



An exploration of a resilient communication model for CIB connecting academics and industrial practitioners in COVID-19

CIB Student Chapter of The University of Hong Kong

1. Introduction

Despite the growing contribution of knowledge by academia in the construction industry, a significant academic-practitioner gap is still evident. The gap has been widened by the globally spread COVID-19 pandemic since 2020 which disrupts the original communication and exchange modes between academic researchers and industry practitioners. In the construction sector this mainly relies on face-to-face interaction, such as conferences, small-scale seminar presentations, exhibitions and trade fairs. Cross-disciplinary, technology-intensive global scale project-based collaborations are instigated through these interactions. The pandemic has become a challenge for CIB— a platform that brings academics and practitioners together. Nevertheless, it is an opportunity for CIB to find alternatives to sustain the authenticity of face-to-face communication while being resilient in crisis periods through integrating new digital technologies.

For formal and informal communication, CIB global members use the website, emails, slack (especially among student chapter members to announce events and job opportunities and have discussions on research methods, collaboration ideas etc.) and Zoom (for meetings, webinars and workshops). Still these methods are not effective as face-to face communication methods due to less demonstrative ability, mixing up with formal and informal communication and accessibility of applications and their demand. According to the preliminary interview with collaborated CIB commissions, three major challenges exist after using multiple communication tools. One is that the virtual demonstration cannot let people thoroughly learn the whole picture and is not as immersive and real a reflection as face-to-face is. Secondly, a single online social tool like either Zoom or WhatsApp cannot fulfil the requirements of real-time formal meetings, delayed informal message dissemination and informal discussions needed by communications between researchers and practitioners. Thirdly, a disordered application of real-time formal and asynchronous informal online communication functions for

significant affairs sometimes can lead to information lost and information disturbance. These challenges reflect three new online communication requirements among academics and industry practitioners under the COVID-19 society. The first one is to deepen the attendees' perception and understanding of an element or a scene by the enhancement and adjustment of the visual and auditory information display methods. Secondly, an in-between communication mode combined main formal meeting with semi-formal and informal discussion in a considerate proportion should be considered. Third, the priority and hierarchy of different formal and informal discussion functions need to be defined.

The current study explores better methods specifically for the researchers and practitioners in a potentially more effective communication and cooperation. It would help rebuild a resilient and sustainable communication platform for linking the academics and industry people no matter in the COVID-19 and post-COVID-19 era. For the purpose of the enhancement of visual and auditory perception and experience, triggering positive and efficient conversations between researchers and practitioners, the visual and auditory display methods are reorganized, as well as formal online meeting across different disciplines and parties is assisted with informal discussion in a smaller group, both of which can fulfil the combined requirements of promoting project progress together and of knowing the partners better. According to the literature review and preliminary interviews, the study proposes to build a new multi-functional communication platform for CIB. That includes 360 virtual view, a scaled and switchable scene view, live soundscape, public long-/short-form asynchronous/live podcasting, combination of online and offline group meetings or solitary online meetings, public live broadcasts, asynchronous or instant text and audio message exchange, real-time audio conversations and simple contact saving. To build such a platform for communication and ideas exchange are essential to promote the cooperation among different researchers, institutions, and enterprises in the construction sector between researchers and practitioners.

2. Methodology

This research adopted a 6-step mixed method to build a more resilient online communication concept model that can closely approach the effects of face-to-face meeting for the connection between academic researchers and industry practitioners in the construction sector. The process began with identifying the gaps and objectives of this research. It was achieved through an in-depth understanding of the industry context and current situation, including the communication gap among parties and the impact of the COVID-19 pandemic on traditional face-to-face communication. Secondly, interviews with representatives from three CIB commissions and

task groups were conducted. This stage can be regarded as a preliminary investigation to both understand practitioners' requirements, assess the existing communication modes, and identify real challenges.

Thirdly, the crucial barriers hindering the communication among stakeholders were redefined based on the research and practitioners' experience. In this research, the challenges are (1) the incapability of the current tool to transfer the experience and environmental conditions, (2) lack of integrated social media platform to fulfil various requirements and demands in the industry, and (3) information delay, loss, and disturbance. After that, the media theory was reviewed, and the current social network products were assessed using SWOT and PEST analysis. This stage was to identify the concept, functionality, and feasibility of available products before prototyping the new network in the following step.

