New technologies for underserved communities:
proposing a cultural framework-driven process for constructing interactive social spaces (multicultural)

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(I.0) Introduction: who are the underserved?
In the backdrop of an emerging market scenario in India and the increasing need in the last three to five years to have to design devices and applications that are technology-driven, one set of users that have arrived on the market's radar is the underserved communities from India.
The reasons are obvious. The focus of the networking technologies has started shifting away from the traditionally established user base, viz., users with large income bases in big cities to underserved communities, whether rural or urban.

The operative word here is *'underserved community members'*, who we prefer to address as our *'new audiences'*– a component of India's rising demographics that can offer a critical threshold for the market to build products specifically intended for these user groups.
It is imperative that we understand the mindsets of the 'new audiences' – their needs for specific products thrown up by their own environments that are hugely culturally-mediated - and what makes them reject or click with certain products introduced by the market.
Needless to say, the reason to term these communities as underserved is precisely because they have remained outside of the pale of our attention – that of the market's, the designer's, and to some extent even that of policy maker's, in a country like India's whose socialist plans have traditionally prided on including a fairly wide social support net for the disadvantaged.

It is our submission, that to get to the heart of the 'new audiences' we need to design and locate technology-driven products within key cultural frames of references, and not on mechanistic, engineering and technology-driven value-neutral bases.
Therefore, in our bid to **construct a set of rationalized precepts** as a credible way to approach something as nebulous as a cultural frame of reference, this paper will attempt the following:
(1.1) at the highest level of abstraction, posit a set of normative **universalizing principles** that could help identify key cultural attributes operating above any individual country reference, and

allowing us to group countries into meaningful cultural categories for the purpose of building product interactions. This means, locating cultural attributes that find affinities with India in spite of the countries or ethnographically similar groupings being geographically dispersed, such as Latin America, Africa, S E Asia, the Native American people;
(1.2) moving down the level of abstraction, carry out a county-specific exercise to identify for India its own **context-driven, specific set of cultural attributes** based on the above universalizing principles, but features that make for an essential 'Indian-ness';
(1.3) moving towards the process itself, where we will identify a single core value as an essential 'connect' between cultural attributes, sensory(s) and interaction design (IXD) in the context of designing; and finally,
(1.4) exemplify this with interactive concept solutions derived from the above set of rationalized precepts, and solutions designed specifically for user groups from big city (Mumbai) - underserved communities such as fisher folks, migrant construction workers, shoe-shine boys at commuter rail stations, long-distance truck drivers, and children suffering from cerebral palsy.

(2.0) How do we get to a cultural frame of reference? The search for rationalized precepts:
In response to our principal question 'how can we make new technologies meaningful and thereby more widespread for the underserved communities', and our assertion that we may need to embed product interactions and experiences within a *cultural frame of reference,* there are two broad aspects that we need to address:
(2.1) the first relating to something that is traditionally inherent in our product and communications environment, viz., our culture's use of *local narratives and cultural mores,* and might we use these as templates for product building?
(2.2) recognizing the need to *build a sensory-rich environment into product interactions* for two reasons:
(2.2.1) firstly, in line with the age-old human affinity for sound, images, smell, touch and speech to build human interactions since civilizational time;
(2.2.2) secondly, in keeping with the sensory-driven attributes of the new media technologies that allow us to mimic human sensory(s) through various sensors and actuators (heat/thermal, pressure, gesture, etc.,),

And, as a subset of the above two, arising out of the realization that sensory use is usually culturally-mediated,
(2.2.3) there is the need to oversee the mapping of human sensory use with technology-driven sensory applications, tempered with the recognition and *identification of local inflections in sensory-use from culture to culture.*

Because these logically beg the following questions that are methodological-related:

(a) why/how is this any different from the way new media technology products have traditionally been built?
(b) what is it that might be construed as a cultural frame of reference?
and,
(c) how may we decode the factors that go to constitute this rather complex and nebulous area that we call 'culture'?
We intend to investigate the above (as already mentioned) at two consecutive levels – the universal and the contextually-specific.

