

Exploration of Indian Covid Vaccine Management System: A leap towards Atmanirbharta in the health sector

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Abstract

The purpose of this paper is to explore Co-WIN as a digital platform to manage the COVID vaccination for the citizens of India with the help of existing literature. A literature review was conducted with limited search words over the net, newspaper articles/interviews published, and also the guidelines and documents hosted by the Ministry of Health and Family Welfare (MoHFW). The study has raised a significant question about the need for the platform and also highlighted the issues related to privacy. An attempt has been made to study the issues and address if India could do things differently. A word about Indian Vaccine diplomacy and its big-heartedness to share the Co-WIN platform with other countries has also been brought out in brief.

Keywords: Co-WIN, COVID-19, PHC, vaccination, vaccine management system,

1. Introduction

Co-WIN is a platform launched by the Ministry of Health and Family Welfare (MoHFW) for the management of registration, appointment scheduling, managing vaccination, and certification for the citizens of India. This is not only for the government-run hospitals and dispensaries but also for the private COVID Vaccination Centres (CVCs). Co-WIN has published APIs for various functionalities to enable various stakeholders such as States/UT Governments, Private Service Providers, Software Developers, and any other agencies who wish to provide vaccination-related services to develop and rollout software solutions around and compatible with Co-WIN. All of these stakeholders are called “Application Service Providers” (ASPs) who may complement Co-WIN to enhance the diversity and functionality of the platform per se, offer better user experience and improve access to the national COVID-19 vaccination program. The ASPs are expected to roll out software systems for all or some of the functionalities relating to registration, scheduling of appointments, and management of vaccination and facilities with a caveat that

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they will have to use the master database maintained as part of Co-WIN platform and any update (add/delete/modify) will have to be made on this master database. Co-WIN allows the ASPs to retain copies of data relating to their customers subject to ‘Terms of Service’ promulgated by Co-WIN. This is also relevant to ensure that the citizen has a consistent view of his/ her own record relating to registration, booking, and vaccination irrespective of any third-party applications he/she may use.

Co-WIN is deployed on a cloud account of the MoHFW and can be accessed across the country through the internet. It has mainly four modules and is integrated with GoI SafeVac system. Registration and Scheduling Module enables one-time enrolment of a person into the system, as well as scheduling appointments for vaccination. This could be used for self-service access or can be used for assisted service for facilitated cohorts of beneficiaries at the vaccination facilities for on-spot or walk-in registration. This module records the beneficiary registration and appointment details on the Co-WIN platform. Vaccination Facility Module is used to register and manage the facilities for providing COVID Vaccination-related services. This includes features such as minimum age setting, declaration of vaccines and prices offered to beneficiaries and also the stock entries. This also includes a scheduling module for creation and publication of vaccination sessions with parameters such as online/on-spot slots rate and slots for 1st & 2nd doses and separate sessions for 45+ & <45 age groups. Vaccination Module is used by the vaccination facilities to manage the workflow at the facilities, including verification of beneficiary ID and the recording of vaccination events for a beneficiary on the Co-WIN platform. Certificate Module is used by the vaccination facilities to issue digitally verifiable vaccination certificates. The certificates are then stored as an Immutable Vaccination Event Record (IVER) and generate digitally signed vaccination certificates. The vaccination certificates can be downloaded by the vaccinator to be printed and shared with the beneficiary, or can be accessed and downloaded by the beneficiary from the Co-WIN portal or applications or other applications

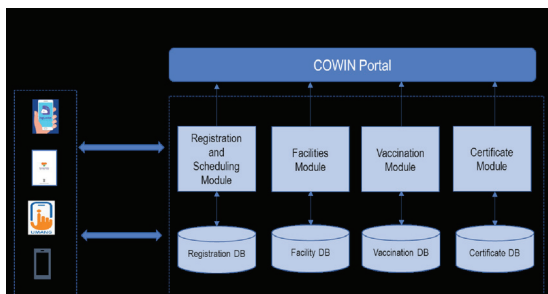


Figure 1: Block Diagram of Co-WIN

that are already integrated such as Aarogya Setu, DigiLocker or Umang; after authentication of the beneficiary through an OTP.

