Establishing the nexus between cultural heritage and risk-informed sustainable development: Experiences of understanding and addressing systemic disaster risk from the World Heritage City of Ahmedabad

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Abstract

The COVID-19 pandemic has drastically impacted all walks of life. Although, the impact of COVID-19 in terms of estimated number of cases & deaths based on anecdotal data is available, the effect and impact, in terms of losses in different sectors awaits confident comprehension. It is understood that COVID-19 is the consequential manifestation of systemic risk but there are only few studies that goes back in time to investigate the chronic nature of underlying vulnerabilities in a community that is responsible for shaping the disaster at hand. This body of work investigates the process of how the risk, the translation of which contributed to faster transmission of SARS-CoV-2 and relatively higher deaths due to COVID-19 during the first wave, in the World Heritage (old) city of Ahmedabad, had been building over a period of more than 600 years by considering the old city as a ‘system’ and its functional and operational dimensions as ‘sibling systems’. The methodology adopted by the study would help policy-makers to understand how decisions of the present, which disregards the past, can lead to tumultuous consequences, emphasising on the need of local level understanding and assessment of risk through the lens of systems analysis. This study also tries to understand how the overall system (the old city of Ahmedabad) managed to cope with the effect and impact of COVID-19 by leveraging its ways of life and collective consciousness - cultural heritage – to build a case of the urgent need of mainstreaming cultural heritage into risk-informed sustainable development.

Keywords: Disaster; Systemic Risk; COVID-19 Pandemic; Culture & Heritage; Ahmedabad India
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Introduction

Since the first report of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), causing coronavirus disease 2019 (COVID-19) [1,2], there have been 172,242,495 confirmed cases and 3,709,397 deaths all over the world, as on 5th of June, 2021 [3]. On 30th January, 2020, following the recommendations of the Emergency Committee, the World Health Organisation (WHO) declared the outbreak as a Public Health Emergency of International Concern (PHEIC) [4], which was eventually declared a pandemic on 11th March, 2020.

The pandemic have had differential effects and impacts on every nation of the world. The deaths and cumulative number of cases, as reported by the governments, although anecdotal and not systematic [5], are known to a certain extent, but a multi-sectoral impact analysis at the global level is awaiting confident comprehension. India, as on 5th June, 2021, has 14,77,799 number of active cases and 3,46,759 deaths [3]. With the first case of COVID-19 reported on the 30th of January, 2020, India has come a long way – from implementing a series of nationwide lockdowns and then another series of ‘unlocks’, followed by several state and district level containment strategies like night curfews. While analysis and interpretation made at this point in time is necessarily provisional [5], looking back at the first wave of SARS-CoV-2 seems to reveal a couple of pointers which could perhaps be lessons that are to be learnt for better management of future outbreaks and strategise risk-informed sustainable development.

It is understood that COVID-19 is the consequential manifestation of systemic risk but there are only few studies [6] that goes back in time to investigate the chronic nature of underlying vulnerabilities in a community. This becomes particularly important because the measures employed to contain the transmission were either generic in nature like nation-wide lockdowns [7, 8] or focussed containment strategies based on computer-aided simulations and predictions [9] without paying much heed to how these decisions would interact with the chronic vulnerabilities [8].

Most of the computer aided models of predictions failed miserably since its accuracy depends not only on the correctness of data but also on factors which were pointed out by Taleb in his note [10] - conventional and empirical assessments of risk (of COVID-19 case surge or mortality) has restricted focus on the bulging centres of bell curves, disregarding the potentially fatal “fat tails”—events that seem “statistically remote” but “contribute most to outcomes,” by precipitating chain reactions. Therefore, it is absolutely essential that systems analysis be done to establish a correlation between the endogenous and embedded nature of systemic risk and the fatal “fat tails” be established, so that the understandings can be incorporated in strategies of not only risk management but also resilient sustainable development.

Secondly, looking on the brighter side, away and beyond the impact of COVID-19 in terms of death, it is also important to investigate factors and enablers that helped communities to float through such trying times. Within the disaster management space in the Indian context, cultural heritage has usually been interpreted within the boxed understanding of ‘tangible’ and ‘intangible’, in dire need of risk management – an inference easily drawn from the lack of use of cultural heritage as a tool for disaster risk management in the acts and policies, and its limited usage in community based disaster risk management. Therefore, it is also essential to explore the possibility of expanding the role of cultural heritage in disaster risk management.
by interpreting cultural heritage in its truest form - ways of living developed by a community and passed on from generation to generation [11]. Understanding this would help policymakers in designing better risk management and sustainable development strategies by tweaking enablers that are already present in the social fabric of a community – rather than inventing alien strategies that finds no acceptance.

This body of research is designed to re-iterate and emphasise the fact the disaster risk management strategies and developmental decisions should be taken only after a thorough systems analysis is done at a micro-level, relying more on systemic capacities of the concerned community.

System of interest (study area) – The old city of Ahmedabad

To better understand the embedded and endogenous nature of systemic risk, as put forth by the United Nation’s Office for Disaster Risk Reduction (UNDRR), the researchers selected a city with more than 600 years of history – a living heritage – the World Heritage City of Ahmedabad also known as the old or walled city in Western India. In addition to this, the proximity of the city to the researchers’ institute and well established network with both the government as well as non-government stakeholders, the walled city was found to be best suited to examine and understand the translation of the ‘invisible’ systemic risk into a disaster (definition of disaster as per National Disaster Management Act of India, 2005).

Systemic Risk – A Primer

Although the understanding of systemic risk is borrowed from the financial (banking) sector [12], UNDRR defines systemic risk as a risk that is endogenous to, or embedded in, a system that is not itself considered to be a risk and is therefore not generally tracked or managed, but which is understood through systems analysis to have a latent or cumulative risk potential to fundamentally impact overall system performance when some characteristics of the system change (GAR 2019).

Translated lucidly, systemic risk can be interpreted as a chronic risk that has been building in a system across timescale, without anyone paying much heed to it and hence, generally not tracked or managed, as the system as a whole, functions adequately and therefore invites no inquisition or suspicion. In the context of disaster risk management, systemic risk assumes a multi-systems perspective, not confined within a single system (sector) and its elements or sub-systems. For example, from an economic perspective, systemic risk is defined as “the risk that (i) an economic shock triggers through panic or otherwise either the failure of a chain of markets or institutions or a chain of significant losses to financial institutions, (ii) resulting in increases in the cost of capital or decreases in its availability, often evidences by substantial financial-market volatility” [13], but in the disaster risk management space, risk becomes systemic when a society’s essential systems, e.g. telecommunications, infrastructures, health care, are potentially threatened [14].

This perspective focuses on the perpetuation of society and implies that contextual factors originating in the domains of demography, ecology, technology and socio-economic structures have a significant influence on systemic risks [12]. Furthermore, these contributing factors are often related with each other, leading to interdependencies and increased complexity which impede comprehensive risk analysis and consequentially, pose a major stumbling block for risk management as evident in case of COVID-19.

