to identify a person and draw numerous conclusions about them. This information is personal data because the person produced through their digital presence (Merzeau, 2009). After collecting personal data, many firms behave as if this data is theirs, so they exchange it, sell it, and process it. The databases index the traces/data collected and analyzed for each patient identified within the medical file under the responsibility of the healthcare team who should be the only ones to have the rights to read, write and execute the applications associated with this file, in accordance with medical ethics (Colloc, 2020). Digital culture shows an essential loss of the user's control over his/her traces and personal data. In this sense, the Healthtech domain should consider these factors to ensure that both firm and user have security and transparency on the data collected and used.

Communicational and Ethical Questions

Health technology enables new forms of diagnosis, treatment, and delivery of health care. It also reflects changes in the form of communication, of care and the social management of health. Digital communication is no more social interaction as we knew in the pre-digital era. Various Schools worked on defining and understanding communication in the 20th century. Some of them have studied social interaction (Chicago School) and face-to-face communication (Palo alto School), others cultural industries (Frankfurt School) and political and social impact of the media (Columbia School). With the advent of digital technologies, new approaches, theories and currents emerged analyzing human-

machine interactions and questioning digital uses and its impacts on human, organization and society. Today, with the development of Healthtech, new approaches to communication are required to understand the communication process and evaluate its effects on the services provided and the beneficiaries.

Talking about e-health brings us to the medical consultation, which is the cornerstone of all communication in the health domain. According to Colloc and Bonenfant the diagnosis follows a "scientific" investigation carried out by the doctor, a method consistent with empiricist approaches in the natural sciences. The diagnosis is the formulation of analogical and deductive reasoning starting from a set of "signs-traces" named "symptoms in context" to determine, when possible, the cause of a disease of the body or of the mind. When the doctor cannot establish a conclusive diagnosis through direct observation of symptoms, he requests additional investigations (laboratory examinations, technological equipment analysis, etc.). This process finds today new spheres where it occurs and develops. With the multiplication of digital platforms where communication can occur between patient and doctor, or where the patient can search information and orientation about his/her symptoms and diseases, the sign-traces of the body dissolved towards digital traces produced consciously and unconsciously by communicators.

This communication change between patients and medical staff introduces questions related to two critical issues: scientific validation and privacy protection. The universe of e-health (the example of Indonesia) is composed of two big categories: on the one hand, some companies disseminate information intended for the general public on health (description of the disease, practical advice, addresses, etc.); and on the other hand, tools allowing remote consultations, videoconferences, the purchase of drugs, etc. This change in the medical practices opens the debate on the reliability and the scientific character of the digital information. Are these tools inspired by scientifically validated work? Can they participate in the enrichment of the medical encyclopedia? Future research should take into consideration this dimension while examining the uses of these tools and obtained results. Another aspect that emerged is privacy protection. As one can't not leave traces in digital environments, privacy emerges as one of the most urgent debates in Healthtech context.

The problem of digital privacy has been treated in many researches works in the last decade, especially with the appearance of digital social networks and its extensive use by teens. Patients or users share confidential and sensitive data about themselves on platforms and applications, revealing traces about their real identity, medical exam results, X-ray images and others. This data needs to be protected, and users need to be reassured that their traces will be saved and not used for commercial or other purposes. Healthtech services have to ensure users of protecting their data and revealing information on where and how their data is hosted and managed. They should avoid any incident that can damage users lives and create significant problems for both. One example is what the French cybersecurity company CybelAngel announced on December of 2020 about discovering "more than 45 million medical imaging files – including X-rays and CT scans (computerised tomography), (...) freely accessible on unprotected servers".

The company analysts discovered millions of "sensitive images", including personal healthcare information (PHI), that were available unencrypted and without password protection. As medical institutions work with an interconnected web of third-party providers and the cloud is a principal platform for sharing and storing data, any security gap presents considerable risk, both for the individuals and the healthcare institutions. This problem enhances Healthtech services to ensure protection data and encourages future research to question measures taken for this purpose. Colloc (2015) recalls the ethical dimension of Big Data: we should decide, on a case-by-case, which data is confidential or not and who can use nominative data for scientific clinical and epidemiological studies while guaranteeing the protection of this data.

AI in healthcare: benefits and risks

The coronavirus pandemic has accelerated the development and deployment of Artificial intelligence (AI) applications in the medical and clinical areas. AI in the domain of healthcare comes with its specific benefits and risks. While it holds great promise, it also raises concerns for patients, healthcare systems and society. According to the European Commission (2019), Artificial intelligence systems are "software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition,

interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions”.