Co-WIN is integrated with the Government of India's SafeVac system, for reporting adverse events. If an adverse event is observed at the vaccination centre, vaccinators can report this in SafeVac. This can be done by clicking on the AEFI button in Co-WIN which will direct the vaccinator to the relevant SafeVac form. In addition, MoHFW provides API-based access to Co-WIN for third-party software applications. It gives a variety of value-added services directly to the beneficiary or enable empanelled COVID Vaccination Centres (CVC) to offer enhanced services to their users. This enabled function for locating the vaccination centres, scheduling appointments, certificate generation, reporting of adverse effects, etc are offered directly to citizens (B2C) or to private CVCs (B2B). This required a mechanism to verify the identity of the person vaccinated in accordance with the laws, policies, and guidelines of the Government of India, in order to ensure that an appropriate certificate is issued. Following ID documents have been specified by MoHFW for use for this purpose:-

- Aadhaar (CVCs to ensure that guidelines prescribed under Aadhaar Act are adhered).
- Driving License
- PAN card
- Passport
- Pension Passbook
- NPR Smart Card
- Voter ID

The purpose of this paper is to explore Co-WIN as a digital platform for managing the COVID vaccination for the citizens of India with the help of existing literature. There appears to be a perception in the literature as well as amongst people that Co-WIN is not working the way it should, probably because it did not meet their expectations or it could be that the platform has inherent lacunae which need to be explored, studied to overcome the limitations if any. An attempt has been made to analyse the available literature over the net, newspaper articles/interviews published, and also the guidelines and documents hosted by the Ministry of Health and Family Welfare (MoHFW). Further, a scan of the Chinese, USA, and the British model has been done to draw the parallels. The paper very briefly mentions the big-heartedness of In-

dia to share the Co-WIN platform with other countries. The study concludes by bringing out the findings and observations. This research subject is definitely an apt subject to go in for a field survey for both urban and rural areas to substantiate its findings.

2. Methodology

The study/ research uses the deductive approach because it starts with the reading of the literature. Qualitative data such as written texts, transcripts of interviews have been used. The study intends to explore the use of Co-Win as a digital platform by the citizens especially the urban upper and middle class who have access to smartphone/ internet facilities and also the use of Co-Win by CVCs and PHCs in registering the citizens for vaccination in the rural sector. Given the vastness of the subject, I intend to limit the scope of the research by studying its existing use and setting aside the myths and the feeling of looking down upon on our indigenous product. There is some data available related to the app but, peer-reviewed literature is almost nil, and therefore I may limit to exploring the documents which are available on Government of India sites. While the aim of the research is to put together an objective understanding of the Co-Win app, I intend to suggest short-term/long-term actions which may help the software developers to make the platform citizen-friendly.

3. Literature review

A grand challenge was announced by MoHFW along with the Ministry of Electronics and Information Technology to strengthen the Co-WIN system on 23 Dec 2000 ^[1]. Innovative start-ups and emerging technology specialists were invited to augment and scale the Co-WIN platform. The challenge was open till 15 Jan 2021. Ironically, the Co-WIN was launched on 16 Jan 2021 for the management of registration, appointment scheduling, managing vaccination, and certification by the Ministry of Health and Family Welfare (MoHFW). Private CVCs were on board for the vaccination program through the process laid down by the Ministry. This was in accordance with the guidance issued by the MoHFW which was amended from time to time. The same is available at www.mohfw.gov.in. Guidance note for Co-WIN 2.0 letter dated April 23, 2021 is also available at MoHFW website ^[2]. The document mentions the need of augmenting and simplifying the process of registration for vaccination etc. Based on the feedback received during phase I, MoHFW decided to come out with Co-WIN 2.0. Further Guidelines for the integration of Co-Win with Third-Party Applications developed by Ecosystem Partners is available at MoHFW website ^[3]. These documents provide a fair amount

of information and introduction to Co-WIN platform and also lay down the customer data management rules.