COVID-19, therefore, can be said to be the culmination of systemic risk into a disaster, built
chronically through the interaction of all the systems of the society (here society can mean a city or a village or a district or even a state or nation), over a considerable period of time.

Breaking down the COVID-19 scenario as per UNDRR’s definition –

A. the risk(s), which led to the terrible effects and impacts of the pandemic, were chronically built either in the society (considering society as a larger system) or within its constituent systems (lack of preparedness of the public health infrastructure, lack of social safety nets that led to the exodus of migrant labourers etc.), thus endogenous or embedded within the system, and hence;

B. the system, itself, was not considered to be a risk and thus generally not tracked or managed (while plans & frameworks for efficient response and management of outbreaks / epidemic / public health crisis were discussed and developed, a detailed systems analysis in terms of the probable impact of such events were not done).

It is to be noted that the understanding of systemic risk bears an uncanny resemblance to Taleb’s Black Swan Theory [15], where Taleb asserts that a Black Swan event is an unprecedented event with the following attributes - firstly, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility, secondly, it carries an extreme ‘impact’, and thirdly, in spite of its outlier status, human nature makes us concoct explanations for its occurrence post-event, making it explainable and predictable.

The ongoing debate on COVID-19 being a Black Swan event has been strongly opposed by Taleb himself as he emphasises that the pandemic or any such extreme event was and is predictable to a large extent, that is the probability of occurrence, however what is not accurately predictable are the consequences, because the output being predicted would always remain disproportionate to known inputs [16] coupled with the inability to model the degree of human subjectivity in any process. Taleb in his seminal discourse [15] highlights that the consequences of any such event is understood only in retrospection and that is exactly where this study comes in. If a process of interrogation is carried out to investigate the chronic risk(s), building over a period of time, the nonlinear and catastrophic manifestations may be prevented – a ‘probable’ black swan event may be prevented by killing it in the egg [16], leading to resilient sustainable development. This study tries to investigate such systemic causes in the old city of Ahmedabad.

The old city of Ahmedabad – A system of systems

To understand the chronic nature of disaster risk through a systems lens in the old city of Ahmedabad, it is pertinent that the old city of Ahmedabad be seen and considered as the larger system – an ensemble of smaller systems, to be referred to as sibling systems hereafter. These sibling systems may be independent, self-sufficient or dependent on other sibling systems for their purpose and functionality. Malfunction of one sibling system may send negative reverberations along the entire system but the entire system would not fail until and unless the ‘risk stress’ shoots beyond the overall bearing capacity of the system - failure in one or more sibling systems will lead to cascading events which may lead to major disturbance or even complete failure of the whole system [12].
Risk stress or bearing (coping) capacity of each sibling system or the larger system is not to be understood as a quantitative figure, or a 'magic number' but as a conceptual notion to indicate that each system has a tipping point [12], beyond which the system, be it a sibling system, a cluster of sibling systems or the system at large would fail. In general, the sibling systems are understood to be dependent on each other to various degrees for their functioning and synergistically contribute to the well-being of the larger system.

To understand the composition of the old city of Ahmedabad in terms of sibling systems, two lenses were used and finally an optimal composition was adopted which adequately estimated the life and functions of the old city.

Using the first lens, the old city was viewed as a Historical Urban Landscape (HUL) [17], which recognizes the landscape as a “living heritage” - an “organism” made of complex characters, relationships and multidimensional inter-relationships [18]. HUL can be considered as the combination of six perceived landscapes (sibling systems, so to speak):

A. Natural landscape consists of existing natural capital (biomass, biodiversity, parks and urban corridors, agricultural areas, natural resources, lakes, rivers, energy resources, etc.) that geographically and territorially characterizes a city.

B. Infrastructure man-made landscape is composed of built infrastructures and equipment systems (roads, ports, airports, bike paths, housing, public spaces, etc.) that are able to improve the quality of people’s life, to promote social welfare, and the economic development (improving economies of agglomeration, scale, reducing transportation costs, etc.).

C. Cultural man-made landscape comes out over the centuries. It is the heritage (cultural memory) of past generations that have to be transferred to future generations (historic centres, etc.) as a fundamental element of identity.

D. Social landscape is composed of social/civil networks, density of associations, third sector, voluntary sector, etc.

E. Human landscape reflects the expertise, local knowledge, local entrepreneurship, creativity of individuals. It helps to determine “human scale” of settlement.

F. Financial-Economic landscape consists of local credit institutions, foundations, co-operative banks, third sector organizations, institutions that promote financing of district projects (promoted by inhabitants, etc.), etc.
Using the second lens, the old city was seen as the synergistic composition of 11 dimensions (sibling systems) as proposed by Hubbard, 2002 [19]. Hubbard’s dimensions are congruent to the 8 systems identified in [20], which highlights the system of systems nature of communities. Upon combining both the lenses and based on multiple site visits, the researchers unanimously agreed that the ensemble of the 10 sibling systems shown in Figure 1, adequately explains the normative functioning of the old city of Ahmedabad.

It is to be noted that the understanding of systems and sibling systems can be upscaled and downscaled to any desired level (from a city to a village or even to a district or a state) with necessary tweaks as and where required.

**Figure 1. Social Sibling Systems**

To avoid ambiguous interpretations of the sibling systems and to justify the rationality of selecting the above ten dimensions, particularly in the context of COVID-19, the table of interpretation [Table 1] may be consulted.
Table 1. Social Sibling Systems – Interpretation and rationale

<table>
<thead>
<tr>
<th>Dimensions (Sibling Systems)</th>
<th>Interpretation</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Health</td>
<td>The health of the community under observation.</td>
<td>COVID-19 is primarily a public health concern and needs to be accounted for. In general, health and well-being of a community forms an important pillar of systems analysis at the community level.</td>
</tr>
<tr>
<td>Governance</td>
<td>The means and measures employed by the government (local administration) to contain the spread of COVID-19</td>
<td>Much of the activities, inter and intra-community, in the old city of Ahmedabad was influenced by the measures implemented by the local government, which directly or indirectly affected the other sibling systems.</td>
</tr>
<tr>
<td>Culture &amp; Relations</td>
<td>The traditional ways of life in the communities of old city and the inter and intra-community relations.</td>
<td>The old city of Ahmedabad is an unique landscape – the ways of life have been shaped by years of experience and multi-cultural confluence. The ways of life of communities have led to social cohesions of various degree, inter and intra-community, which is manifested through the social relations and ties.</td>
</tr>
<tr>
<td>Media (news)</td>
<td>Media – print, electronic &amp; social.</td>
<td>The role of media (of any form – print, electronic or social) in affecting the other sibling systems of a society cannot be neglected.</td>
</tr>
<tr>
<td>Education</td>
<td>Education sector – not the level of literacy.</td>
<td>Due to the measures employed by the government, amongst other sectors, education sector was affected and demands an introspection as to how the society responded to it.</td>
</tr>
<tr>
<td>Religion &amp; Religious Practices</td>
<td>Religion and religious practices is understood to form an important pillar of community life.</td>
<td>Religion and religious practices drives the way of life in close-knit communities and is often found to be misleadingly interpreted as culture. It is to be noted that in this study religion and culture are not to be treated singularly; while religion has its usual interpretation, culture has been interpreted and used as the collective consciousness of communities built through years of experience and interactions.</td>
</tr>
<tr>
<td>Science &amp; Technology</td>
<td>The enhanced use of science and technology by various sibling systems. This may or may not include innovations.</td>
<td>In the battle against COVID-19, science and technology emerged as the most used tool. Even otherwise, the gradual reliance of individuals and communities on science and technology in whatever form need to be accounted for in such systems analysis.</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>This circumscribes two aspects: a. Healthcare systems b. Transportation systems</td>
<td>While infrastructure, invariably, circumscribe many sectors, but at the community level, all of such sectors are not relevant and also not important as far as a study on the effect of COVID-19 is concerned.</td>
</tr>
</tbody>
</table>
While healthcare infrastructure is an obvious selection, transportation has been selected because much of the businesses and livelihood depends on the transportation system which came under serious restrictions.

