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A Decolonial Approach to Brazilian Design

Analysis of New 'Householding' Structures

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Discovering Thoughts, Inventing Future

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A Decolonial Approach to Brazilian Design: Lina Bo Bardi's Contribution to Embracing Projects

By Karin Vecchiatti

Introduction- In recent years, it is common to associate a *decolonial perspective* to different areas of design. This occurs mainly when one thinks of a "Brazilian approach" to design. The discussion becomes heated when it is followed by other questions: who are, after all, the people who create Brazilian material culture, generating products-services-communications? The idea of a decolonial approach to design still questions the aesthetic and functional standards reproduced for so many years by many local creative professions: why does it seem so difficult to break the white-centering predominance both in academia and in the design market? How can original, popular, local or "unerudite" knowledge be taken as a starting point and not just as something to be copied or studied in various projects? To what extent are projects, products, material goods and services actually accessible in places that lack original solutions?

This article tries to answer these questions. It suggests the need to delve into the history of Brazilian design, and it points towards an alternative approach to modernity – mainly, a different understanding of the enterprises that forged histories, policies and lifestyles in the last centuries. Fortunately, there are tools for that. For design, the first and probably most important tool is the evidence and arguments that present Brazilian design long before the 1960s.

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Karin Vecchiatti

I. Introduction

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This article tries to answer these questions. It suggests the need to delve into the history of Brazilian design, and it points towards an alternative approach to modernity – mainly, a different understanding of the enterprises that forged histories, policies and lifestyles in the last centuries. Fortunately, there are tools for that. For design, the first and probably most important tool is the evidence and arguments that present Brazilian design long before the 1960s. The second tool is the difference between *design as program* from *design as project*, admitting that the first dominated design strategies since the beginning of the 20th century and discarded design as social artifact or, in other words, as a continuous process of becoming projects. The third tool for understanding modernity and the history of design from another perspective is an analysis the relationship between popular and industrial Design. This proximity was experienced by the Bauhaus, but erased by the corporate worlds's forceful drive throughout the 20th century; in Brazil, the same proximity was also envisioned by Italian-Brazilian architect Lina Bo Bardi in the 1960's, while trying to establish the Museum of Popular Art in Bahia.

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[1] https://hhmagazine.com.br/epistemologia-decolonial-uma-ferramenta-politica-para-ensinar-historias-outras/

These three perspectives (an approach to Brazilian design history considering an alternative look towards modernity; the differences between *design as project* and *design as program*; and an analysis of the relationship between popular and industrial design) are discussed in this article in an attempt to reveal charecteristics of Brazilian design and, above all, to pave the way for a more inclusive, comprehensive and significant design production in the near future.

II. An Alternative Look Towards Modernity

To develop an alternative look at what modernity has achieved, one has to start understanding different knowledge systems and practices – especially those that were excluded by the modernizing thrust. When it comes to design, this involves knowing and understanding the past of Brazilian design and emphasizing how fundamental it has been in the building our material culture.

> As long as designers continue to ignore the rich and fertile historical legacy of design that has existed in our culture for a century or more, they will be doomed to discover gunpowder and to reinvent the wheel at each new generation. Worse than that, they will be choosing to remain trapped within the narrow limits of a concept approach towards design, trapped within an aging modernity that still manifests itself in false dichotomies such as form/function, product design/graphic design, appearance/use, art/design, market/society. (CARDOSO, 2005, p.37)

A key contribution for understanding the past of Brazilian design is art historian Rafael Cardoso's work *Brazilian Design before Design*. In it, the author explains how the development of design in Brazil was not immune to colonial thinking; how it was extremely influenced by modernity's narrative on rationalization and progress. This drive ended up discarding the so-called "popular" knowledge and began considering the 1960s as the "beginning" of design in Brazil. Cardoso, however, shows that already in the 19th century there were a series of design activities with a high level of conceptual complexity, technological sophistication and enormous economic value, applied to the manufacture, distribution and consumption of industrial products (CARDOSO, 2005).

Nevertheless, there are reasons why Brazilian design activities prior to the mid-20th century were conveniently overlooked:

(1) Between the 1950s and 1960s, Brazil began to participate in a new world economic system, and this drive was seen as an opportunity to create a new model for the country – a model of "the future", breaking away from an archaic slaveholder past.
(2) Furthermore, the growing presence of multinational companies in the country helped spread a dominant model of globalized corporations. Since then, the corporate world has been imposing itself as an absolute truth, as the "only" viable means of production, ruling out so many other possibilities.

These factors helped to diminish the importance of projects that preceded the 1960s, mainly separating Brazilian design from the idea of social artifact and considering valid only a very particular area of project development: *the program*. To reinforce the transition towards a modern Brazil, it became much more logical to see design as a concept, profession and ideology and to diminish the importance of social bonds behind each project.

