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TELEMEDICINE DIGITAL PLATFORMS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

This paper presents a literature review of the research reported in the field of Telemedicine. The research was conducted to capture the two main concepts: multisided business models and access barriers to healthcare. The search yielded a total of 112 articles, that were considered fit for the criteria. The three main structural barriers identified throughout the reports were the lack of (1) physician incentives for use of digital technologies, (2) public funding for hospitals and clinics to use digital tools, and (3) incentives to use Digital Tools for Care Coordination. Telemedicine has strong benefits to collect from the use of Multilateral Business Models. Further research is being conducted to validate the model presented with in depth case studies evaluating the several combinations of parameters on unique scenarios.

Keywords:
Multilateral Business Model; Digital Platform; Telemedicine; Healthcare Access Barriers

1. INTRODUCTION

People from lower socioeconomic backgrounds have poorer health outcomes. These health disparities are due, in part, to barriers in accessing medical care and utilizing primary care services (DeVoe et al., 2007). Recent research suggests (Hein et al., 2020; Hermes et al., 2020; Smith et al., 2020) that Telemedicine presents an opportunity to deliver care for those who suffer from some kind of barrier to access healthcare, be it Financial, Structural among others. In this context the Multisided Business Model, a business configuration that enables patients, physicians and other actors in the healthcare business interact with each other directly, is posed to increase the access to healthcare and overcome some of the existing barriers(García-Holgado et al., 2019; Kolasa & Kozinski, 2020; Marcos-Pablos & García-Peñalvo, 2019).

If the current health care problems were not enough, since the end of 2019 a global pandemic is in place. The COVID-19 pandemic has resulted in over 15 million confirmed cases and over 2.000.000 deaths globally (Worldometer, 2020). It has also sparked fears of an impending economic crisis and recession. Social distancing, self-isolation and travel restrictions have led to a reduced workforce across all economic sectors and caused many jobs to be lost.

Before the pandemic causes it impacts, chronic conditions accounted for more than half of the global disease burden and are a primary challenge for 21st century health care systems (WHO, 2000). This is a dramatic shift from the health concerns of the 20th century, when acute infectious diseases were the primary focus in every country. While the world is experiencing a rapid transition from acute diseases to chronic health problems, training of the health care workforce, however, relies on early 20th century models that emphasize diagnosis and treatment of acute diseases (Pruitt & Epping-Jordan, 2005).

It is almost requisite that any discussion about the future of health care begin with a reference to the unsustainable growth rate of global medical spending. Charts and graphs expound on health care's accelerating share of gross domestic product (GDP), depicting a voracious beast that threatens to swallow what little money remains for other vital services. And yet, although deliberations about how to curb this dramatic increase in spending are imperative, a related, but equally important, question is often lost amid these debates.

On the other side, health care providers must adapt to this increasingly complex environment. This adaptation goes beyond the health care delivery practices and ventures in the realms of technology and business design and management. Recent research indicate a close positive correlation of a company's business model evaluation with its success (Schrauder et al., 2018).

When studying a broad issue such as healthcare access, approaches focused on how the business in this industry organizes itself is relevant. An objective definition for business model is "a business model is nothing else than the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams." (Osterwalder & Pigneur, 2002). Although a consensus about the correct definition of Business Model is yet to be achieved (Osterwalder et al., 2005), this definition is broad enough to fit this research purpose.

One particular configuration of business model often referred as Multisided Business Models or Platform Business Models has as its main advantages it's scalability (Zhang et al., 2015), partially enabled by the Networking Effect (Andersson Schwarz, 2017).

Key studies such as the one published by Svarts (2017) show that the economy of scale enabled by the networking effect have different effects when considering the different types of healthcare services. For surgery for eg., significant scale effects related to spreading of fixed cost, the experience curve, and potential for process improvement. For patient care, moderate scale effects related to spreading of fixed costs and costs of doctors on on-call duty. For outpatient care, small or no scale effects.