<table>
<thead>
<tr>
<th>Basic Necessities</th>
<th>This includes the access to availability of food &amp; water primarily, amongst other essentials.</th>
<th>Due to multiple factors including the financial condition of the demography, access to necessities were questioned multiple times. In general, access to basic necessities and its availability are an integral part of community well-being.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business and Economy</td>
<td>Individual and community level businesses.</td>
<td>Amidst many other sectors that were affected, businesses and economy of individual household and thereby communities were affected, which indirectly affected many other sibling systems like access to basic necessities, education etc.</td>
</tr>
</tbody>
</table>

With the above understanding, of systemic risk and sibling systems, the researchers investigated the process of risk building through systems analysis across timescale.

It is to be noted that the process adopted to understand the chronicity of risk should be and can be adopted in other contexts too and it is absolutely essential that such kind of understandings are developed by policy-makers before deploying decisions of risk management or risk-informed sustainable development.
Methodology

The study is composed of the following parts. The first part is focused on developing a partial understanding of the chronic risks in the old city of Ahmedabad to understand how the impact of COVID-19 is the consequential manifestation of systemic risk building across timescale. While there is no laid down and accepted standard of systemic risk assessment, the researchers follow the footsteps of Anthony Oliver-Smith [21], and undertook a detailed analysis of the history of the city spanning across various sectors of the society, emphasising on the variations seen in the sibling systems. In addition to systemic risks, the analysis also focuses on systemic capacities that have been built in the communities of the old city of Ahmedabad.

The second part is composed of two sections. In the first section, the researchers perform a hybrid Grounded Theory Analysis (GTA) of narratives collected through news articles, reports etc. (literature review) on the scenario of COVID-19 in the old city of Ahmedabad from reliable sources across print, electronic and social media to understand if the effect and impact of COVID-19 can be understood as the interaction of sibling systems, and to understand if cultural heritage (to be interpreted as the collective consciousness of a community or the ways of life) been helpful in curtailing the effect and impact of COVID-19? Based on the outcomes of this analysis, themes were identified and questions were designed to interview selected stakeholders. This encompasses the second section. These semi-structured interviews were carried out with the purpose of verification and validation of the narratives and to interpret the overall picture of COVID-19 scenario in the old city of Ahmedabad in terms of sibling system interactions.

The third part of the study contains Causal Loop Diagrams (CLDs). A CLD is used in this study to depict the causal connections and illustrate how the COVID-19 scenario in the old city developed over time – how factors (in some cases sibling systems) influenced each other and piggy backed to itself, via feedback loops. [22]. A preliminary understanding of systems interaction was obtained through the CLDs. Based on this a conceptual model, Sibling Systems’ State diagram (SSSD) was used to plot how the sibling systems interacted with each other and were influenced by each other. SSSD is a visualisation tool developed by the researchers to depict temporal sibling system dynamics. The purpose of developing such a model was also to identify fragile sibling systems which might require attention and also those systems, the potential of which may be harnessed.

The fourth part draws a comprehensive conclusion to the study.

Understanding Systemic Risk in the Making

The Old City of Ahmedabad: A ‘living heritage’

The city of Ahmedabad has been described as - “Unlike Bombay, Calcutta, Madras, and Kanpur, Ahmedabad was not a creation of the British, but a city which, while remaining true to itself, successfully adapted to the new industrial age, carrying over commercial and industrial skills and patterns of traditional social organization. In no great city of India can the continuity of the past and present be seen as clearly as in Ahmedabad” [23]. The city of Ahmedabad, was established by Sultan Ahmed Shah in the year 1411. The city derived its name, from its founding ruler who, established the city mainly for political reasons. The geographical location of the city was along former trade routes and, in the vicinity of an existing
commercial settlement of Asha Palli. The population therefore remained commerce oriented, with an economy based on flourishing trade. The indigenous financial and mercantile elite of the city, have been responsible for shaping the city, and, the future of the city has depended on them. Initially the development of the town was slow, until the initiation by Sultan Mohamad Begada, who introduced a policy of a dispersed administrative structure. He permitted his commanders to establish townships (paras) and collect revenues in exchange for services to the Sultan. The city expanded very rapidly under these successful policies. The city walls were constructed in 1457, to check the growth of the city and, provide for security to its inhabitants. The wall being a later addition, accounts for the irregular shape of the city [24].

In the walled city of Ahmedabad, there was less differentiation of living and working quarters than in the cities of today. Most people worked at home except, when they went to the market to sell their wares, which was held once a week. Most people lived and worked in a house group known as the pol, normally (but not always) associated with one caste. Eventually, these pols became one of the reasons why Ahmedabad was declared a World Heritage City – “The settlement architecture of the historic city, with its distinctive pur (neighbourhoods), pol (residential main streets), and khadki (inner entrances to the pol) …. constitutes an integral component of its urban heritage” [25].

In 1872 there were 356 pols in the city. A pol is a residential neighbourhood with well-defined boundaries. There is an entrance through a main gateway, a primary street, and secondary streets along which a cluster of houses adjoin. Often there was a quadrangle, with a temple / mosque and well, and there were common latrines at the entrance. The pol has a defined area of jurisdiction spread over continuous houses, binding the families under certain rules and regulations, and creating a sense of belongingness among its inhabitants. Another interesting aspect of the pols was that, there was no differentiation of area of residence by wealth. The rich seths (businessmen) lived within the pols among their caste fellows, unlike today, when they have moved to the suburbs and live in bungalows surrounded by gardens. The outward urban sprawl has been further depicted in Figure 2. The influence of this unique pattern of life is responsible for the strong social cohesion that one can sense during inter and intra-community interactions.