This transition took shape from the second half of the 1950's and early 1960's, during the process of accelerating the industrial and urban development of some Brazilian cities, which opened the field for new experiences in design. At that time, three major design schools and reference centers were founded: ESDI - Superior School of Industrial Design (*Escola Superior de Desenho Industrial*), in Rio de Janeiro; courses related to industrial design coordinated by architect Vilanova Artigas in São Paulo University's School of Architecture (FAU-USP) and the School of Visual Artes in Belo Horizonte (*Escola de Artes Plásticas de Belo Horizonte*), in Minas Gerais. Establishing design as an area of knowledge made sense and complemented the very important idea of progress for the country.

In 1951, even before ESDI and FAU-USP, art patron Pietro Maria and architect Lina Bo Bardi created the Contemporary Art Institute (*Instituto de Arte Contemporânea*/IAC), conected to the newly established São Paulo Art Museum (MASP). With new courses (photography, fashion, architecture models, advertising and design), IAC brought to Brazil a series of principles established by the Bauhaus in Germany. Again, this happened at a time when technological-industrial transformations were very welcome in the country, emphasizing the drive to leave behind knowledge linked to a traditional past.

The result of these actions, mainly through design activities linked to production and consumption on an industrial scale, brought a turning point in Brazilian design history. It can be suggested that, little by little, the possibility of considering the practice of *design as project* was discarded and an approach of *design as program* began to be much more valued. Thus, a "programmatic" version of design became predominant, losing a proposition that pays more attention to the complex development of material culture and to the social bonds that support it.

III. Design as Project and Social Artifact

Contrary to what this programmatic version of design tends to emphasize, material culture, symbols, two-, three-dimensional or digital objects produced for centuries by human beings tell the history, reveal connections, textures and processes of a people and their culture. Material culture is not restricted to its uses or functions. If, on the one hand, each object is, at each moment in history, "the result of the balance between normative forms", it is also "all the time a process in becoming" (BARTHES, 2005, p.259).

This process can only be perceived insofar as design practices are linked to the idea of social artifact, which shows the social construction behind each object: how they influence and are influenced by people's lives and behaviors and how they reveal the economic, political and technological context in which they are produced. Therefore, to think of *design as social artifact* is to face a more complex idea than that of *design as form-function*. It is closely linked to the idea of *project as a historical-social becoming*: flexible, changeable, capable of learning and adapting; very different from the idea of *a project as program*: fixed, rigid, incapable of making concessions.

With time, the industry-progress-globalization paradigm began to value the *programmatic side of design* and radically diminished the importance of projects understood as the *process of becoming*; of creating our material culture. This lead the historical-social products that were made under certain "popular" conditions almost to oblivion. Design as project takes into account the context that influences the materials and techniques used; it dwells into the uses and meanings assigned to each product. It considers objects-services-communications not as something ready-made, in its forms and meanings, but rather, as a result of processes related to the way society is organized, its ways of life and its cultural values. If today we are looking for a "Brazilian design", if we question hegemonic aesthetic standards, then it is essential to pay attention and understand the social mechanisms that create the predominant forms, colors, textures and uses (or functions) and to understand why so many others end up being left out. (MOTA, no date)

Unfortunately, the *programmatic version* of design thinking that largely guided the work of multinationals in this "modern country" sought to erase the history behind the making of objects. But it is precisely these forgotten stories that need to be told so that design does not cease to be project or social artifact; so that one remains connected to the continuous experience of everyday life and learning. It is

mainly through rescuing these stories that one could begin to address the themes that permeate a possible decolonial design and in fact to question the aesthetic and functional standards reproduced in recent decades by the creative professions. It is certainly this rescue that would offer an alternative look to understand modernity.

IV. When Design is No Longer Project

Art historian Giulio Carlo Argan (1998), when addressing architecture and design, drew attenion to the crisis that resulted from *projects* turning into *programs*. He named it the "object crisis" or the "programming crisis". One of the reasons that triggered this crisis is project practices relying too much on totalizing thoughts and planning, thus becoming a program. It is the moment in which the *intention of becoming* as the core of project making, became rigid.

It is never enough to remember that the avant-garde movements that influenced design in Europe at the beginning of the 20th century participated in this transition. They often created visual and material products that brought the belief that planning a perfect society would be entirely possible. To a certain extent, early 20th century design translated certainty in progress visually and materially, as if it were enough to employ a fixed plan to stimulate the progress of society. The ultimate aim of the modern utopia was to create perfectly planned societies, changing unsatisfactory situations and healing the world's ills.

Over the years, however, the utopia of perfectly planned societies was gradually replaced by the disuse and obsolescence of modern theories. Seeking to fix chaos caused by the industrialization of cities, seeking to solve society's problems, modern utopia unleashed a crisis whose epicenter was precisely in the ideas it intended to defend: 1) the belief in a concept through which one can plan a perfect society and 2) the idealization of planning itself, facing it as a rigid structure, as a fixed and unchangeable plan. The problem is that these ideas left out many others, which were not even considered by the modern propulsion.