The autonomous AI system collects data from the subject and accesses data on the Internet (Cloud, Social Networks, Big Data). The collection of data allows to better understand the needs and expectations of the subject and to respond to them or even prevent them. The patient does not have access on his data and is not a part of the data processing process.

A study on AI in healthcare (Lekadir K. and al., 2022) identifies and clarifies the main clinical, social and ethical risks posed by AI in healthcare: potential errors and patient harm; risk of bias and increased health inequalities; lack of transparency and trust; and vulnerability to hacking and data privacy breaches.

In this context, we highlight the potential risks of lack of data confidentiality and protection of patients. The main risks for data privacy and security in AI for healthcare, include sharing personal data without informed consent, reuse of data without the patient's knowledge, data breaches that could expose sensitive or personal information, and the risk of damage, cyberattacks against AI solutions, both at the level of individuals, hospitals or health systems.

The National Consultative Ethics Committee (CCNE) in France emphasizes that while Artificial Intelligence Systems used for Medical Diagnosis (SIADM) are gradually irrigating the different fields of medical practice and transforming the caregiver-patient relationship, it is essential to create the conditions for Trust.

The new ethical issues combining digital and medical aspects questioned: (1) Training of practitioners; (2) Qualities of the SIADM implemented; (3) Appropriation and informed consent of patients when using these new tools; (4) Digital intermediation involved in the doctor-patient relationship.

Healthtech use and digital health literacy

With the Internet, health, as an essential issue in people's lives, becomes related to digital literacy and inclusion. People need to have access to the technology and know how to use it to access health information and manage their health cases. In this context, digital inclusion has become critical. Information circulating on websites, mobile applications, and social networks became valuable. It explains the organization itself and the services that it provides. Whether it is an address, a time, a service, or a debate, the information that turned digital data became the essence of communication and health processes.

E-health users need to be able to seek out, find, evaluate, appraise, integrate, and apply what is gained in digital environments toward solving a health problem or e-health literacy. This mixed skill requires the person to work with technology, envelop critical thinking about issues of media and science, and navigate through information tools and sources to acquire the information necessary to make decisions. This requires that people, regardless of age, income, or education, can adequately access, understand, and process health information to meet their needs. Access refers to the ability to access information resources like health websites and the quality of this access. This includes the quality of the technology (Internet connection speed, hardware, software) and the conditions of use (privacy or time). It also requires an ability to derive meaning from text.

To benefit from e-health, users need to develop skills that enable them to use health services in a responsible and constructive manner. According to Cameron D Norman and Harvey A Skinner (2006), e-health literacy is comprised of six components or literacies: (1) traditional literacy, (2) health literacy, (3) information literacy, (4) scientific literacy, (5) media literacy, and (6) computer literacy. These literacies aim to promote competencies and confidence for the user to develop strategies to assist him/her in using eHealth to its fullest potential. They help to enable users to distinguish between trustworthy and less trustworthy health apps and health information in general.

Material and Methodology

This research applied qualitative approach using secondary data which is available digitally. Data gathering was done by using google search engine with key-word Healthtech in Indonesia; visiting website of 12 health-startups then put it in a map based on provided services, usage easiness, content

completeness, and performance. Interview to management was conducted in very limited condition based on the resource person availability. As an explorative study, this research provides healthtec-map in Indonesia which is based on the analysing of situation as well as internal and external organisation.

Result and Discussion

Map of Healtech in Indonesia

The European Institute of Business Administration (INSEAD) emphasizes in its report untitled "Southeast Asia VC HealthTech Landscape" (2020), that the rising income groups and the affluent population have fueled the demand for higher quality of care. The report underlines that the digital technology facilitates the access to health while it decreases the costs and improves the quality of healthcare.

Focusing on Indonesia's situation, research shows that twelve health startups as the objects of research have diversity in its services. The research is aimed at understanding the health startup map available in Indonesia in term of service provision, usage easiness, content completeness and the whole performance. It can be known that in Indonesia there are 12 startups Healthtech suitable to be inserted in the map of analysis situation. Those analysed twelve health startups are Halodoc, Klikdokter, Alodokter, GoodDoctorTechnology, Dokter.id, DokterSehat, MoCehat, HelloSehat, Flo (website on woman menstruation), Calm, Doogether (website on sport) and SehatIrit. Research shows that not all information of Healthtech could be easily found via search-engine even though it has its-own website as an e-resource. In the digital environment, each algorithm has its behaviour, which means browsing a search engine depends on the user and the search engine itself. Search engines, like Google, Bing, Duckduckgo and others, are complex software entities, supported by distributed architectures, dedicated to providing answers to user queries.