(3.0) Towards a cultural frame of reference - high-level clues identifying cultural values through universalizing principles applicable to developing economy conditions:

We will attempt to locate some universalizing principles as a first line of defense towards building a cultural frame of reference, that could work as clues for design decisions across environments similar to ours, such as in Latin America, South East Asia, Africa, etc.,
Our research into pointers at this highest level of abstraction suggests three strains of thoughts:

(3.1) 'Social capital' as a construct going back to Aristotelian times and redefined in recent times by **Francis Fukuyama (2000),** represents the collective utilization of human, technical, and physical resources for social construction. It is necessarily predicated on recognizing with some satisfaction, that man is a social animal, and as a reconstructive or development tool, social capital could find special meaning in India. According to **Gurcharan Das (2002),** a social commentator from India with deep corporate experience, social capital in Village India is encapsulated in Indians being warm, gregarious and seldom alone, interacting incessantly, and usually within the context of their extended family. In Das's words, "if someone falls sick, the entire village shows up at the hospital, practically willing the patient to get well!"

This might help explain why it is important to vet design decisions in terms of community-level participation, where the affinities that people carry with regard to various practices, products, public messages etc., are necessarily organized around the core of community-attributes, not around individualistically-fashioned spaces. E.g., while designing tractors for particular communities (the Jats from Haryana in Northern India, or the Marathas from Maharashtra in Western India) - a communities with large land holdings and hence frequently using tractors, and with their propensity to revolve around a strong centralizing core of patriarchy – a company like John Deere is careful to access local-level design help that tells the company to provide its tractor fronts with a sturdy, macho-styled nose. An effeminate front will not do for communities such these.

On the flipside, such Intense community conviviality can also impart an altogether new context to the idea of self-reliance in

the context of the individual from India. It needs to be emphasized that the 'cost' at which social capital in India is achieved, viz., the primacy of the collective/family/community over and above the individual, an attribute that goes for a premium in the West, is clearly offset by the parents' willingness or sense of duty to support their progeny with economic and emotional support for as long as they are alive, unlike in the West where the child is set free at age 18 to take care of himself/herself.

In design terms, social capital as a factor could help validate why communication systems in India or in environments similar to ours such as Africa, Latin America, etc, that are organized around community affinities and sometimes even jeopardizing individual interests, will stand in better stead than designs aimed at individual preferences. Ignoring these dynamics is to risk ground level signals for decision-making practices that can appear to defy most orderly patterns of decision-making known to systems in the West. E.g., the house built by a young couple will carry stamps of aesthetic preferences from his parents because the couple and the parents are seen to be a collective unit.

(3.2) History as a source of narratives and tales revolving around human experiences is universally known to have provided cultures with an anchor from which to select one's role models from historical anecdotes or personalities that have since become larger than life.
This kind of historicity is not something that is unique to India. Any country with recorded antecedents of human anecdotes of some civilizational value across the centuries, with peaks and dips in the fortunes of its people, will empathize with what this can generate for its people as a source of narratives.
However, what remains unique to India, is the fact that India lives in several centuries simultaneously, clichéd as this may have begun to sound today, and the implications of a culture carrying the hues of multiple ages all at the same time, whereby historical role models can take on a fresh meaning. Way back in 1961, noted French cultural historian **Jeannine Auboyer (1965)** had noted: "Modern India is perhaps unique, historically, in that its twentieth century existence is still fashioned on traditions laid down thousands of years ago. Yet it has by no means been trapped in the rigid mould of an archaic civilization."

This is necessarily predicated on a pace of change that is 'slow', and in Auboyer's words, "a necessary accompaniment of such continuity". And reflecting accurately "the rhythm of rural life, which has always provided the essential framework of the country's structure."
In design terms, this means that pushing a product or a design that requires updating every so often will fail. It also means that products have to capture the sense of a locale's history. E.g., it would help to understand that in central India, the divine space is simultaneous in its association with the feats of its warrior queen from Jhansi, who, strapped with her infant baby on her back, had ventured forth on horse back to rescue her people upon hearing

the untimely death of her husband the King, and disregarding the dangers posed by the scepter of a young woman of royal lineage venturing out unprepared into the man's world.
It is possible that the lore surrounding her valor has today found representations of particular color, texture, size, or meanings within which the notion of femininity itself has been re-crafted in those parts of the country.
This sense of history derived from a pride from the past and evolving itself as a narrative, can account for preferences that may find no immediate causality to the presently available source of materials or contexts for the designer who remains unfamiliar with the given cultural milieus.