Varsha Bansal, a journalist from Bangalore published ‘Pandemic Technology report’ as part of MIT Technology Review on Feb 10, 2021. It brought out the technical glitches as a reason for low vaccination^[4] at the same time as she called Co-WIN as the Asia’s most ambitious vaccination drive. On May 21, Unnati Sharma reported that many software developers and tech companies are providing real-time updates to help people book appointments^[5]. The author highlighted that these companies leveraged the Co-WIN’s open API feature and thus solved the so-called technical glitches. Further, on June 10, 2021 Hindustan Times reported that beneficiaries can now correct mistakes in their certificates via the Co-WIN digital platform. At this point, Union Health Ministry stated that the digital platform has been modified from time to time to make it more user-friendly for citizens. On June 30, 2021, Economic Times reported that about 50 countries which include Canada, Mexico, Nigeria, and Panama showed interest to have Co-WIN like system to run their vaccination drive^[6]. At the second Public Health Summit 2021 on ‘Emerging Imperatives in strengthening Public Health for India’ organized by the Confederation of Indian Industry, Dr. RS Sharma the chairman of the empowered group for COVID-19 vaccine administration stated “ In five months Co-WIN has grown to handle 30 crore plus registrations and vaccinations. It is a citizen-centric platform and provides a single source of truth till the district level. The development of Co-WIN like platform shows India has the capability to develop such great scalable digital systems.”

Hon’ble Prime Minister Shri Narendra Modi during his address at the Global Co-WIN conclave on Jul 05, 2021 said that there is no parallel to such a pandemic in this era and no nation can overcome the challenge in isolation. We have to learn from each other and guide each other about our best practices^[7]. Therefore, Co-WIN platform is a digital public good to the world to combat COVID-19.

In addition to this, a scan of what is being done in other parts of the world was done on site.^[8]& ^[9]. Information for COVID 19 vaccination providers etc is available. The CDC USA uses VAMS which is a web-based application that supports planning and execution for COVID-19 vaccination^[10].

4. Observations and discussion

The literature reveals that the basic architecture of Co-WIN is the Real-Time Monitoring (RTM) model-based. It ensures evidence-based policymaking, increases the efficiency of the immunization program, avoids overcrowding at the

vaccination centers, and last but not the least avoids corruption. RTM was first introduced in eVIN for Universal Immunisation Programme not only in India but also in countries like Zambia, Indonesia, Australia etc ^[11] accessed on 25 Jul 21). While RTM may not be the optimal solution since it has its own limitations but it certainly provides advantages related to supply chain, cold chain management and wrt data of vaccination undertaken. In Co-Win, the citizen has to register himself and he has to schedule his appointment etc, thereby increasing the burden on the citizens in general. This limitation was known and therefore walk-in registrations have been enabled. Also, the PHCs and the ASHA workers have been authorized to help register citizens. Further, same registration can be used to register other family members etc. Dr RS Sharma, the chairman of the empowered group for COVID-19 vaccine administration confirmed at the second Public Health Summit 2021 that “from the beginning itself we ensured that it is very easy to get on the platform and at the same time if that is not possible then you can call a centre and go to a common service centre to get an appointment.” He further added that one can go without any appointment to a vaccination centre and get vaccinated.