Then, all information was utilized to develop and prototype the new communication model. It was a strategy to gain various advantages from both the face-to-face and digital worlds. Finally, it reaches the experimental stage. The model's feasibility and efficiency will be validated through the collaboration among the CIBHKU student chapter, CIB commissions, and task groups. During the real-world implementation, the data will be recorded to improve the proposed model further as well as identify the core challenges in the actual situation. The expected outcome of this research can also be considered as the preliminary version to enhance collaboration among members and ultimately make CIB society better.

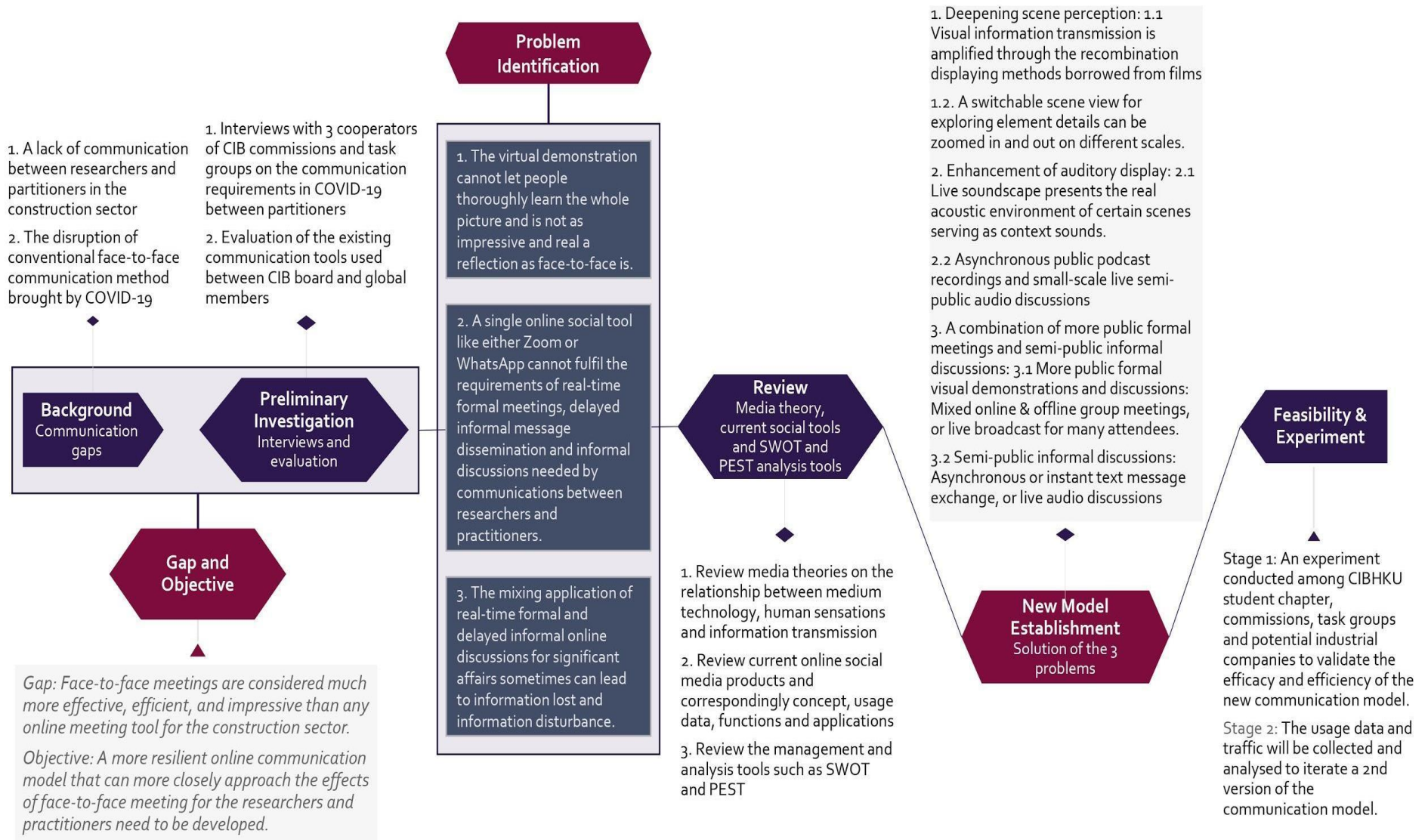


Figure 1: Methodology of the study

3. Literature review

3.1. *The importance of media in the society*

Media has never been lifted up as such important social infrastructure in the time of pandemic. Public needs to be informed by the media to keep safe, governments need to be held accountable, industries need to be kept connected (Daly, et al, 2020). In classic media theory, wide recognition of media has reached that it is the unique features of the medium, not the content that they carry, that affects the society (McLuhan, 1994; Federman, 2004; Euchner, 2016). McLuhan observes that any medium or technology is an extension of our human body's sensations. New forms of media "adds itself on to what we already are", realizing "amputations and extensions" to our senses and bodies, mediate our communication, and their forms or structures affect how we perceive and understand the world around us.