(3.3) Antipodal to the role played by history as an impresario of human experience**, a disdain for history in Indian culture** that ends up **imparting to its human tales a certain quality of myth and magic**, and works as a repository of inspiration for preferences for products and experiences that could defy scientific logic.
This highly antipodal situation of a country steeped in history and yet its people usually quite indifferent to its historicity in the conventional time-honored sense of the term where people make icons out of historical monuments, needs to be understood in its all its complexity.
This antipodality towards history in India is related to the concept of time and history as a function of historical materialism, where according to eminent Marxist historian from India, **Romila Thapar (2000)**, it is important to view Indian concepts of time not just as a linear construct (with a distinct start and end), but as being cyclical and non-linear, with no distinct start or end, and hence inimical to encouraging a sense of history.

What do these antipodal elements of time do for design? Whereas *a linear concept of time* has traditionally helped people relate to social concerns based on activities that were measurably concrete - since linear time in India has always been measured through the invention of sundials, water clocks, the latter day mechanical clocks or the present-day electrical and digital ones – and this physicality/materiality, in turn, carrying the merit of helping communities follow the trajectory of their social activities (harvesting, marriages, funerals, festivals,…)
A non-linear or cyclic time, on the other hand, by its very nature of being fluid and de-material, ends up having ambiguous terminal points and defies any clocking of activity. Instead, its ambiguity helps to build myths and tales of magic that are inspired by its own atmospherics/references - usually the elements of nature or the human experiences surrounding a culture. In effect, according to Thapar, "the creating of cyclic time (had to be) an act of imagination, metaphorical and symbolic."
However, in spite of the cyclic concept of time being held to be a primary reason for the supposed absence of a fascination for history in India, Thapar contends that there is not only evidence of "linear time in Indian concepts", but also suggests ways in

which "cyclic and linear forms could intersect employing a complex view of time."

In design terms this would mean employing two different kinds of time constructs inherent in two categories of time machines in India:
(i) the 'panjika' (a written scroll or printed book), on the one hand, based on the lunar cycle and measuring planetary movements and connecting these movements directly to one's state of mind and indirectly to social activities, and
(ii) as an antipode, the idea of being exact about how time constructs itself in material (physical reality) terms, based on which Indians had once built one of the most remarkable sundials known to the world.
Perhaps because of its inherent cross-dynamics, the construct of time in the Indian context remains one of the most puzzling elements of product development and experience-building for technologists and designers, who need to figure the right 'pace' for a product but remain stuck with the uni-dimensionality of mechanistic time, since that is the paradigm that applies itself to industrial processes and one that the West and its industry are familiar with. Needless to say, the most direct outcome of the above constructs of time are on its social spaces, and which need to be dealt with quite differently while designing in India.

(4.0) Towards a cultural frame of reference – contextual (low-level) clues for apprehending an essential 'Indian-ness' through identifying specific cultural values:
Having established the grounds for universals as a normative framework for our own cultural mindsets we are forced to ask: (i) what is that 'Indian-ness' that can be like no other? (ii) what are those culturally specific nuances that could go to facilitate or impede our 'capacity' for innovation and creativity; and, lastly (iii) how can we leverage our ability to utilize human, technical, and physical resources for social construction – that Francis Fukuyama terms as the 'role of social capital'?

In trying to arrive at an understanding of what is it that is essentially 'different', we ask the question: Is it the geographies, the technologies or the cultural contexts surrounding people, or is it a a combination of these conditions thereof?
Dr.Romila Thapar says: "the historical past demonstrates that similar technologies do not create identical societies." Thapar, as also thinkers such **as Jared Diamond (1998)**, share the view that it is a complex amalgam of factors that work as a DNA for a society's particular projection of choices and decision-making about its way of life, overriding any singular feature, however overwhelming – be it technology, locational advantages attributed by geography, supremacy of power achieved through historical turns of events, or individual achievements by humans at given points in time, such as by discoverers of land or inventors of technologies.