Though the issue has been addressed by providing the offline mode of operation but it is a fact that in spite of projects like ‘Digital India’ we are still lagging as far as the availability of the internet to the masses is concerned. While huge progress has been made but there is still a large population segment that does not have the access to the internet. Even in the areas where the internet is available, there is a segment of society who have low digital literacy and therefore can’t access/use the internet. On top of this, the possibility of technical glitches can’t be ruled out. The ‘digital divide’ along with class, caste, gender, urban/rural, marginalized districts, access to resources (education, health), social capital, etc leads to inequities. Some of the evaluators will use all these reasons stated above against the Co-Win, however, Co-Win has taken the feedback in a positive manner and undertaken mitigation measures as required. For instance, the facility to work offline (akin to Open Data Kit (ODK)), removing the burden of the citizens, adding the options of identifiers, etc to make this platform work. The introduction of digital technologies prior to the pandemic and during the pandemic are the key interventions as part of RESPONSE to the pandemic.

The technology did bring in efficiency but the efficiency gained through the use of Co-Win needs to be balanced with the Right to health and equality which falls under the broad term of ‘Accessibility’ and the ‘Data Protection’ which mainly is concerned with the Right to life and privacy. As far as ‘Individual privacy and data protection is concerned, Co-Win maintains a centralized database. It does not use the ‘Open Data Kit (ODK)’ tools and uses only the aggregated data for evidence-based policymaking. Though India does not have a data protection law but there is a privacy rule and

policy regarding data protection in MoHFW guidelines. National Digital Health Mission (NDHM): Health Data Management Policy (HDMP) is also applicable. In case there is a deviation, both the guidelines and HDMP do not have teeth to take charge and therefore grievance redressal mechanism is required with enough deterrence for the violators.

It is incomprehensible that there are a few individuals who take the digitization process as a violation of the Electronic Consent framework and facial recognition or authentication linked to Aadhaar as a violation of privacy but the fact is that the features being used for Co-Win Registration are by no means violation of any regulations rather a means for login and facilitation and has an electronic trail which can be tracked on need basis only. Here, Hon'ble Supreme court order in respect of Aadhar and privacy is relevant ^[12].

5. International Scan: Could India have done things differently?

In a technologically-driven world, it is likely that every country would have had at least partial digital vaccination drives. Thus, India fared no different but the real question is how have other countries fared in relation to India? To begin with let's start with the Chinese model. Their Vaccination programs for selected groups were initiated as early as December 15th of last year, using locally developed and produced Chinese vaccines. The process was further digitally streamlined for those who needed to travel abroad for their studies or work. For example, Shanghai's Healthy Cloud app^[16]. It required them to register their flight details and provide reason for traveling abroad, before being administered two doses of the vaccine within a fortnight at a local community health centre. The app may also be used in the future as an 'immunity passport' to facilitate inter-provincial travel amidst any new outbreak. It also has the potential to provide authorities with primary data about the efficacy of inoculation. The model appears to be very similar to the one India did, the only difference perhaps is that we started a little late and that is mainly attributable to the availability of the vaccine.

The United States of America, a country with extensive privacy jurisprudence, allowed States and jurisdictions across the United States to use different web-based applications for vaccination clinic management. One of those systems is the Centers for Disease Control and Prevention's (CDC) Vaccine Administration Management System, or VAMS. In addition, most states in the USA are predominantly distributing vaccines through establishing hotline numbers, which residents can call to schedule their appointment, indicating an 'opt-in' approach of sorts. Some states even allow residents to preregister for

the vaccine if they are presently ineligible, arranging to notify them when they become eligible. Most states also require residents to visit a clinic, provider, or health centre only with an appointment.

In the United Kingdom, the NHS is delivering the coronavirus (COVID-19) vaccination program. This includes ensuring that the right data and technology solutions are in place for vaccinations to be delivered safely and efficiently. The NHS is delivering the vaccine in 3 main ways:

- hospital hubs - NHS provides for vaccination on site
- local vaccine services – community or primary care led services which could include primary care facilities, retail, community facilities, temporary structures, or roving teams
- vaccination centres – large sites such as sports and conference venues set up for high volumes of people

The above three models share a very common fact that services are delivered digitally through Digital Health Mission in India and countries abroad will have databases with facilities for the patients and the health service providers to access the records legally. While some of the nations were ahead of India in terms of digitization of the services but corona period has brought to the fore that India can also go digital and we are at ease with the handling of digital data for delivering health services. The credit for this to some extent can be given to the creation of digital artifacts like Aadhar which has enabled the delivery of services digitally.