McLuhan further identified two types of media: "hot" media and "cool" media in relating to their demanded 'degree of human participation' (McLuhan, 2003). Film, for example, is a hot medium which needs lower active participation by users. Film watching fosters an immersive experience to users filled with high visual and hearing sense. The ideas are better conveyed to the audience in the sense. A phone call, instead, is a cool medium as users need to pay particular focus on listening, otherwise they may be interrupted by surrounding people, sounds and contexts. In a separated society caused by covid-19, people's demand of visual and hearing have been exaggerated, and the emergence of new communication software like ZOOM and clubhouse seems to aim fulfilling the gap (Lowenthal, et al., 2020; Serhan, 2020; Purtill, 2021). However, the effectiveness of these communication tools is lack of research from the perspectives of users' actual participation efforts and degree of information transmission. The following section had a preliminary analysis for that.

3.2. *Existing communication approaches through different media*

Traditional face-to-face (f2f) communication has strength in establishing trust through active body language, eye contact during in person networking. People's attention will be more focused during a meeting as playing phones in front of others who are talking is inappropriate in hidden social rules. Further, it is user-friendly for all ages. Elderly's capacity of communicating will not be limited by advanced technologies nowadays. In contrast, it is time-consuming and costly. In the globalization era, people's daily network and corporation are expanding temporally and geographically. Holding an offline meeting like a conference or seminar requires sufficient planning in advance, which includes manpower, venues and other equipment that increase the cost. The commuting time and cost are also linked to f2f not being

environmentally friendly. Moreover, it limits people’s possibility of reaching out as much as possible. It is easy to have a schedule conflict in a conference, as academics can only attend one roundtable session at a time. There are no other technologies that can help them to record other sessions they are interested in.

Under the current social structure, particular demands of communication in certain fields may bring the opportunity of insistence using face-to-face communication. For instance, in the construction industry, some corporations are based on real perceiving, such as building in construction sites. It is hard to manage the whole construction site in a distance. Moreover, as the sense of security has risen among citizens, the danger of leaking important documents and privacy information of online communication brings the opportunity of f2f meetings (Chow, 2021). Most importantly, new technologies are distancing individuals in the society. The desire of emotional binding and perceiving will retreat as an important component of human’s psychological health (Lamb, 2020; Galea, Merchant & Lurie, 2020).

At the same time, it is undeniable that new virtual technologies of communication seem more resilient in a turbulent society when facing environmental disasters or social crisis. The resilience and advancement of future technologies might be the most important external threats of using face-to-face communication. Charlton (2020) estimated that at this stage of the economic downturn, governments’ policy will encourage more online communication and innovations as it is cost efficient, environmentally friendly, and stimulating growth.

Four types of online communication modes considered to serve as the methods for displaying oneself and seeking right cooperated persons, and thus for triggering a new communication and cooperation, are categorized and reviewed, namely, social network, video conference platform, instant messaging, and media sharing network.

a. Social network

	Facebook	Twitter	LinkedIn	Instagram
Concept	An online social networking platform	A microblogging system	A social network specifically designed for career and business professionals	An online photo-sharing application and social network platform
Usage	Allowing users to create profiles,	Allowing users to send and receive	Allowing users to find the right job or	Allowing users to edit and upload

	share information such as photos and quotes about themselves, and respond or link to the information posted by others	short posts called tweets	internship, connect and strengthen professional relationships, and learn the skills for a career development.	photos and short videos through a mobile app
Popularity	Over 2740 million users	Over 353 million users	Over 722 million professionals	Over 1221 million users