The second quarter of the seventeenth century saw Ahmedabad experience a period of decline [26]. With the decline of the Mughal Empire, the reigns passed onto the Marathas. The administrative system of the Marathas was not equal to the task of governing a great commercial city like Ahmedabad. The city became a source of profit to the Marathas who, indulged in illegal exaction and bribery from the citizens. The building restrictions were disregarded, and the wide streets narrowed or even blocked. The houses were in a state of disrepair, and the people unwilling to spend any more on the repair of their houses than was needed to prevent them from falling. These acts of then, would eventually (centuries later) contribute to high fire risk in the old city of Ahmedabad – ensemble of closely packed wooden houses exacerbating the risk of fire spreading and narrow roads leading to difficulty in responding. The British annexed the city, more due to the high status that Ahmedabad held than due to its location, or reasons of collecting revenue. They realized the business character of the city, and sought co-operation of the rich and influential, merchants and bankers in governing the city. The Ahmedabad merchants too, were pragmatic and had acquired, through experience, the art of getting along with the ruling elite.

There were a series of events in the nineteenth century, which intensified the growth of the city: the emergence of the Municipal commission in 1857, the first textile mill in 1861, the
introduction of railways in 1864, the building of the first Ellisbridge in 1870 which was washed away in the flood of 1875 and the establishment of the city Municipality in 1874. With the rise of economic prosperity in the city, the population of the city began to increase. There was an influx of migrants from the surrounding villages, which created a demand for housing. The density kept rising as the houses were subdivided to fulfil this growing demand for housing. The average density in the walled city reached 220,000 persons per square mile, with certain neighbourhoods having a density as high as 350,000 people per square mile by 1971. The rising congestion and deteriorating living conditions saw the elite in the city move out to the suburbs across to Ellisbridge or to Shahibaug where the British had located their cantonment [23, 24]. The Municipality made several new roads to encourage a spread of settlement, relieve congestion, connect the centre of the city to the railway station, and open up the pols. This work aroused resentment in the people and was in fact no solution to the problem of congestion, because it compressed the communities in the pols even further [23, 24]. The municipality did not take into account the needs of the people who preferred to live close to their communities. The timeline of the development has been depicted in Figure 3.

Figure 2. Urban sprawl of Ahmedabad – The changing morphology
Figure 3. The timeline of development of Ahmedabad

- **1870**: Ahmedabad attained status of municipality

- **1921-1931**: Unprecedented population growth
  - Ellis bridge development scheme, on the western side of the Sabarmati;
  - New phase of urban expansion in the form of cooperative housing societies.

- **1930-1940**: Development
  - Western Ahmedabad attracted the university and colleges and the city’s first public hospital.
  - New bungalow type housing.

- **1950**: Ahmedabad Municipal Corporation (AMC) formed

- **1958**: City expanded by 21 sq.km
  - Creation of Rapunagar industrial area on the eastern side and the residential growth west of the river, which was boosted by the establishment of Gujarat University.

- **1960s**: Elite educational institutions and new forms of commercial development. Public institutions of education and health, including the university, were set up with philanthropic funds.

- **1971-1981**: Population grew by 30%
  - The new slums concentrated around the textile mills in the east absorbed most of the demographic increase. In 1976, nearly 22% of the city population consisted of slum dwellers.

- **Late 1980s**: Beginning of an industrial crisis
  - Closure of mills resulting to impoverishment of the inhabitants of the chawls, which gradually became more like slums.

- **1980-1990s**: The eastern periphery of the city developed with emergence of industrial suburbs with small-scale industries and housing for workers and low-income groups.

- **1990s**: The western periphery experienced sprawl. This sprawl was through high-rise development, Western segment of the city is relatively low-density development and high land and property prices, vice-versa for eastern segment.

- **Post 2000**: Western periphery has attracted many gated-communities and township developments. District, on the north-west and south-west, has attracted automobile industries and hence low-density urban sprawl on the city’s western periphery.
While the above timeline of development focusses on the entirety of Ahmedabad, this study focusses on the old city of Ahmedabad. Through the lenses of social sibling systems, as illustrated in Figure 1, and adopted in this study, the urban sprawl, throughout the timescale, interacted with various sibling systems like that of culture and relations, religion and religious practices, business and economy, infrastructure etc. These interactions were driven by other sibling systems like governance and have had a significant contribution towards the building of systemic risk, which manifested as the effects and impacts of COVID-19, and also, perhaps, as systemic capacities which led to better management and containment of COVID-19. Thus, this study opens up a paradigm of understanding systemic capacities of societies [27, 28] and communities along with the usual assessment of systemic risks.

The above depiction of urban sprawl is to be seen along the lines of spatial dispersion of population and hence economy – people moved out of the walled city due to different reasons; some of them moved out in search of better quality of life, while some movements were spurred by communal divides. This resulted in a unique status quo in the walled city. The walled city has an unequal distribution of population – religion wise; while most of it has Hindu population, the Muslim majority population is seen to be residing in specific pockets (municipal wards) of the walled city. The segregation along religious lines is meekly visible but there remains a strong intra-communal cohesion. The social integrity of ‘pols’ and the cohesion it was meant to foster is evident even today. But this does not mean that old city can be seen and felt to be divided among communal lines [26]. In fact, multiple focussed interviews have even revealed that inter-communal ties have been exemplary in many cases, especially during communal disturbances.

To sum up, as reported by Mahadevia et al. (2014) [29], the city of Ahmedabad is broadly divided into at least three cities: the old city or the walled city where different communities live – divided along certain lines yet united, the industrial area on the eastern side of the walled city where Dalits and Muslims live in close proximity but remain somewhat segregated and distanced, and the western side of the city where the rich and the middle class migrated to establish their housing societies - these communities face inwards, seeking to isolate themselves from their surroundings. The western part of the city apparently seems to be more developed in terms of availability of basic services, public spaces etc., than the eastern part of the city and its periphery.

Another important aspect to take note of is the livelihood pattern in the old city of Ahmedabad. According to the National Sample Survey Office’s (NSSO) Periodic Labour Force Survey (2017-18) [30], 94% of the workforce in Gujarat is unorganised and the same is true for Ahmedabad as well. A large part of economy of the old city is dependent on informal and unorganised work which is being done for years together – almost like a tradition (like shopkeepers outside the Jama Masjid without any establishment, or eateries at different locations around the walled city, like at Manek Chowk or food joints in Kalupur) and the survival of this is predominantly dependent on sectors which were massively hit by the COVID-19 imposed lockdown like tourism. Although a good number of businesses had deep pockets to survive the brunt of the lockdown, many did not have and this explains the differential impact of COVID-19 along economic lines.
The city is therefore segmented in terms of economic class, caste and religion, as well as quality of housing, its typologies, and levels of services and amenities. A point noteworthy in this context is that the social fabric of the old city may have been reported to be creased along various differences [26], but the social cohesion that the city was meant to be weaved with is seen to be omnipresent. While these divides among religion and castes exude risk in the making (chronic and systemic risk), the social cohesion infused within the very ways of life of these people needs to be seen as systemic capacities which steers the entire society through trying times like that of COVID-19.