But importantly, in Thapar's eloquent observation that says, germane to this "intermeshing of many other conditions and decisions, not least the social choices made by these societies" there is what we may term as being native knowledge systems arising from a culture's innate sense about its surroundings, and which as a collectively come to reside in their interactions with their lands, habitats and their ecosystems – a complex amalgam across the centuries that can make these sensibilities hard to decode. But also, precisely, what will set cultures apart no matter what the overriding set of universalizing principles, creating, in the case of India, the dreamlike visage of a cultural landscape "rather resembling the images that float in the imagination after reading *The Arabian Nights*" even in modern India. **(John Keay, India Discovered – the recovery of a lost civilization', from chapter 'This wonderful Country', Harper Collins, London, 1981).**

Some of the culturally specific features worth noting as part of the body of 'Indian-ness', with the specific purpose of drawing the contours of the user's context in India, would be as follows:

(4.1) Although open to transformations, so characteristic of Indian culture and society from the repeated incursions from outside, the Indian mindset shows a tendency to generate a certain amount of **creative ferment**, once the original stimulus for change has been found.
This stands in striking contrast to the protestant work ethics of the American society and its driven nature of enterprise, and as an exceptional situation, evident in the driven work culture of Mumbai.

(4.2) Most outside influences that have endured through the process of social reconstruction are those that had created a dialectics of change between indigenous and alien value systems – forcing into the system **a set of creative interrelationships.**
Where no dialectics had been achieved, innovations have failed to take root.
This is imperative to understand wherever the industry wishes to build products for local communities.

(4.3) Most changes that have occurred have done so as layers upon layers**, without rejection of the earlier layers** – the piling up of traits being compared by our first prime minister, Nehru, to **a palimpsest** - an ancient manuscript written upon over and over again without the preceding layer completely obliterated.
It means that any dialogue/investigative session with user group needs to include questions about his environment not just at the obvious level. For instance, while trying to understand the attire/garment characteristics on a woman from the user group, one may engage her in talks not just about the particular sari she's wearing, but about the trousseau she had received from her father years ago.
It also means that, neglecting to see the palimpsest nature of the information archiving can run the risk of treating sources of

information as being reposed in static hierarchical equilibrium.

(4.4) That, given the propensity for art in India to act as virtual repertoires of cultural meanings, one needs to view Indian art as making a direct appeal to the senses – **being intensely metaphoric without being abstract.**
Which accounts for traditional Indian architecture and its structural engineering
component, e.g., being able to draw up its design principles through a set of stylized representations – the five elements of nature (earth, water, fire, wind and ether) mapped on to five geometrical representations across the five sections of an architectural construction – square for earth at the base, upheld by the circular for water (the pillars), the triangle for fire (the roofing), and so on.

(4.5) The brilliant employment of Gestalt-like thought processes – "the visualization of patterns 'all falling into place' and the insights into the nature and relations of things – all reflected in the unified-field awareness of traditional Indian thought-processes. This reflects the extent of control that the visual arts had achieved over antithetical processes – **the objective combining with subjectivity** while practising creativity.

Importantly for the designer, this was been likened to the 17th century physicist Kepler's method of apprehending information about stars. There was something more than a series of reasoned and orderly steps and the linearity of logic with which Kepler had approached scientific information. Kepler's genius was, in fact, defined as the "the power of aesthetic enthusiasm to disclose universal objective truths." by cultural historian **Richard Lannoy (1971)**

The designer is obliged to read into these precepts of orderliness laid out in various documentations - the 'mandala' depicting the universe, 'the 'rangoli' depicting patterns and rhythms and narratives of everyday life in abstraction, the 'ikkat' weave on fabric as a geometric representation of elements of nature and other everyday aspects of life – and comprehend the cultural cues embedded in the palimpsest structure of the cultural constructs, if only to find the necessary convergences between the user and the construction of a product.

(5.0) Reflecting on the essential 'connect' between cultural attributes, sensory(s) and IXD in the context of designing for India – 'sacred spaces' as a holy grail for building experiences:

Having enunciated in design terms some methodological pointers as clues to accessing a cultural frame of reference, can we find an essential 'connect' as a bridge between design (specifically interaction design) and use of cultural attributes while building interactive design experiences in India?
To recapitulate our original premise: (i) down civilizational time, human experiences have been built on use of multiple sensory(s) -

sound, images, smell, touch and speech; (ii) wherever product interactions are built in close synergy with local lores and cultural narratives, it is to be assumed that these are spaces that become primordially defined, since sensory use is a positive function of man's basic (animal/visceral) instincts – and hence innately and organically driven, rather than extraneously driven as a technological or mechanistic force; and (iii) assuming IXD = sensory use, can we leverage India's propensity to design around use of cultural narratives with Interaction Design's innate technological bias/capability for building sensory(s) via sensors and actuators.