b. Video conference platform

	Zoom	Google meet	Microsoft teams	WebEx teams
Concept	A cloud-based video communications application	A video communication service	A collaboration application that helps a team stay organized and have conversations	A collaboration solution that keeps people and teamwork connected anytime and anywhere
Usage	Allowing users to set up virtual video and audio conferencing, webinars, live chats, screen-sharing, and other collaborative capabilities	Allowing two-way and multi-way audio and video calls accompanying chats.	Allowing users to collaborate, meet online, and use many more extremely useful features for business communications	Allowing messaging, file sharing, video meetings, white boarding, calling, and other tools used to streamline teamwork and produce results
Popularity	Over 300 million participants	Over 100 million participants	Over 115 million daily active users	Over 324 million users

c. Instant messaging

	WhatsApp	Line	WeChat	Facebook Messenger
Concept	A platform providing messaging and voice-over-IP (VoIP) services	A freeware application for instant communications on electronic devices	A multi-purpose messaging, social media and mobile payment application	A messaging application
Usage	Allowing users to send text messages and voice	Allowing direct messaging, video and audio calls,	Allowing messaging, sharing pics and captions (moments)	Allowing direct messaging, video and audio calls, location

	messages, make voice and video calls, and share images, documents, user locations, and others	location sharing as well as money transfers	and also make digital payments	sharing as well as money transfers
Popularity	Over 2000 million users	Over 84 million users	Over 1213 million users	Over 1300 million users

d. Media sharing network

	YouTube	Podcast	Clubhouse	Website (CIB-HKU)
Concept	A video sharing service	An episodic series of spoken word digital audio files	An audio-based social media application	A presentation of related contents to CIB-HKU student chapter
Usage	Users can watch, like, share, comment and upload their own videos.	Users can download to a personal device for easy listening	Users can talk, tell stories, develop ideas, deepen friendships, and meet new people	To inform people about the organisation; past, ongoing and future events; and other related links
Popularity	Over 2 billion users	Over 155 million users	Over 10 million users	NA

There is a hierarchy of importance among the five types of communication modes, when considering their efficiency and efficacy on fulfilling the displaying and seeking demands. Media sharing network is the most important function that a platform shall be equipped with, as it serves as a displaying window for a person's profile, experience and researching fields and achievements on the one hand. On the other hand, the one who seeks a potential cooperated partner also needs to review the key information of that potential partner before beginning a contact. Social network ranks the 2nd and instant messaging ranks the 3rd. Video conference platforms serving as a virtual conference avenue does not directly contribute to promote a specific cooperation.

4. SWOT + PEST analysis of the mainstream social communication tools

This study incorporates SWOT and PEST models to analyse the proposed model. SWOT is a situational analysis tool for company leaders to assess strengths, weaknesses, opportunities and threats of a business or reviewing corporate strategies (Gürel & Tat, 2017). While SWOT seems a balanced analysis model that considers internal and external factors, the external opportunities and threats can be better informed by incorporating PEST model which consider political, economic, social and technological influences on a business (Sammut-Bonnici & Galea, 2015). The SWOT+PEST analytical framework is beneficial for communication software to evaluate its business and customs performance compared to competitors and larger industry contexts.

YouTube has created many channels, which is a great way to bring exposure to interests and activities. The channel is the home for broadcasting on YouTube for individuals and companies. The development of YouTube channels is continuing, many foundations, agencies, government organizations and nongovernmental organizations benefited from the services of new channels via YouTube. Also, universities benefited and began to create their own electronic channels, which increased in the world. These university channels have many goals, such as education, entertainment, training, social and global networking.

YouTube is the largest video sharing website on the internet with over 100 million video accesses and about 65,000 video uploads per day. It displays a wide variety of user-generated video content, such as movie clips, TV clips, music videos, amateur content, such as video blogging and short original videos. According to the global Alexa rating in 2021, YouTube comes in second place in terms of highest ranked websites, where YouTube's parent company Google still in the first place in global Internet engagement. Approximately 1.8 million sites link to YouTube and more than 2 billion people around the world already use YouTube. They currently watch around 5 billion videos every day. Further to that, approximately 1000 videos are uploaded by the time someone finishes watching one video on YouTube.

As YouTube is a public platform, anyone can upload and watch videos without any substantial barriers. This may lead to copyright challenges. With billions of users and videos in action, YouTube has indeed become a hotbed for copyright infringements. In addition, YouTube adverts are often very intrusive as well. Further, there is a long-term ban on user access to

YouTube currently in force in 5 countries: China, Iran, Pakistan, Syria and Turkmenistan, with Egypt the latest in a long line of other countries to face more temporary censorship.