In this context, the characteristics of a multisided business model can increase the probability of healthcare access, even more on a Telemedicine setting.

2. OBJECTIVE AND RESEARCH PROBLEM

This literature review aims to provide an overview of the research reported in the field and identify possible issues that existing literature is not addressing adequately. This work is intended to function as a snapshot of the research in the field by (i) identifying and analyzing the different definitions of Digital Platforms for Telemedicine, (ii) analyzing the distribution of the research reported per year, (iii) classifying the research by type of result, (iv) refine and adapt the classification and description of Digital Platforms using the model proposed by (Ardolino et al., 2020).

The following research questions are proposed

RQ1: What is the research output per category and year on Multilatreal Business Model for Healthcare?
By grouping the literature per publication year, a possible trend in the research invested in the field of Multilateral Business Models for Healthcare. An increase in the number of publications per year, for example, would imply the increase in importance of the field while a decrease in the number of publications might have as a possible reason the research in the field reaching a dead end. Analyzing the trends might give an idea of how the importance of the field is changing with time.

RQ2: What are the main categories and classifications of Multilateral Business Model in Healthcare present in the literature?
Analyzing the papers in the SLR can bring more comprehension to the topic, presenting a detailed breakdown of Multilateral Business Models characteristics in an organized manner enable further studies to be created.

3. THEORIC FUNDAMENTS

A preliminary exploratory search was made in order to identify key articles that could help kickstart the research. Previous Systematic Review papers were preferred among others. The articles presented in Table 1, along the concepts they are supporting and how many citations each study got according to Google Scholar, were used as the result of the exploratory search:

Table 1 – Exploratory search reference

Concept	Title	Year	Reference	Citations
Multisided Business Model	Software ecosystems –A systematic literature review	2013	(Manikas & Hansen, 2013)	516
Multisided Business Model	Technological Ecosystems in Care and Assistance: A Systematic Literature Review	2019	(Marcos-Pablos & García-	38

			Peñalvo, 2019)	
Multisided Business Model	A business model framework to characterize digital multisided platforms	2020	(Ardolino et al., 2020)	10

Source: the author

In the next step, keywords were identified through an iterative search strategy, including further search terms as relevant articles were found. Articles were also identified by hand searching citation lists and grey literature.

The full literature search was conducted using SciVerse Scopus published by Elsevier to capture the two main concepts: multisided business models and access barriers to healthcare. We limited our search to articles written in English over the last 5 years to get the latest perspective on the subjects.

Scopus newest search functionalities were used to improve the search results. Scopus applies word stemming to fields containing text (not to names, affiliations, dates, or numbers). Word stemming ensures that different occurrences of a word are found. This enable the search criteria to be made using only the singular form and the search results will include the plural forms.

Considering the short period defined to get the state of the art for each concept, no initial filters were made regarding the document type, yielding results including articles and conference papers.

Various terms for representing the “multilateral” aspect of the business model were used, including multisided, ecosystem, digital platform, bilateral and marketplace.

The search was designed to retrieve articles on a wide range of subtopics within the main topic but without being exhaustive. The search criteria were applied on January 3, 2020 and is fully documented in Table 2.

Table 2 – Search criteria for literature review

(1) Multisided Business Models in Health contexts	Multilateral	Language: English Date Period: last 5 years Search Fileds: title, abstract and keywords Search String: (TITLE-ABS-KEY ("Multilateral" OR "Multisided" OR "Ecosystem" OR "Digital Platform" OR "Bilateral" OR "Marketplace") AND TITLE-ABS-KEY ("Business Model") AND TITLE-ABS-KEY (Health*) AND PUBYEAR > 2014 AND PUBYEAR < 2021)
	Multisided	
	Ecosystem	
	Digital Platform	
	Bilateral	
	Marketplace	

Source: the author

All records were exported to the Mendeley database for inclusion/exclusion evaluation.

The search yielded a total of 112 articles, that are presented in Table 3. As part of the review protocol the results were refined using a two-step approach. First all the results that include the wrong document type and were not a Journal Article, such as Book Chapters, Reviews, Conference Reviews were excluded. This resulted in 64 articles deemed not being fit for this research.