Given the above assumptions underlying potential design/product experiences in India, and given our analysis of cultural frameworks as universal and contextual references for designing, **where does our search for that one important 'connect' that could help us with the difficult exercise of mapping human sensory use with technology-driven sensory applications lead us to?**
In our opinion, that would singularly point to the idea of **'sacred spaces'** which are essentially everyday physical spaces around which the human interacts, and upon getting mediated with its interactions with human sensory(s), become mentally determined spaces.
Not realizing this would be to ignore a major dynamic of the user mindset in India.

As indicated, sacred spaces (not to be mistaken with being religious), arise out of rites of passages being overlain on physical spaces in a seemingly *ad infinitum* spectrum of time. To that extent, sacred spaces necessarily need a certain passage of time and organic growth to come of age.
The reason why sacred spaces can work as a powerful tool of design is because, at the people's level in India, almost everything that is ecologically legitimized could be construed as being a manifestation of the divine - a mirror image of God - starting with the elements of nature (earth, wind, fire, water, ether), right into our flora and fauna. There is no reality in the Indian cultural context that is not divine.
Nobel laureate writer V.S.Naipaul, in his concern for a culture's traditions being misunderstood by the outside observer as being unnecessarily ritualistic, gives the example of Brazil and some of the Latin American countries colonized by Portuguese and Spanish 'conquistadores'. He says the colonizers had wiped away all the sacred spaces, and in the absence of sacred spaces, people, otherwise driven by traditions, can "treat their surroundings quite badly." **('Hard Talk' with Tim Sebastian, 1998)**

It will be instructive to briefly observe instances of how 'sacred spaces' have been leveraged with design idioms - driven by the people's need on the ground to express themselves almost viscerally through use of their sensory(s). Disciplines that have traditionally used sacred spaces as a concept driving design solutions in India are architecture, typography and calligraphy, film-making, poster-design, the performing arts, etc.,

Through intervention of design – voluntarily or involuntarily - this instinctive, deeply-rooted outlook around sacred spaces eventually gets translated into the richness of our mythological imagery, as well as in constant translations into plastic images. The yearning to build experiences that are very primary/visceral/basic and yet connoting a certain level of visual sophistication in their stylizations, is evident when these people-driven plastic images get embedded with an entire range of the human sensory(s). The reason why the painted walls of houses or interiors of caves, or interiors of temple walls, or tree trunks, or even the foreheads of humans make for very primordial experiences in India is because the materials used are visually rich, variously textured, using a wide range of the color spectrum, a wide range of smells, and over and above, variegated across the different functions, such as:

- the smell and texture of the white powdered 'tilak', usually for the male forehead, and quite different from the oil-smeared red vermillion on the married woman's forehead meant as a sign of her desire for longevity of her spouse
- the visual quality, vibrant colors and textures embedded in the 'rangoli' – paintings at the entrance of houses that are quite apart from the white powders used for painting one's walls of the house.
- the smells of foods or 'prasad' offered to the Gods, the textural quality of the cool waters from the earthen pitcher kept at the entrance of a place of worship by the roadside for the thirsty traveler, the textural and visual quality of the 'sindoor' or vermillion smeared on the tree trunk as a swastika to depict the Goddess representative of the cycles of both creation and destruction, and so on.

The *visual representations* of this sacred space embodied by the banyan or the peepal tree, the vermillion on the tree trunk, the 'rangoli' patterns around the roots/foot of the tree, the **textural quality** of the temple encrusted into the tree's hollow or the association of cooling down with water pitcher kept at the base of the tree for travelers to quench their thirst, **the smells or the haptics** associated with the body language employed by the local priest while offering 'prasad' to the hungry traveler – to ignore these is to approach a user context blindly as well as to undermine the design clues embedded in these, and eventually depriving oneself as a researcher of an enormous amount of information and insight about the cultural mindset of Village India.