WhatsApp is a top of the mind app among customers worldwide for personal and private chat. It has a very high awareness and extremely high user engagement. With increase in telecom services, the app has had a cascading effect in terms of installations. It is available in all major smartphone platforms like iOS, Android and over 2 billion people use this. WhatsApp also plans to launch applications for small businesses and enterprise level solutions. Similar to Youtube, WhatsApp is banned in China, United Arab Emirates, Iran, Syria, North Korea and Cuba. Therefore, people from these countries will not be able to reach communication through WhatsApp. Thus, the invitation-only audio-chat iPhone app: Clubhouse can eliminate this barrier. With its wide variety of features of clubs and virtual rooms with conversations on diverse topics will add further value to the proposed model.

The use of the Internet and Smartphones is on constant rise around the world. The vast majority of the Smartphone users install YouTube, WhatsApp, Zoom, and Clubhouse on their phones. This clearly shows that the use of these applications is highly likely to continue to increase in the future. Moreover, more and more people are developing and sharing their contents on YouTube. In fact, videos have largely overtaken written blog contents.

The strengths and opportunities of different communication approaches are integrated together in our proposed model to avoid the weakness and threats.

5. Preliminary interviews

Based on our interview of the leaders of CIB commissions and task groups, most of them acknowledged that the communication modes and efficiency between the researchers and other stakeholders or cooperated partners have changed a lot during the spread of the epidemic compared with before. Before face-to-face meetings and travelling were dominant communication methods, and now online meeting by means of Zoom/Teams etc is dominant. Online communication methods sometimes are efficient in saving time and traveling. However, some problems arose when such shifts of communication modes happened during COVID-19 era. Prof. Jia from W104 – Open Building Implementation said video meetings and videos which cannot fully reflect the whole real situations are the only way to communicate with engineers and workers on the construction sites. The instant messages which are sent at any time without an appointment cannot be seen and replied immediately, leading to a not real-time

conversation. Prof. Airaksinen from TG88 – Smart Cities considered that face-to-face meeting is more impressive and allows people to learn deeper the whole thing than a virtual demonstration is and does. Moreover, the virtual meetings by Zoom/Teams are more difficult to trigger some informal discussions whereas face-to-face meetings can let people know each other better. Prof. Bob Giddings supported face-to-face meetings and considered face-to-face meetings is nearly always more effective than the electronic ones. Thus, the gaps between the face-to-face meetings and online communications identified by these both senior researchers and practitioners shall be paid attention to and minimized through our study. The online communication model and concept framework need to be improved and adjusted to reduce its distance from face-to-face meetings.

6. Proposed concept model

6.1 The concept of the model

A new communication model that aims at solving the three challenges of virtual meetings and discussion as well as at producing a better communication effect closer to face-to-face one was established in this study, as the collaboration in the construction sector always involved many different disciplines and stakeholders in various fields. A total of two main aspects, i.e., **enhancement of the scene perception and understanding through visual and auditory display**, as well as **an integration of public formal and semi-public informal communications** were designed to solve the lack of real and impressive environment experience, as well as the independent social functions in different online tools such as separating formal public meeting from informal semi-public discussions.

To fulfil the two main requirements of perception enhancement and integration of formal and informal communication, four strategies which focus on deepening view scene experience, upgrading auditory display, combining more public and formal meetings together with semi-public and informal interactions. Then, several concepts and tools are proposed and adopted for each corresponding strategy that consists of the basic module of the whole model.

For the enhancement of scene perception and full context scene understanding, firstly, visual information transmission is amplified through the displaying of **360 view**. 360 view aims at showing the whole scene in 360 degree and serving as the background video for the fully understanding of the environment. Different angles and perspectives of the background scene can be viewed through panning and rotation. Secondly, for the observation and exploring details and additional information of an element or a scene, **a scaled and switchable scene**

view which may be a video or graphics can be zoomed in and out on different scales from large, medium to small. The camera and its position to the scene are relied on to define the visible area, the angle and focal length.