The Impact of COVID-19

The Old City of Ahmedabad under COVID-19

COVID-19 is a fine example of individual event(s) triggering systemic risks in a complex system - the communities in the old city of Ahmedabad [31]. The same study [31] goes on to exemplify that system collapses are often triggered by individual failures, i.e., without any individual failure (caused by, e.g., disease, default, bankruptcy, or stress), no systemic risk would be realized, which is perhaps the exact case of COVID-19. While the first COVID-19 patient in Ahmedabad was hospitalised on 17th March, 2020 [32], by 13th May, 2020, Ahmedabad became a matter of concern as the city’s confirmed cases stood at 6353, bearing 71% of the state’s total caseload [33]. While in May 2020, the caseload of the walled city was almost 64% of the total cases in the city, by June 20th, the walled city, which was under strict containment protocols thus far, was freed as there was a shift in caseload from the central municipal zone (the walled city) to the western municipal zone – the west zone accounted for 21.8% of the total caseload of the city of Ahmedabad, while the central zone caseload was only of 6.8% [34]. The researchers in this study tried to investigate the transition of the old city from being the prime concern of the state to a containment-free zone.

Situational Analysis of COVID-19 in the Old City

Setting the foundation of the study & Grounded Theory Analysis

To take stock of the COVID-19 scenario, a preliminary desk-based analysis was done, through sifting of reports, government issued regulations and measures etc. A very basic understanding was developed on the reasons behind the case surge and the worrying mortality.

The city of Ahmedabad reported 31 confirmed positive COVID-19 cases on 1st April, 2020 and in a span of 18 days reported a twenty eight-fold increase to 862 confirmed positive cases, which accounted for 62% of all confirmed cases in Gujarat. Apparently, two primary reasons were reported to be responsible for the spike in COVID-19 cases.

First, the propensity of residents to travel internationally due to reasons of business - while there was (and always have been) a huge influx of travellers (before international travel was completely banned), the recommended quarantine regulations were leniently implemented and much loosely followed. In fact, a study [35] justifies the above reasons – “all cities having the highest burden of COVID-19 cases either have an international airport or are major financial/tourist hubs, with a population density of 1,036-28,220 persons per square kilometre in urban areas.”
Secondly, a congregation held in Delhi in March, 2020, was attended by almost 1,500 people from Gujarat, many of whom were from households in the old city [34]. Mistrust brewing from old rifts coupled with ‘ill-information’ led some of these people to voluntarily avoid testing, while they continued to mingle with their kin and kith. The household pattern of these people and dependence on community resources was conducive to rapid transmission of the infection.

These were the reasons that were ‘reportedly’ held responsible for the case surges – a superficial conclusion which overlooks the systemic nature of risk.

Therefore, the researchers intended to investigate the reasons through the lens of systemic risk, using the partial assessment of the chronic nature of risk done in the previous section.

In line with the conclusion that population density alone can’t be said to be a determinant of the rate of transmission of the infection [36, 37, 38], the researchers tried to prove that the old city of Ahmedabad is also not an exception. Had it been so, Surat (another prosperous city in the state of Gujarat) with a higher population density than Ahmedabad would have been the worst hit city. Of the total 3,774 cases in Gujarat on April 29, 2542 (67.35%) were in Ahmedabad district. The city of Surat had a case load of 570 cases on the same day, which is nearly one-fourth of that in Ahmedabad. In an attempt to understand what other factors may have contributed and whether their emergence can be traced back to the chronic risks of the old city, the researchers performed an exercise in line to the suggestions made in [36] and [38]. An analysis was carried out by the researchers to establish a statistical relationship between the number of COVID-19 cases and total population, average number of people in a household in each municipal ward of the old city of Ahmedabad.

Municipal ward wise of data COVID-19 cases on 27th May, 2020, were obtained from COVID-19 Dashboard of Ahmedabad City on Ahmedabad Municipal Corporation website [39]. This date was selected as the researchers unanimously agreed that between the period of March to June, 2020, it was majorly during May that the old city of Ahmedabad and Ahmedabad in large, saw a surge in COVID-19 cases. Demographic data of the wards were obtained from Census-2011 but was adjusted using the decadal growth rate and annual growth [40, 41, 42].

Data was created along the heads of cumulative case count [CCOUNT], total population according to Census 2011 data [TOTPOP_11], total population adjusted to 2020 – 2021 [TOTPOP20_21], average number of persons residing in a single household [TOTHHPOP], illiterate population adjusted to 2020 – 2021 [POPILL21], population density of each municipal ward [POPDENS], percentage of scheduled caste (SC) and scheduled tribe (ST) population residing in the wards of the old city of Ahmedabad [PERSCSTPOP], percentage of households with only 1 room [PER1ROOM] [23] and percentage of households with more than 5 people in a household [PERHOH5POP] [34].

R Software was used for the following statistical analysis:

A. Shapiro-Wilk’s normality test was performed to understand if the datasets are normally distributed. The datasets were not normally distributed and hence non-parametric Kendall’s Tau test was performed to elucidate the correlation between the various parameters.

B. A correlogram was obtained as shown in Figure 4 and the obtained correlation coefficients and corresponding p-values have been tabulated in Table 2.
The statistical inferences obtained through the results of above tests (although not significant) strengthens the proposition that population density alone can’t be a determinant of the surge in the number of cases; it depends on other factors like number of people in a household, gathering due to shared resources like water or bathroom etc. coupled with social behaviour. While the above analysis shows that crowding at home is a hotbed of transmission, one must be mindful while drawing conclusions as there are also examples of “crowded” neighbourhoods with relatively low number of cases per 100,000 households [43] in developed countries, suggesting that any analysis or interpretation made at this point in time is necessarily provisional [5].

With regards to the statistical analysis done above, a substantive indication can be seen – while the number of cases or the surge in cases may be dependent on factors like household population or need of people to gather for shared resources, the deaths are primarily dependent on other factors like access to healthcare systems, life-quality etc. and that's why some studies [44] suggest that that population density may also be a strength in coping with COVID-19, provided such areas are economic centres that support high-quality infrastructure,
which means faster emergency response times, better hospital staffing, and a greater concentration of intensive-care beds and other healthcare resources. A partial conclusion can be drawn here – the surge in the number of COVID-19 cases in the old city of Ahmedabad, at least in the initial phases of the first wave, can be attributed to the systemic and chronic risk building across timescale due to the differential urban sprawl along communal, caste and economic lines and hence, recurrence of similar natured outbreaks may have similar risks of morbidity, if not addressed during the post-COVID recovery phase.

Building on this conclusion and moving ahead, Grounded Theory Analysis (GTA) was performed on narratives collected from reliable sources of media to understand how the COVID-19 scenario played out in terms of sibling system dynamics and also to investigate the role of systemic capacities (collective consciousness of the community or cultural heritage) in coping with the adversities. The simple reason behind selecting GTA to investigate the narratives was to give due consideration to social processes or actions, human interaction etc. [45] which, in all likelihood, adds to the ambiguities leading to the fatal “fat tails” as pointed by Taleb 10]. Since the development of Grounded Theory, this research approach has gained popularity by scholars in anthropology, sociology, healthcare and other fields in the social science [46]. The unique methodological elements of Grounded Theory such as constant comparison, theoretical sampling and systematic analytical process, make this methodology different and somewhat distinctive from other qualitative research methodologies [47]. It was ensured that the characteristics that are essential for a study to be legitimately referred to as grounded theory, as laid down by Sbaraini et al., 2011 [48] were followed.