The next step in the screening process started with a title review followed by an abstract review and ending with a full-text article review of the 48 remaining papers. There were 16 exclusions due to incompatibilities identified in the abstract and title. These articles did not present a business model in its development or were not directly related to the Healthcare area. A grand total of 16 articles were considered fit for the criteria.

Table 3 – Search Results

Key Concept	Search Results	Exclusion due to document type	Excluded due to incompatible abstract	Excluded due to incompatible content	Total Results Considered
(1) Multisided Business Models in Health contexts	112	64	16	16	16

Source: the author

The first analysis done to access the demand for the Digital Platform specifically in the Health context over the time. The Table 4 presented below shows stable number of publications peaking in 2020, the last year included in the research parameters, mainly due to the appeal of platforms on the current pandemic situation.

Table 4 – Multisided Business Models Publication Temporal Analysis

Year	Publications	Sum of Citations
2015	4	166
2016	3	64
2017	4	20
2018	6	24
2019	4	24
2020	11	18
Grand Total	32	316

Source: the author

A top cited paper analysis is presented on Table 5:

Table 5 – Top 5 cited papers from this key concept

Authors	Year	Title	Source	Citations
Pang Z., Zheng L., Tian J., Kao-Walter S., Dubrova E., Chen Q.	2015	Design of a terminal solution for integration of in-home health care devices and services towards the Internet-of-Things	Enterprise Information Systems	136
Van Dijck J., Poell T.	2016	Understanding the promises and premises of online health platforms	Big Data and Society	33
Ranerup A.,	2016	An analysis of business models	Government	20

Henriksen H.Z., Hedman J.		in Public Service Platforms	Information Quarterly	
León M.C., Nieto-Hipólito J.I., Garibaldi-Beltrán J., Amaya-Parra G., Luque-Morales P., Magaña-Espinoza P., Aguilar-Velazco J.	2016	Designing a Model of a Digital Ecosystem for Healthcare and Wellness Using the Business Model Canvas	Journal of Medical Systems	11
Anwar S., Prasad R.	2018	Framework for Future Telemedicine Planning and Infrastructure using 5G Technology	Wireless Personal Communications	10

Source: the author

From the analysis of the top five cited papers, Telemedicine and its variants have been present in 80% of them. This type of healthcare delivery has been a constant on the literature review both on the healthcare barrier side and on the business model side.

4. DISCUSSION

The literature review is focused on a set of research questions that serve the aim of this work and derive from the reasons that initiated this review. The review protocol is organized in a way that the research questions define the main areas this study is focusing on.

Using the works of Ardolino *et al.* (2020) as a base for initial mapping of the literature, the model was further customized based on the findings of the review. Thus, the model presented on Table 6 was created.

The dimensions listed on the original model that were not present or relevant in the literature review were removed and there was no evidence for a new dimension to be created.

Variables were also reviewed and adapted to the healthcare context with the addition of network effect under Direct Externalities among others.

Table 6 – Multisided Business Model in Health context from 2015-2020 review

Dimension	Variable	Item
Platform Sides	Sides	Number of Sides
		Sides Type
	Segmentation	Presence
		Segment participation criteria
		Benefits
		Benefits standardization
	Engagement incentives	Presence
		Reward
		Reward type
		Reward setting

Dimension	Variable	Item
	Direct externalities	Presence
		Direct externalities characteristics
		Direct network effect
		Indirect network effect
Platform Revenue Model	Affiliation fees	Presence
		Payer
		Standardization
		Frequency
	Interaction fees	Presence
		Payer
		Standardization
		Interaction charged
	Financial flows between sides	Presence
		Transaction object
	Referral fees	Presence
		Recipients
Platform Control	Control mechanisms	Presence
		Type
		Timing
	Rating and Review System	Presence
		Sides involved
		Direction
		Privacy
Platform architecture	User registration	User registration
	Boundaries between sides	Boundaries between sides
	Platform access	Web portal implementation
	Openness	Dedicated app
		Operating System
		Platform openness

Source: Adapted from (Ardolino et al., 2020)

By definition, a business model describes the organizational framework and the processes involved in optimizing the value that can be created, delivered and captured from leveraging innovative products, technologies and services.