Visual medium dominates the online social communication tools, as people mainly obtain information and learn things from eyes. However, the potential value of audio medium is also great, as vivid audio input can transform the image and environment data to auditory organs and create a more immersive and real perception which can trigger deep thinking and deepen emotional bond. Moreover, audio mediums can be eye- and hand-free which can be listened to at any fragmental time. Thus, for the upgrading of auditory information transmission, firstly, **live soundscape** which presents the real acoustic environment of a certain scene and can arouse people's certain related experience and thus help people deeply understand a scene will be added as a sort of context sounds in the mainstream of speaking soundtrack. Secondly, **public long-/short-form asynchronous/live podcasting** is adopted as an easy way of audio media sharing. People can learn things deeper and more intellectually stimulating when concentrating on meaningful auditory input. It is also convenient for content creators to generate a series of their ideas sharing, as what people merely need is to record their speaking through an ordinary mic and a pair of earrings.

Most online virtual meeting tools focused on the formal demonstration and discussion without the opportunity of informal discussions. People cannot contact each other or save contacts after the meeting finishes. Thus, it is necessary to combine more public and formal meetings together with semi-public and informal interactions. Moreover, face-to-face meetings shall be employed as possible and it can be integrated with an online virtual meeting if necessary. **A combination of online & offline group meetings or solitary online meetings** with formal visual demonstration is the fundamental basis of an online communication tool. Based on this elementary function, **public live broadcasts** for many participants at a time on a larger propaganda scale such as conferences can be applied. Secondly, semi-public or private informal group discussion needs to be integrated in the whole online communication tool. That means, **asynchronous or instant text and audio message exchange, real-time audio conversations** and **simple contact saving** for collaboration shall be provided as supplementary communication methods to trigger informal and social conversations for better understanding of other people.

Thus, for the purpose of triggering positive and efficient conversations between researchers and practitioners and of better visual and auditory information transmission, the visual and auditory display methods for immersive experience are employed in this model. Secondly, the formal online meeting across different disciplines and parties supplemented with informal text and audio discussion within a semi-public or private group are adopted to fulfil both requirements of promoting project progress and of knowing the partners better.

6.2 Feasibility of proposed model

Three stages will be conducted to assess the newly defined online communication model. At stage 1, all CIBHKU student chapters, commissions, task groups and potential industrial companies or institutions will be invited to assess and evaluate the proposed concept communication model regarding the aspects of efficacy, effectiveness and efficiency. At the 2nd stage, money will be invested to develop a testing model, and then all invited CIB members will have a preliminary usage on this model. Then the usage data and feedback will be collected and analysed to iterate a 2nd version of the communication model. A backup scheme of the 2nd stage in case of the difficulty of a software developing is that a current online social tool widely used by CIB members such as Slack will be chosen to upgrade its functionality by adding the plugins of our proposed strategies and functions in the model. Then again, the usage traffic and feedback will also be collected for the 2nd revision of the improved online collaborative tool for CIB.