The researchers undertook a two staged exercise – the first stage, unlike the contemporary approach undertaken in a Grounded Theory analysis, was to search for articles, blogs, news reports from reliable sources (print, electronic and social media). The articles, reports etc. selected were exclusively on and about the old city of Ahmedabad, the effects and impacts of COVID-19 in the old city of Ahmedabad, the measures taken by the government (local administration) to contain the spread of the infection, the efforts made by the communities to float through the trying times. Grounded theory studies are characterised by purposive theoretical sampling which requires some data to be collected and analysed [45]. The articles, reports etc. that were collected, were used as narratives for theoretical sampling. It has been propounded that narratives can be any text or discourse, or it might be text used within the context of a mode of inquiry in qualitative research [49], with a specific focus on the stories individuals tell [50]. Thematic analysis was carried out on these narratives through two stages of coding – open and axial with a clear analytic strategy to identify issues within each narrative and then look for common themes [51], which in a way would be able to explain the unfolding of COVID-19 scenario in terms of sibling system dynamics. These themes, thus identified, were verified and validated through focussed semi-structured interviews with relevant stakeholders from the community (residents of different pols belonging to different communities as well as religions – 4), the local administration (1) and public health worker engaged in the old city area (1) – six interviews were conducted based on convenience sampling.
Post Grounded Theory analysis and its validation through interviews, a conceptual model of how different factors (sibling systems in some cases) have behaved was deduced. The primary themes that emerged out of the analysis centred around the following:

A. the perception of consequences of COVID-19 – apart from the usual risk perception of infection leading to death, the financial impact overshadowed the mortal fear.

B. ill-information – misinterpretation of information, biased interpretation of information & overburdening of information often led to trust issues which fuelled activities that went against the protocols that were in place.

C. trust – (mis)trust due to various reasons and seeded issues (may be attributed as the manifestation of chronic risks).

D. social cohesion – inter and intra-community relationships & such social connections acted as ‘stress sponges’; the stresses were psychological as well as financial.

Based on the above themes, a Causal Loop Diagram (CLD) were prepared to illustrate the causality behind – case surges in the old city of Ahmedabad and high mortality in the old city of Ahmedabad.

Causal Loop Diagram (CLD)

As mentioned earlier, a CLD is used to depict the causal connections and illustrate how the COVID-19 scenario in the old city unfolded over time – how factors (in some cases sibling systems) influenced each other and piggybacked to itself, via feedback loops [22]. For the sake of limiting the interpretation of causalities, a specific timeframe was chosen – from the time the national lockdown was invoked on the 25th of March, 2020 to the period when cluster containments within the old city were revoked as shown in Figure 5.

Figure 5. Timeline of events in the old city of Ahmedabad

<table>
<thead>
<tr>
<th>AMC implemented cluster containment strategy forming five clusters (all in the walled city)</th>
<th>Closure of the Nehru Bridge, a link connecting the old city with the new. Sale in biggest vegetable wholesale market situated in Kalupur was suspended</th>
<th>60% of the city’s cases were reported within the walled city. South Korean strategy of active testing in cluster areas was adopted. The surge in the number of cases was driven by intensive testing</th>
<th>66.7% cases were from Central and South Zones alone</th>
<th>The state government ordered all private clinics, nursing home and hospitals to open in the next 48-hours or lose their licence</th>
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<tr>
<td>53 April</td>
<td>54 April</td>
<td>06 April</td>
<td>12-15 April</td>
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- 7-day curfew was imposed in the walled city and Danilimda area putting approx. 29 lakh people under curfew. 3-hour relaxation period was given to the women of the area to step outside to procure necessities. Drones were deployed to disinfect the walled city.
- More than 50% of the cases were detected in the walled city.
- AMC identified 9 clusters mainly from the Central and South Zones which are all in the Walled City.
- Walled city was freed of containment as it had lowest COVID-19 case share at 6.8%, whereas containment zones were made in the push West Ahmedabad accounting 21.8% case load.

Based on the GTA and the themes that surfaced thereafter, the following CLD was developed [Figure 6]. A CLD is composed of a number of nodes and edges. The edges are usually marked (+) or (-) expressing a direct or an inverse relationship between nodes. For example, the higher the household finances, the better would be the access to healthcare systems and facilities, and, larger the number of COVID-19 cases, the higher would be the load on existing healthcare facilities and systems, pruning down the access to it manifold.
Discussion on Causal Loop Diagram (CLD)

The explanation of the CLD as shown in Figure 6 is as follows. The researchers have tried to link the causalities, wherever possible, to the chronic and systems risk that have been building over years. The words within ‘[]’ depicts elements from the CLD in the discussion below.

The nation-wide lockdown enforced on the 25th of March, 2020 impacted the livelihood [Livelihood] of people and the education sector [Education] directly, due to the enforced closures. Eventually, schools shifted onto e-learning mode which required the households to have access to technology in terms of access to internet, mobile phones, laptops etc. In poor or middleclass households, having more than two or three children, sharing of such resources became a problem. Procuring new resources like laptops or phones was out of the question because the lockdown had already put a stop on the businesses (except those engaged in essential services) which, over time, affected the household finances [HH Finance]. With the household financial situation deteriorating over a period of time, access to basic necessities like food etc. also began to be affected. It is to be remembered that the scenario is exclusive to the old city of Ahmedabad and one must refer to the previous sections to understand that the pattern of livelihood did not allow majority of people to have deep pockets to sustain a long period of almost no income.

The stress on the availability or access to basic necessities were met by different volunteer groups, special initiatives of the local government like ‘Vegetable on Wheels’ but mostly people relied on each other, inter and intra- community (‘pols’) for support, be it financial or for basic necessities. Thus, social cohesion [Social Cohesion] which has been found to be deep rooted in the old city – a systemic capacity – surfaced as a saviour. However, there was
another front that led to the surge of cases – due to the decreasing access to basic necessities, the propensity to access markets grew, for purpose of replenishment and also hoarding, and this came at expense of violating expected COVID-19 Appropriate Behaviour (CAB) / social behaviour [Social Behaviour]. In this context, social behaviour simply means the attitude of following COVID-19 safety precautions like maintaining safe distance, wearing masks at all times etc. With the increase in access to markets and declining social behaviour, the transmission of the virus increased leading to a surge [Cases], which eventually led to the closure of Kalupur vegetable market (the largest fresh vegetable market of the city) also.

While social cohesion had been helpful in all ways possible, it did contribute negatively too. Due to the ways of life of people living in pols, social & physical distancing was impossible – in fact, with more time to spend at home, people violated the ‘stay at home’ instructions, which also contributed to the increasing number of cases. The increasing number of cases eventually increased pressure on the existing healthcare systems – hospitals were overwhelmed, more number of hospitals were being designated as COVID-19 hospitals, cutting down the access of other patients (with ailments other than COVID-19), which also contributed to deaths. In certain cases, the state of household finance made it difficult to seek treatment – public hospitals were overwhelmed and private hospitals were charging exorbitant prices till the point when government stepped in and regulated the cost. Carrying out surveillance (according to the protocols in place) of households within the dense pols was also a very big challenge – while the policies of local administration showed signs of flip-flop [33], eventually a strategy of intensive testing was adopted (higher the number of tests conducted, higher were the number of cases reported). Asymptomatic cases were also a menace [Delayed Symptoms] – those who got tested after appearance of symptoms were treated, while those who could not be tested or were admitted really late, could not survive [Deaths].