Our celebrated architect Charles Correa considers the notion of 'sacred space' as one of his most inspirational take-off points while designing in India – without it, he says, his designs in the Indian context would become irrelevant. And cites for peerage, the Japanese people for whom Mount Fuji is a sacred space, likened to God. To the Europeans, in contrast, Mont Blanc is just another high mountain peak – snow clad, beautiful and pristine, but definitely not divine **(Correa, 1997)**

(6.0) In conclusion – a symbiotic rather than an exclusive relationship between the universals and the context-specifics if designing for 'new audiences' is to become meaningful:

There is an acute irony underwritten into the question of 'Indian-ness' as an identity proposition for products. That irony relates to how universalizing in sentiment the elements of this identity can actually be. To that extent, we are obliged to comprehend the line one needs to draw between the merits of universals and those of cultural specificities – and not just one or the other.

In conclusion, therefore, it would be highly instructive to reference here for our understanding, an example of the universals intrinsic to 'Indian-ness'. The fact that the example cited below comes from Europe is meant to broaden our canvas to stretch as farther away from Indian as possible
In 1929, the world of art, design, social order and politics had got rocked by the release of the 'Surrealist Manifesto'. In it, Andre Breton had said:
"There is every reason to believe that there exists a certain point in the mind at which life and death, real and imaginary, past and future, communicable and incommunicable, high and low, cease to be perceived in terms of contradiction."

The Surrealist Manifesto finds an immediate affinity with the way Indian culture deals with antipodes. It also immediately locates the Indian principle of the conjunction and reconciliation of opposites in a larger, more modern context. The Indian notion that the transcendence of opposites is a state that can humanly be attained had also become the inspirational basis for a lot of 20^{th} century popular cultures worldwide, including popularized mysticism and science fiction (exploring the idea of the human attaining god-like supernatural powers, or humans overcoming the space-time continuum).
This notion of an antithesis also finds affinity with the Dinka tribe of Sudan, where tribal lores and sayings combine together universally-received wisdom with cultural specificities, which means clichés with odd and striking images, admonitions with approbations.

This is to emphasize that while delving into cultural mindsets, it would help to spot universals from other cultures and use them as clues to broaden one's own design horizons. Being driven entirely by cultural specificities without referencing them to a broader universe simply means being stuck in a space and time warp and depriving oneself of related experiences to draw inspirations from. Lacking this perspective vision could also entail undermining the exercise of building a set of rationalized precepts for the act of designing.

If cultural specificities were not underwritten by the larger idea of universals, how otherwise would one find a thinker from another culture and another land perceiving with fair accuracy

and sensitivity, that essential reality about the way sensory(s) have been used as a design idiom in India to construct interfaces from fields such as music, dance, sculpture, architecture, etc.? We cite the case of Nobel Laureate poet-essayist Octavio Paz who had spent time in India in the 50's and 60's, first as a cultural attaché to India for Mexico and in later years as Mexico's ambassador to India, also having spent time as a career diplomat in France. Paz says in his book **'In Light of India' (1995):**
"It has been said that Gothic architecture is music turned to stone; (just as) one could say that Hindu architecture is sculpted dance."
In one go, Paz validates the idea of the universal feeding the contextual and vice versa. Mexican sensibilities have as much to do as ours with the play of sensory(s).

Finally, as a running thread of the narrative across the three cultural references above (India, Europe, Africa) remains the presence of at least one astounding universaling metaphor – an oracular undertone articulated by the presence of the wisdom tree or the ventriloquist from these cultures and from others such as that of the Greeks', the Native Indians', and the Chinese to mention a few.
The universality of this experience itself is enough to group the plight of our 'new audiences' as common cause with those from other geographies – underserved as they remain by an inattention from new media to build interactive solutions for their needs – the underserved communities continue to exercise their affinity to dwell in mental spaces that are outside of the mechanistic bounds of technology reasoning. For the African-American in the USA it takes the shape of the incredible notion of 'soul food', for Indians it is 'utsav' or festivals - important universalizing sentiments that sharpen the focus of individual 'contexts'.
It means, all we need to do is to examine the universals to make it easier to penetrate the mental spaces of these communities – separated by contextual differences, united by universalizing metaphors.

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