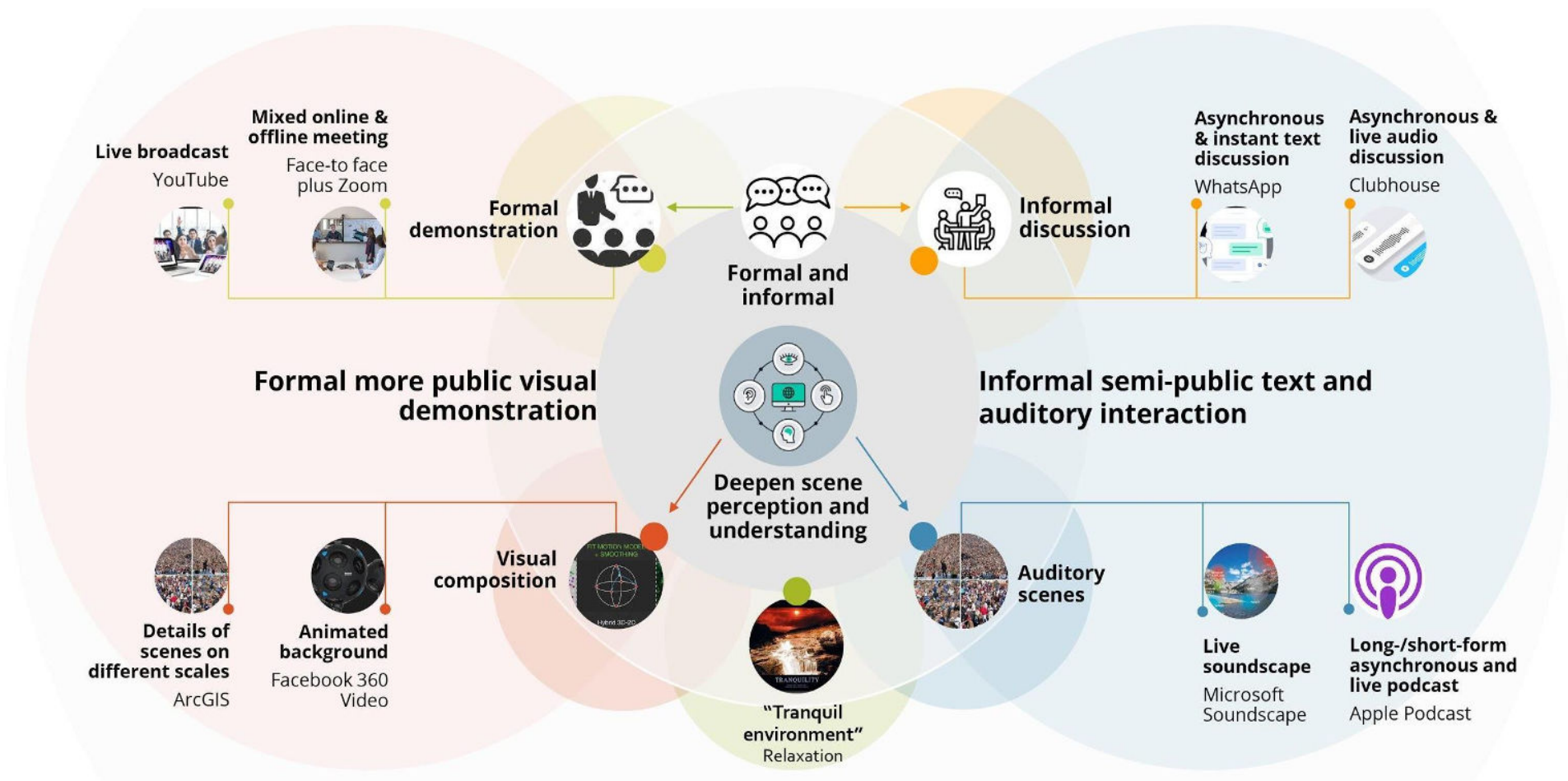


Figure 2: Newly established concept model

7. Conclusion

To sum up, this project aims to propose a prototype communication media specifically tailored to the construction industry whose needs are multi-scaled **demonstration, immersive information transmission and semi-formal networking**. By the end of this year, a final feasibility report will be submitted to the CIB which contains the comprehensive SWOT evaluation of our proposed communication prototype. The evaluation will be conducted in a board scale which includes sending email or interviews with more CIB members, student chapters, commissions, task groups and potential outside industry practitioners. Their comments on current communication gaps in construction fields, feedback to our proposed functions and implementation techniques will be recorded in the report. These responses will help us to refine the prototype more clearly to the needs of everyday communication in the construction industry.

If time and funding are available, a testing version of the prototype could be programmed with the experts' help in CIB main body. CIB HKU student chapters can invite a few academic professors, young scholars and industry practitioners to use the testing software. CIB-HKU student chapter can initiate a working group to record several visual or podcast sessions which includes research interests and current projects of academics and practitioners. The content can be recorded in various forms like dialogues, interview and self-filming. Finally, the real product testing data from users in CIB can be collected as the evidence for further improvement and maturation.

Multi-functional and immersive communication media would be the future of a technical based society in the global world. **Our proposal is significant in three ways**. First, the prototype fulfils the CIB's objective in collaborating and innovation in the Built environment. The perception enhanced and semi-formal communication channel with recorded sessions not only promote the collaboration among CIB members but also promote the CIB culture towards outside in the global stage. Interdisciplinary learning and information gathering can be reached through this media which helps the general public to know what the construction industry is doing and the impacts of latest achievements to everyday life. The second significance lays in the nature of this project which is about technological innovation in the built environment as well. While the concept of this prototype is frontier based on the current pandemic situation, the technologies that need are already there in the market dispersedly. The main work is to better integrate these technologies. The proposed prototype fits well in the gap of existing communication approaches in the construction industry and can be cooperated with existing

CIB media like websites and forums. Last but not least, though the prototype is designed for the special needs in the construction industry, it also has the potential to be promoted on a larger scale towards other industries. Especially in the post COVID-19 period where face-to-face communication will become more costly but desired. After all, better and instant communication helps to construct mutual understanding that makes the world better.

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