The term digital ecosystem integrates and uses the concepts from natural domain; evolving to the sectors specific ecosystem integrated by digital infrastructures, aimed at creating a digital environment for network services and organizations with common resources or expectations. Digital ecosystems build communities that dynamically share geographical regions, business, knowledge, infrastructures, and human resources. This type of unit is called Digital Business Ecosystem (León et al., 2016)

The ecosystem model, also called Multisided Business Model disrupt the underlying markets, such as local distribution, transportation and construction, as the emergence of digital platforms reduce entry barriers, such as the need for in-house resources, information

technology equipment and expertise to establish and maintain online presence. (Eferin et al., 2019).

4.1 Platform Sides

This dimension deals with the specific characteristic of the MSBM having two or more groups of users/customers that interact with each other to generate value.

4.1.1 Sides

There is currently a strong likelihood that the pattern of care becomes provider-driven. Thus, at the very time that the person is vulnerable and needing help, their lifestyle is changed around them (Marceglia et al., 2018). When considering telehealth, the presence of the physician is necessary for the healthcare delivery process to happen.

Chen et al. (2020) cited that patients seem to exist as either invisible stakeholders or passive participants, despite their indispensable role. Results demonstrate that the patient's role in healthcare is essential, yet often ignored, as they have little power for influencing decision-making.

According to the respondents of a study, patients tend to stick to the physician and caregivers that they are familiar with. Therefore, healthcare platforms may be a promising implementation for them to stay 'ageing in place'. Other actors cited in another study consider individual practices, hospital laboratories and pharmacies as well (Vezyridis & Timmons, 2015).

Recent development of ICT platforms for more flexible care delivery to older people and those having dementia lack technology features and functionalities that enable integrating the full spectrum of formal and informal caregivers, both important sides in this ecosystem, into a single information loop with a view to enabling truly joined-up support, including people with dementia themselves as co-producers of well-being and independent living.

ICT-based services tend to be delivered within socio-technical systems, and value is frequently achieved by people (e.g., care professionals, family carers) utilizing technology for their purposes (i.e., delivering people services) not by technology alone. As such, ICT-based solutions for integrated dementia care require technology innovation and service process innovation to be pursued in parallel. This includes the need to recognize co-contributions by informal carers alongside formal carers as part of one system, with due identification of the role of each and for sharing of selected appropriate information and recording.

As another ever present side, the family always has a central role, supported to a greater or lesser extent by formal professional or para-professional care services. Informal family care, representing the cornerstone in almost every country, is sometimes supported or supplemented by paid home caregivers, respite opportunities and palliative end-of-life care. (Marceglia et al., 2018)

Lastly, one of the most mentioned sides was government participation, mainly due to public funding and public health concerns (Mukhopadhyay & Bouwman, 2018; Vezyridis & Timmons, 2015; Visconti & Morea, 2020).

4.1.2 Segmentation

The platform may create a segmentation of different types of users within each side, complementing the MSBM other combinations can be used such as the freemium approach, where the platform has a free layer but users can pay to have extra functionalities, more use time (Ardolino et al., 2020).

There were very few mentions of segmentation in the papers evaluated in this review. One of the possible causes was that the models described did not focus on this aspect. This need to me further explored in a multiple case study.

4.1.3 Engagement Incentives

System-level incentives for care provisions are outdated and discourage clinicians from adopting digital technology and misalign drivers of institutional procurement and user adoption. The 3 primary structural barriers repeatedly identified throughout the reports were the lack of (1) physician incentives for use of digital technologies, (2) public funding for hospitals and clinics to use digital tools, and (3) incentives to use digital tools for care coordination. (Kelley et al., 2020)

4.1.4 Direct Externalities

A benefit or cost that one participant imposes on another participant without direct monetary compensation. An externality could arise from a network effect or from a behavioral externality (Evans & Schmalensee, 2018).