6. Vaccine Maitri / Co-WIN Diplomacy

India's Vaccine Maitri has positioned India at the forefront of the global fight against COVID 19. As the 'Pharmacy of the World' and keeping our commitment to use 'Made-in-India' Vaccines for the welfare of humanity, it has given a ray of hope against the pandemic in more than 70 countries across the globe^[13]. Furthermore, Co-WIN India's indigenously designed digital vaccine delivery platform is becoming global. Over 50 countries from across Central Asia, Latin America, and Africa have shown interest in the technology. Hon'ble Prime Minister during his inaugural address of Co-WIN Global Conclave on Jul 05 said that India is prepared to render Co-WIN as a digital Public good to the world to combat the COVID 19 pandemic. The Co-WIN Conclave, according to Shri Modi, is the first step towards bringing this platform to a global audience. Hon'ble Prime Minister asserted that India has provided 350 million doses of COVID vaccines through Co-Win, with 9 million individuals receiving vaccines on a single day. Additionally, persons who have been vaccinated do not

need to carry around delicate pieces of paper to confirm their vaccination status. It's all digitally available. The Prime Minister also emphasised the need to customize the software's capacity to meet the needs of interested countries' local governments. The Prime Minister concluded by expressing hope that, guided by the 'One Earth, One Health' concept, humanity will be able to overcome the pandemic^[14]. As humanity is fighting against the pandemic, the humanitarian gestures of India are reverberating the world.

7. Conclusion

The study demonstrates that India has adopted the world's best practices and kept people at the heart of our work. Co-Win is designed to meet the user needs and aims to reduce the burden on healthcare staff and make the best use of scarce health resources using digital means. Co-WIN has grown to handle 130 Crore plus registrations and vaccinations. The registration trends from the Co-WIN dashboard are as shown in the figure 2 ^[15].

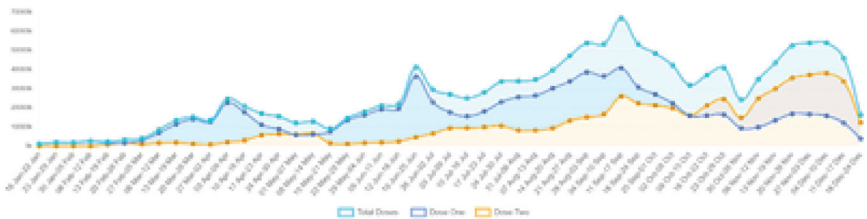


Figure 2: Registration Trends

The data above indicates that the usage of Co-WIN is substantial however, for enhancing the vaccination of the citizens it must overcome the digital divide. While India's love for techno-solutionism is very much visible but at the same time India has a heart for its people and that is the reason a host of other methods are also being used in tandem to inoculate the Indians along with Co-WIN, ensuring a fixed number of 'offline' walk-in appointments per day, or setting up an IVRS telephone line where users can register themselves and receive a call or SMS with an appointment, or door-to-door vaccinations are also options. Co-WIN, India's indigenously developed digital vaccine delivery platform is now available in 12 languages thereby making it more citizen-friendly and ensuring that enhanced numbers can register and get vaccinated. To enable and facilitate those people who intend to travel abroad, Government has allowed the users to link COVID 19 vaccination certificate to passports on the Co-WIN portal. Thus Co-WIN is not only a 'Digital Public Good' to the world but also a 'Scalable', 'Inclusive' and 'Open' technological system.

While this study is pioneer in giving a holistic analysis of the Co-WIN as a digital platform, there is a need to undertake a field survey to corroborate the statements made on the basis of literature and the documents available. This will facilitate a systematic understanding of the citizen's trust in the Co-WIN platform and will also provide useful feedback for the policymakers/application developers to amend the qualitative requirements as required.

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