They are based on classic Information Retrieval (IR) techniques, but also on hundreds of other factors (Dean, 2018)¹ which are constantly renewed by considering user traces, to promote user satisfaction in the first results (personalisation). Their work opens the question on transparency. "Transparency" tends to be used to refer to forms of information visibility, which increases by reducing or eliminating obstacles. According to Matteo Turilli and Luciano Floridi (2009), transparency depends on the availability of information, the conditions of its accessibility, and how it may support the user's decision-making process.

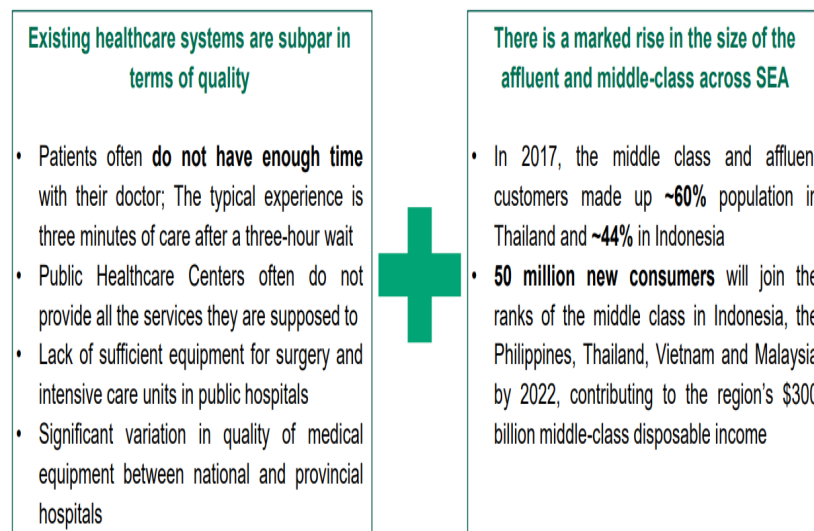


Figure 5. A growing demand for access to healthcare facilities
Source: INSEAD, Monk's Hill, Bain & Company, Consultancy Asia

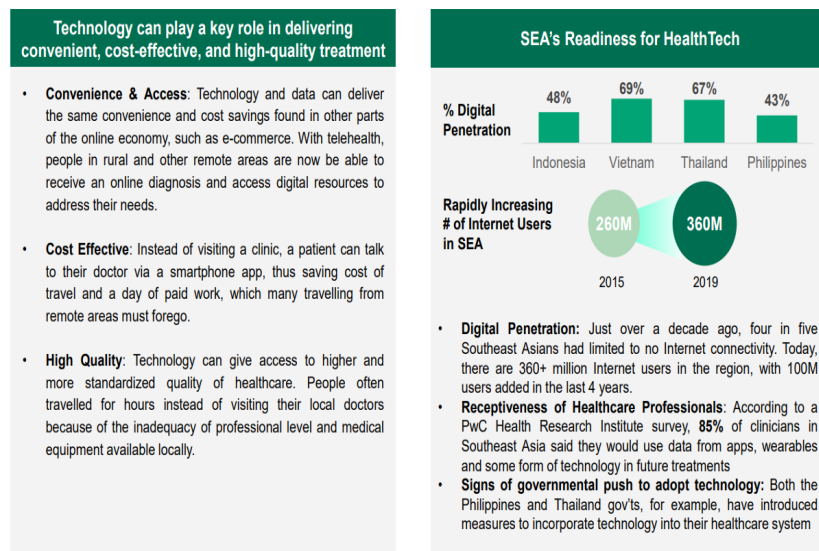


Figure 6. Technology impacts on health domain
 Source: INSEAD, Monk’s Hill, Bain & Company, Consultancy Asia

There are many factors that impact the transparency of the research on search engines. To name a few: relevance of the content or the link between the concordance of the content of the destination page and the intention of the user entering a search query; the quality and credibility of the content (the reputation of the author or site and the level of content); the user engagement (his/her behaviour); the freshness of the content (active sites); the localisation of content and the page load time. These factors become criteria that interfere in the results that a search engine presents to its user. This reality complicates the classification of some sites on the Web and determines the information's level of visibility. More or less of online data availability can be described by its balance of provision. The following data is the result of mapping based on Healthtech situation analysis in Indonesia.