While this was the major story, there was another parallel story that had been running – in fact, this is argued to be how the cases started appearing in the old city. People returning from a religious congregation were suspected to be infected [Suspected Cases]. This was heavily reported by media [Media] all over. Over reporting and existing communal distrusts [Biases] and other parallelly running rumours led to a pervasive atmosphere of distrust [Mistrust] in certain parts of the old city. Due to this, such suspected people were reluctant to get tested [No Testing] and they were progressively supported by members of their community and this is again where social cohesion factored in negatively. More the social cohesion in such groups, more was the violation of social behaviour (CAB), resulting in delayed appearance of symptoms, eventually leading to increase in number of cases or death (if testing was avoided all along).

The CLD helped the researchers to paint an illustrative scenario of how COVID-19 unfolded in the old city. However, CLD could neither depict the temporal flow of events, nor could it depict the interactions of sibling systems. Therefore, the researchers developed the sibling system state diagram (SSSD) – a visualisation tool to depict the temporal dynamics of the social sibling systems [Figure 1] and their interpretations in the context of this study [Table 1].
Sibling System State Diagram (SSSD)

To clearly understand and explain the effect and impact of COVID-19 through the lens of systems analysis, it was important to see the same scenario, as depicted through Figure 6, as interaction of sibling systems, played on a timeline. The CLD limits the interpretation in terms of causal agents being single events with their consequences also being singleton. However, systems analysis should help one to understand how the larger system (the old city of Ahmedabad) behaved owing to the interactions (impacts and dependencies) of the sibling systems – the depiction of reverberations [52] within the larger system. Figure 7 illustrates the Sibling System State Diagram (SSSD).

The SSSD can be interpreted as follows:

The nodes represent sibling systems. All the 10 dimensions mentioned in Figure 1, can be found as nodes except that of Governance and Media as these are two sibling systems which have been always present, influencing and impacting the overall dynamics of the larger system through the timeline under consideration. Governance here connotes governance at all levels – from the national level to the local level. Similarly, media is representative of communication and news at all levels, including communication within smaller groups in a community.

Systemic risk - the chronic risks that have been building over time - has been depicted as an arrow representative of the on-going process of building risk – we can never conclusively say that the measures that we are taking today, i.e., our present actions are not contributing to the innate risks which would manifest when triggered in some ways, as these relationships between trigger and effects are often found to be stochastic [12]. The blue dotted lines represent dependency of sibling systems, the red and green solid lines depict negative and positive impact of sibling systems on each other, respectively. A timeline has also been included in the SSSD to depict that temporal dynamism of a sibling system – a sibling system when affected by another system, say governance or media, starts behaving in a particular way and remains in that state until and unless it is affected again by some sibling system or affects another sibling system. In the SSSD, certain nodes (sibling systems) appear twice or more, depicting that the last instance (state of the system) was affected by some action. For example, Culture & Relations appear twice in the depicted timeline.

Additionally, the SSSD is divided into two horizontal swim-lanes, the lower swim-lane depicting the national and state level system and the upper swim-lane, i.e., the wider swim-lane, depicting the system at the community level. In this study, the focus is on the system at the community level.

It is to be noted that almost all sibling system affects ‘media’ as everything that was happening was being constantly reported by the media, which, in turn, had both positive and negative impacts on different sibling systems.
Figure 7. Social Sibling System State Diagram
The SSSD illustrates the following events and the corresponding dynamics of sibling systems, where the larger system is the old city of Ahmedabad. In the description below, to avoid the repetitive use of the term – sibling system – the abbreviation SS is used.

With the declaration of COVID-19 as a pandemic on 11th March, 2020, India imposed a sweeping stop on everything through a national lockdown on the 25th of March, 2020. Thus, the SSSD, at the extreme left, depicts the negative impact of the pandemic on public health at all levels. With the lockdown in place, education sector came to a halt (depicted by the red arrow from lockdown on the education SS). Eventually, as explained through CLD earlier, education started depending on science and technology (depicted by Science & Technology SS), which in turn depended on the financial state of households (depicted by Business & Economy SS). With Business & Economy SS itself being negatively impacted by lockdown, the interdependencies of both these systems had a conjoined negative impact on Education SS. These dependencies and conjoined impacts could not be depicted through a CLD and that was the reason why SSSD had to be innovated.

However, government, through various decisions, was fostering the sustenance of Education SS, it was being continually negatively impacted by other sibling systems. This dynamism could also not be depicted through a CLD. Lockdown brought the transportation sector to a halt which negatively affected the Business & Economy SS. The lockdown also led to closure of many healthcare facilities and many, on the other hand, especially the public ones, were designated for COVID-19 treatment. The closure of all such facilities impacted the Public Health SS at the community level – seeking treatment for diseases other than COVID-19 became a huge problem and also the spiralling down economy restricted access to proper healthcare facilities which is depicted as a negative impact on public health sibling system. As explained through CLD, there was a profound negative impact on the availability and accessibility of basic necessities.

The Basic Necessities SS eventually started depending on interventions of technology in terms of many applications and open forms that were developed to mark shops and locations of essential products. The government also started technology driven initiatives to replenish the demand of basic necessities. Religious institutions like temples and mosques came together to distribute food and the same was done by community leaders and hence there are positive impacts shown on the Basic Necessities SS from Governance SS, Culture & Relations SS and also Religion & Religious Practices SS. The negative impact of communal rifts and social cohesion has also been depicted. A dependency between the two sibling systems – Religion & Religious Practices and Culture & Relations have also been depicted – this is in line with the strong inter and intra-community cohesion that have been visible throughout the study, interviews and local interactions.

Over a period of time, with dependencies on innovative technological tools like ITIHAS (IT-enabled Integrated Hotspot Analysis System) backed by Aarogya Setu app, containment zones were defined [9] – a more granular approach to control the transmission was adopted. While these were initiatives taken by the national government, used by the state government, the local government also introduced its own initiatives like EPIC (Enhanced Testing, Proactive Detection, Intensive Surveillance, and Corona check-posts) [53], Sanjivani Van, Dhanvantari Rath [54] etc. During this phase, rumours & misinterpretation of information also became rampant due to which COVID-19 tests, imposition of protocols became very difficult, which affected the overall public health. While these negative impacts were visible, community leaders came forward and tried to resolve such issues as far as possible by volunteering to participate in COVID-19 test drives. In
a systems analysis, such as this one, it becomes increasingly easy to visualise how systems interacted with each other, impacting each other both positively as well as negatively. On the 6th of May, the local government issued an order to reopen community level clinics and private clinics and hospitals. This is depicted by a green arrow running from the Governance SS to the Infrastructure SS, which in turn positively affects the Public Health SS. This was a much needed and welcome step as local people felt at home to discuss their health issues and concerns with doctors and medical practitioner of their own community. In fact, the success of the strategy relied upon the confidence of people in such local establishments. With all these interactions which led to the shifting of caseload to the other zones of the city, the old city of Ahmedabad was freed from containment of all sorts.