One of the main externalities evaluated in a Multisided Platform is the Network effects.

Network effects are the ways in which a platform's customer base impacts the value of the platform itself. More specifically, the more people engage with a platform, the more useful and valuable it becomes. There are two types of network effects that can be enabled. Direct and Indirect Effects.

The direct network effect deals with the impact of the addition of another participant to a network on other participants in the same group. A positive network effect occurs when an additional participant makes other participants of the same sort better off because they can reach and interact with more participants (Evans & Schmalensee, 2018).

For example, the greater the number of patients on a platform that connect them with doctors, the greater the incentive for other patients to join and benefit from the interaction.

There are also negative aspects of the direct network effects. A negative direct network effect occurs when additional participants make other participants in the same group worse off, perhaps because of congestion or competition. This can cause a Telehealth platform to have long waiting times due to an imbalance of both patients and physicians.

On the other hand, an indirect network effect occurs when the greater the number of members on one side of the market attracts an increased number of members on the other side of the market. In effect, the greater the number of patients joining the platform, the greater the chance to attract a larger number of doctors (Garbuio & Lin, 2019).

A negative indirect network effect arises when an additional participant of one type decreases the value to participants of the other type. This can be seen when a physician evaluates a platform and consider joining, they evaluate the prospect patient base. Having a

growing sub served base with long waiting times can cause the perception of a bad sevice that could reflect on the physician evaluation and rating.

4.2 Platform Revenue Model

As digital platforms constitute a complex process of interrelations among different participants, they follow various revenue models, including models where revenues are based on commissions, subscriptions, advertisements and services (Rossotto et al., 2018).

Chen (2020) noted that as soon as potential customers are not willing to pay for the service, it will affect the structure of the healthcare industry chain. As far as industrial players are concerned, many companies incorporated Connected Health into their own businesses without proper preview of business fads or trends.

In these terms, few of them will likely be able to survive. Those who successfully identified the market gaps and developed stable relationships with academia, governments, and/or industries are more likely to succeed in market competitions.

Individuals participate in economic activities through privately owned resources, such as assets and labor, or participate in the ownership of privately-owned assets in a shared mode. Platform business models allow for the “asset-as-a-service” mode, also called collaborative consumption (Constantiou et al., 2017)

4.2.1 Affiliation Fees

The price that customers are charged for obtaining access to the platform. For example, credit card issuers sometimes charge people an annual fee for using the card, thereby obtaining access to the merchants that accept these cards for payment.

On healthcare context some platforms charge a flat access fee (Dupont et al., 2017; Gomes et al., 2018) while others choose another funding method. The affiliation fee choice is a key part of the business model and dictates partly how the platform access will be made.

Some platforms also adopt a freemium business model in addition to the MSBM and usually the payer is the patient.

4.2.2 Interaction Fees

Interaction fees happen in a health context in the same as traditional business models such as paying for a specific consultation with a physician. In MSBM this fees can happen in conjunction with affiliation fees or using a discount rate for those with premium service.

A respondent from a cell therapy firm within a study found in the review, with UK and US experience, highlighted the health technology assessment and affordability challenge, especially when national health care systems are financially constrained.

One of the examples found were from diabetes treatment and questioned whether the health care system could afford a high upfront payment for a therapy compared to the current small costs spread over the lifetime of a patient. A recent shift in the Medicaid reimbursement model in the United States had a negative effect (Banda et al., 2018).

A study from Anwar & Prasad (2018) showed that 29 states of Colombia have passed parity laws for the reimbursement of telemedicine services via private payers. Patients directly pay their charges through online service. The insurance does not cover it. Before planning of a telemedicine service, it is essential to have a solid financial plan. Payment models can be changed flexibly.