Table 1. The 12 healthtech services mapped in Indonesia

Healthtech	Facilities	Website and social media
1. Halodoc	It provides several services: chat with a doctor, video call or voice call with doctor by using mobile phone.	https://halodoc.com/ Twitter, Facebook, Instagram, Youtube
2. Klikdokter	It is a communication portal site that provides information and health education and aimed for medical community and public.	https://www.klikdokter.com/ Twitter, Facebook, Vidio
3. Alodokter	It offers services by general and specialist doctors that are registered in organisation of Ikatan Dokter Indonesia.	https://www.alodokter.com/ Twitter, Facebook, Instagram, linkedIn, Youtube
4. Gooddoctor Technology	It provides medical consultation and information 24 hours a day and sell health products at drugstores.	https://www.gooddoctor.co.id/ Facebook, Twitter, Instagram, Youtube
5. Dokter.id	It provides free online consultation, the possibility of checking symptoms, a directory of hospitals and doctors and health information.	https://www.dokter.id/ Facebook, LinkedIn
6. DokterSehat	It provides health articles.	https://doktersehat.com/ Facebook, Twitter, Instagram, Youtube, LinkedIn

07. MoCehat	It offers health information and online products.	It is an application that can be accessed via google play store.
08. HelloSehat.com	It offers health and lifestyle information and other medical services.	https://hellosehat.com/ Instagram, Facebook, Twitter, LinkedIn, Youtube
09. Flo	Flo is a menstruation application. It is completed with figure for ovulation calendar.	https://flo.health/
10. Calm	It provides seven-day feature to help users sleep well.	https://www.calm.com/ Instagram, Facebook, Twitter
11. Doogether	It is a sport platform with online reservation.	https://web.doogether.id/ Instagram, Facebook, Twitter
12. Sehat Irit	It provides several health services.	Facebook, Twitter, LinkedIn

Source: Mapping of healthtech situation analysis in Indonesia

Conclusions

Based on the above-mentioned research it can be concluded that healthtech in Indonesia has a rapidly developed since 2017. Such development is getting more rapid after being supported by services diversity provided in line with the presence of Covid-19. Several services are conducted with the aim of providing more flexible access for customers to find health services and to promote e-health information in a way that consolidates the prevention vision: prevention is better than cure.

Data measured by algorithmic or AI devices may be collected by non-medical professionals using questionnaires, mobile applications, geolocation and other ways. The general public development of these devices is accompanied by several risks, a major one is of an increase in medical consultations due to the anxiety that data can generate in certain people. To be truly useful to health professionals, in addition to regular and rigorous validation, it would be necessary to be able to cross-reference these mobile data with those of the patient's shared medical record, which raises considerable logistical, legal and ethical questions concerning health data, which are outside the scope of this opinion.

The services mapped in this study, promote health information on their websites and social media. This last became a space for marketing and public relation. Their activities can be put in the category of business and education: educating people on health issues. But looking at this landscape only from this perspective is very reduced. Because these online platforms work on calculability, as a computing interfaces managed by algorithms. Thus they change the communication model and the relationship on health, between physician and patient. Communication becomes a set of processes of digital traces produced voluntarily or not by users but also by machines and systems. In the digital traceability world, health is a sensual issue and its traces are very sensitive (for the users) and precious (for the firms that use it to make profit).

Four main points can be underlined: (1) Healthtech services are called to take measures to ensure transparency and security of the data collected, and to respect the privacy of users. The protection of personal data produced and collected in this context must be ensured. How do e-health services store them and who do they share them with? It is therefore necessary to ensure that the data is processed, in the same way as that produced within the framework of the healthcare system, such as sensitive health data. Beyond the only problem of data protection, the eventual diffusion of these tools could help to distance the most informed patients (in terms of digital use) from the strictly regulated healthcare system. These health tools are likely to widen a gap between health care offer regulated by the State and other unregulated care practices. There is then a risk of medical disintermediation or disruption of the relationship patient-doctor; (2) Users must therefore be informed of the security procedures which govern the production and storage of this data and they must be able to control their use within the framework of the expression of consent, or at least the possibility of opposition; (3) By doing so, firms can develop a positive image and can build positive reputation and have improved communication management toward stakeholders; (4) These tools can generate inequalities in treatment between the most advantaged people – in economic capital, but also in relational and cultural capital (including digital culture) – and others. The former could in fact afford the services provided by private companies to meet their specific needs, while the others would be excluded – private companies only develop profitable services.

Focusing on scientific validation, marketing communication, traces management, data security, and the respect of privacy, good handling and provision of two-way communication as well as engagement to customers will create a positive image of such Healthtech. In case of image for several services provided and communication management toward stakeholder particularly customers are maintained and improved, positive reputations are built.

Based on this research a scientific recommendation can be forwarded to analyse organisation and public to see deeper and more complete map of Healthtech in Indonesia. Such research can also be used by each Healthtech management to compete with the similar Healthtech, to create value-added for its services in the perspective of difference in competitive strategy and to build communications both corporation communication for image and marketing communication to create competitive strength for such Healthtech.

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