The dynamics of the sibling systems have been depicted as clearly as possible and such a systems analysis helps in drawing substantive conclusions.
Conclusion

The systemic nature of disaster risk and its implications on disaster risk governance

The switch in paradigm from managing to disaster to managing disaster risk, as propagated by the Sendai Framework for Disaster Risk Reduction (SFDRR 2015 – 2030), and the coherence of the same with other agreements and agendas like the Sustainable Development Goals should be seen in a different light, drawing from the experiences of the pandemic, similar to the proposition of incorporating the learnings from COVID-19 responses in the education sector [55]. SFDRR proposes understanding disaster risk to be the first priority. While understanding risks being the first step towards effective management makes perfect sense, very little is being talked about how to understand such risks, especially when such risks are evidently systemic and chronic in nature. Although disaster risk has been conceptualised through a systemic lens since at least the 1970s [56], not much heed is paid to understand it as the outcome of a constantly evolving system [57] and therefore the contemporary interventions that treat risks distinctly (hazard specific or sector specific), fail to account for interconnections that leads to reinforcement of the underlying processes creating risk [58, 59].

Contemporary ways of understanding and assessing risk takes into account the status quo, hardly looking into how the risk has come to be shaped over a period of time. For example, in the context of COVID-19 in the old city, the percentage of population residing in a one room household or percentage of population with more than 5 people living in a household appeared to be a dominant factor in the spread of SARS-CoV-2 in case of the old city of Ahmedabad, which is undoubtedly the result of historical realities. Thus, recurrence of a similar outbreak would lead to comparable consequences if these underlying vulnerabilities are not addressed. An important takeaway for policy-makers in this regard would be to investigate into such contemporary and historical realities of the causes of vulnerabilities, such that the issue of disaster risk creation during post disaster recovery or resilient development is tackled by integration of disaster risk reduction within the many wider contexts that foment and perpetuate vulnerability. In fact, many authoritative decisions during and post disaster (COVID-19 in this case), reverberate negatively due to the chronic vulnerabilities already embedded in the larger system or the sibling systems and thus, it is absolutely important that even such crucial decisions like nation-wide lockdown be analysed through a system’s lens or else the effects may be extremely unwanted (exodus of migrant labours [60]).

The case study of the old city of Ahmedabad clearly shows the importance of understanding and assessing risk at the local level as much of the chronic nature of risk is contextual. Thus, decision makers in the disaster risk governance space must urgently strive to go beyond the tendency of creating ‘fantasy documents’ [61] of superficial risk assessment at macro levels and promote understanding and assessments at the local level.

There has been a constant surge in the dependency on technological tools for modelling or simulations, pertaining to various aspects of disaster risk. But the COVID-19 pandemic served as an eye-opener. While scientific advancements have made it possible to depict the doubling rate or R0 to certain extents, no tool have yet been able to model the ambiguity fed by human subjectivity, intervention etc. - the concern of case surges due to mistrusts brewing from decades old communal rifts, can never be accounted for and this is exactly what pushes such technology driven methods off the rails. Thus, decision makers would have to be extremely cautious in this regard too.

The researchers could have adopted existing tools like CLD or network analysis [52] to depict
the systemic or networked nature of disaster risk to make it extremely simple for decision makers to comprehend but the researchers argue that such methodologies undermine the underlying complexity and feed into the practice of siloed approach towards disaster risk reduction. It is extremely essential that in a systems analysis, systems are used to depict scenarios and not causal factors or triggers as done in CLD. Also, decision makers must understand how decisions of risk reduction / management reverberate across a larger system, positively as well as negatively across a timeline. Therefore, the researchers have come up with the SSSD, which is complicated, but does a fair job in depicting the systemic dynamics. Similar approaches, adopted to the context, would be extremely essential to tackle emergent risks. In fact, SSSD also depicts sibling systems which are fragile or require more attention during implementation of risk management or developmental strategies.

Establishing the nexus between cultural heritage and risk-informed sustainable development

Systems analysis of the COVID-19 scenario in the old city of Ahmedabad revealed that the positive reverberations of the ‘Culture and Relations’ sibling system, outnumbers the negative reverberations. ‘Systemic capacities’, an element of the aforementioned sibling system, which could be also interpreted as the outcome of the ‘ways of life’ or cultural heritage of a particular community, stands out as an extremely important factor. One of the objectives of this body of research was to expand the interpretation of cultural heritage in the disaster risk management space beyond the boxes of ‘tangible’ and ‘intangible’ to collective consciousness of a community or ways of life and to explore the possibility of mainstreaming it into disaster risk reduction or sustainable development processes. The evidences positively support the fact that the ways of life of these communities, the years of experiences these communities have shared together and the incredible ways in which their lives remain intertwined, helped them to remain afloat throughout these trying times.

In this era of extreme dependence on technology, the case study of COVID-19 puts forth an excellent example of how systemic capacities, oozing out of the cultural heritage of the community, stands out as an important factor of consideration in disaster risk management and risk-informed sustainable development. As reported [62], the mantra of the city leaned on “Chit tu shid ni Chinta kare, Krishna ne karvu hoy te kare” (Oh heart! Why are you worrying, Krishna will do what He wishes to) and this is what powered the community at large by serving support to each other in all forms through the period under consideration – social, psychological and financial (manifestation of systemic capacity as ‘stress sponge’). When support from the authorities seemed inadequate, these systemic capacities manifested as social cohesion beyond religious divides.

This is one aspect that is rarely accounted for in risk-informed decision making – systemic capacities of a community are overlooked, systemic risks are superficially overvalued. This study provides enough pointers to urge policy makers to mainstream cultural heritage (as interpreted in this study) into the fundamentals of risk-informed sustainable development. This conclusion reemphasises that communities have certain levels of resilience built over centuries - local adaptation strategies, culture, heritage, knowledge and experiences are the building blocks for boosting disaster resilience [63]. Much of such discussions have already been reported but this study provides evidence to take action in this regard. The tendency to romanticise the concept of mainstreaming cultural heritage into risk-informed sustainable development needs to be done away with; moving away from the semantics towards action. A point to be noted here is that for a decision to be risk-informed, systemic risk needs to be looked at, which would
instinctively draw in the systemic capacities of a community developed through years of shared experiences and integrated into disaster risk reduction strategies at local level.  

While the pandemic is being referred to as a test – ‘survival of the laziest’ [64], it is high time that we break out of the cocoon of laziness and hasten the process of looking back into our collective consciousness to step forward towards a sustainable future. The pandemic has given us a wake-up call and lot to learn from and now the onus is on us (the society at large and the government)—either we learn and build forward & smarter or, we ignore and build back dumber.
Bibliography