As an example of the Fee-For-Service approach, Talkspace, a software company, is connecting licensed physician to the patients through unlimited messages and provides virtual connections. They are using data analysis to find out right practitioner for the patient and provide service for 25 dollars per week and has raised Dollars 9.5 million led by spark capital (Anwar & Prasad, 2018).

4.2.3 Financial Flows Between Sides

For two-sided platforms, a group of customers that provides all or virtually all of the profits earned by the platform. For multisided platforms, one or more groups could not contribute any profits, while two or more groups together could provide all or virtually all of the profits (Evans & Schmalensee, 2018).

On the other hand, there are cases of a group of customers who do not cover their costs of participating on a platform. A multisided platform could have more than one group of subsidized customers, so long as there is one group that functions as the money side. Most consumers of ad-supported aps, for example, pay little if anything and are provided content of significant value, making this a funding option for health companies who are looking for a supplier paid platform.

In a recent study in Taiwan (Chen et al., 2020) it was found that since governmental funding has ceased, the issues of payment method are now becoming a concern. In fact, those who are most in need of connected health tend to have a lower purchase capability for connected health's products and services. Therefore, most of the institutions engaged with this type of healthcare delivery are supported by foundations.

In Germany, compensation is only through the health insurers otherwise patient have to pay by his pocket while in France some telehealth services are paid as well as in UK and Sweden (Anwar & Prasad, 2018).

One novel approach identified in the literature was Performance-based financing (or P4P) is a financing mechanism that gives healthcare providers (facilities or health workers) financial payments based on the achievement of predetermined targets, goals, or outputs after being verified for quality (Visconti & Morea, 2020).

The P4P model should adequately consider a system of economic incentives for private players acting together with public actors in a formal agreement. This coordination is consistent with a model that is widely used in healthcare

4.2.4 Referral Fees

A study by Kamada and Ory (2017) found that the optimal referral incentive scheme in a scenario in which existing customers benefit from recruiting new customers through word-of-mouth (WoM) either because (1) they get a referral reward from the platform, or because (2) they benefit directly from having their referrals in the platform.

The platform can give referral rewards to existing customers, or provide free products to new customers, in order to increase their likelihood of being a customer and to increase the benefits from externalities to existing customers.

Their model predicts that referral rewards should be used when externalities accrued from recruiting new users to the platform are low, and free products can substitute referral rewards only when the fraction of premium users is relatively low (Belo & Li, 2018).

This reward can also be monetized, expressing for the platform the cost of acquiring a new customer in a direct way.

4.3 Platform Control

The control of the platform implies the control of the distribution channel; hence, the owner of the dominant platform, controlling all the underlying data, increases its position of market dominance (Eferin et al., 2019).

Schmalensee et al. (2020) explained that rules that prohibit bad behavior (that is, negative behavioral externalities) by platform participants and proposes mechanisms for enforcing those rules, including methods of detection and punishment.

4.3.1 Control Mechanisms

Platform leaders need to deploy effective coordination mechanisms to manage interdependency between multiple partners. This is to ensure that gains due to collaboration between multiple partners are not overshadowed by the increased coordination and overhead cost as well as possibility of conflict.

One of the most efficient control mechanisms is money based. As noted on the financial aspect of multisided model, although traditional fee-for-service (FfS) reimbursement is still a large percentage of income for hospitals, the shift towards payment for value-based healthcare programs is accelerating rapidly.

In P4P programs, hospitals are required to pay attention to a broad array of factors which they are not incentivized to address in traditional FfS systems. Two approaches for P4P programs in healthcare are used.

The first with payers reduce global FfS payments and use the funds to reward hospitals based on how well they perform across process, quality, and efficiency measures. In the second, hospitals are penalized financially for sub-par performance, and the penalties are either translated into direct cost savings for payers or are used to generate an incentive pool (Visconti & Morea, 2020).

Platform governance and control has low coordination costs and the potential to create value for individual participants as well as for the entire ecosystem (Mukhopadhyay & Bouwman, 2018). This is achieved as partners in an ecosystem are organized around a shared vision, have agreed division of roles; own complementary assets and resources.

4.3.2 Rating and Review System

Consumers shift their core attitudes from buying goods to access-based consumption, leading to a peer-to-peer economy where platforms increasingly mediate interactions, typically coordinated by peer-based trust relationships (Eferin et al., 2019).

The rating of services has become integral part of the connected health plarforms. One study of Long Term Care (LTC) show a working networking platforms built to offer integrated, seamless care by connecting subjects information from different care service providers with a referral system to increase resource connecting efficiency (Chen & Liu, 2020).

4.4 Platform Architecture

The Platform Architecture deals with the technical details of the development and operation of the platform. Although not listed as topic for this research, it was found in the literature that reducing the cost of traveling to remote areas is one of the most proposed features of health platforms, but many remote areas currently lack the ICT infrastructure necessary to implement some communication services. Low population density makes it less cost-effective to build up infrastructure, such that profit-oriented companies are likely not to be eager to adopt it (Chen & Liu, 2020).

According to Chen & Liu (2020), it usually requires 5 to 10 years to earn back initial expenditure, such that it is often not considered cost-effective for ICT companies to establish infrastructure. In addition, many people still have fear and uncertainty in relation to new technological interventions. Therefore, the concern needs to be with user-friendly customer-focused infrastructure.

More than 75% telemedicine services designed for the care providers fail because of practical instability (Anwar & Prasad, 2018).

4.4.1 User Registration

Adopting a clearly user-driven, choice-giving approach and avoiding all technology ‘push’, aiming to increase respect, quality and also efficiency and effectiveness of ICT solutions.

An additional challenge when dealing with user data is that Patient personal data is mostly stored in one place in the form of repository, only exchanged with the authenticated users. But most of the time this data remains at one location as hospitals and doctors are not connected sufficiently (Anwar & Prasad, 2018)

4.4.2 Platform Access

Including elements of telecare and telehealth where needed, respecting the wishes and preferences of the person with dementia, especially in the early stages when they should be able to express informed choices on the way they view their future care. Then, record and information presentation mechanisms need to be in place that keep knowledge available and actively refreshed, in a way that is in line with the individual’s persona and expectations. (Marceglia et al., 2018)

Overall, the interview results in a study by Chen (2020) imply that a collaboration which uses technology along with an appropriate Business Model may be more successful for future healthcare delivery. Therefore, a more holistic connected healthcare industry blueprint and vision would be important for designing and engineering such ecosystems in Taiwan.

4.4.3 Platform Openess

The degree of openness dictates the selection of mechanisms for data and the information flow between components within a platform as well as with the external environment.

Platforms have the option of implementing either an open interface or closed proprietary interfaces.

Utilizing care coordination applications to run holistically as a virtual system on formal and informal care platforms (including mobile devices), such as scheduling, automatic messaging, and voice and video telephony support. Considerable improvements can be achieved by interfacing different ICT technologies to empower the remote carer.

The combination of video call contact with the frail relative, coupled with access to an ongoing log of carer comments, and the ability to input to that communication system, could still effectively bring a remote carer into the virtual team delivering real care. (Marceglia et al., 2018)

It is important to note that quality problems are usually caused by poor integration. It is essential, therefore, to carefully consider issues of integration when planning or implementing a healthcare service that seeks improvements both to quality and cost-effectiveness as presented by (Chen & Liu, 2020).

5. CONCLUSION

From the literature review we can conclude that Telemedicine has strong benefits to collect from the use of Multilateral Business Models. The model adapted from (Ardolino et al., 2020) is deemed fit to organize all the findings and shedding more light on the subject.

All the categories that arose from the model represent practical aspects of the platform and had enough detail to create a verification instrument and can be used to describe a business model for telemedicine for a potential investor, strategic planning and better communicate the company's overall objectives.

Further research is being conducted to validate the model presented with in depth case studies evaluating the several combinations of parameters on unique scenarios.

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