In Design, the program as pre-calculated and almost mechanical procedure started replacing projects. If, on the one hand, projects are an integrated process linked to the development of society as a historical becoming, programming presents itself as a strategy for overcoming history, dangerously taking away from individuals all choice and decision making, giving them to power structures (ARGAN, 1998).

According to Argan (1998), the object crisis spread to the postmodern world, a world in which programming (supposedly) continues to ensure the well-being of humanity (Argan, 1998). The difference is that since the last decades of the 20th century, the program has no longer been based on the rigidity of the (modern) concept, but rather on capitalist hegemony, especially on financial capital (postmodern) of globalized multinationals. And design was not immune to this transition: it surrendered to the principle of a supposed freedom of commercial expression and (almost) lost its ability to … design.

V. One Needs to Embrace Projects Once Again

The restlessness presented at the beginning of this article suggests that design needs to go back and embrace projects. This requires, perhaps more than at other times, the need to create new relationships and perceptions with everyday life. It is about paying more attention to strategies that are created through learning processes. Embracing projects is what defines design in dialogue with the rest of life; that is open to random interactions and, above all, that is available to encounters that can shape and change behaviors.

Embracing projects translates itself into an invitation for designers to recognize themselves in different identities, to understand and value different knowledge and practices and to get to know and create different aesthetics. The first Bauhaus professionals tried to do this. Architect Lina Bo Bardi in Brazil's mid 20th century also tried. And current designers need to try one more time. Otherwise, design will remain stuck with programming.

If the early years of the Bauhaus seemed to follow a project approach towards design, the school's efforts to renew the formal and social potential of design were neutralized years later by the corporate culture that its descendants ended up attending (LUPTON, 2009). This path led to assumptions of objectivity and universality in design, something spread by modern thought in the West; it was only decades later that different minds started acceping the idea that communication is not as universal or impartial as one would like. All communication is loaded with principles and values that make such "universality" and "objectivity" almost impossible to achieve (PATER, 2020).

This alternative vision was in part brought by *Bauhaus Imaginista,* a 2018-2019 exhibition that toured different cities around the world, celebrating the Bauhaus' centenary. In São Paulo, Brazil, the exhibition had a subtitle: "Mutual Learning". Inspired by post-colonial studies, the exhibition presented a revisited Bauhaus and highlighted, on the one hand, how the school incorporated pre-modern and non-Western cultural elements. On the other hand, the exhibition also showed how this same repertoire and its indigenous peoples continued to suffer from the devastation of their territories and traditions, while the *program of modern design* continued to be spread a result of the ongoing European colonial instinct, which in a certain way deepened in the post-war period with the *International*

Style and the teachings of Ulm (BAUHAUS IMAGINISTA, 2018).

It is important to remember that, in the first years after its founding (1919), the Bauhaus had as primary premise the understand of *design as a social project*; one of its main goals was to reform art and design teaching. Art and design were seen as agents of social change. Nevertheless, the Bauhaus heirs incorporated and were incorporated by the striking thoughts of modernity. They also affected and were affected by legal, political, ideological, religious and cultural systems that disqualified what was proper to native peoples – the then uncivilized and uneducated. In other words, despite their energetic avant-garde spirit, Bauhaus members and heirs were affected by the unfoldings of the *totalizing systems that shaped modernity*.

> "Many Bauhaus members believed that the future lay in the "universal" laws of reason, freed from the constraints of traditional culture. Sibyl Moholy-Nagy, spokesperson for the Bauhaus methodology, advocated the creation of a *new code* of visual values. Herbert Bayer hoped to transcend transient cultural whims by basing his design on objective and timeless laws. Style considerations and personal expression were subordinated to the "purity" of geometry and functional requirements". (LUPTON, 2009, p.150)

In many ways, the search for "purity" and "universality" ended up creating a very static formal vocabulary and a consequent *programmed and totalizing vision* of everyday life, artifacts, and communication.

VI. The Contributions of Lina Bo Bardi

In the 1950s, the Contemporary Art Insitute (IAC) – founded by Lina Bo Bardi and Pietro Maria Bardi in the São Paulo Art Museum (MASP) brought Bauhaus credentials into its curriculum and faculty. But a few years later, noticing the need to stimulate Brazilian aesthetics, Lina paid closer attention to the innovative potential of Afro-Brazilian and indigenous cultural products. This occured mainly after the architect started teaching at the School of Fine Arts at the Federal University of Bahia and also started directing the Museum of Modern Art of Bahia (MAM-BA) in Salvador. During this period, she also atempted to open a design school that, if implemented, would have greatly differentiated itself from IAC, ESDI, the Industrial Design School at FAU-USP and Belo Horizonte's School of Fine Arts.[2]

The school of industrial design envisioned by Lina would have had *pre-craft* and *popular art* as reference points. It would be closely connected to an also envisioned Museum of Popular Art – MAP. Although neither MAP nor the industrial design school were created, their intended purpose is extremely important for *understanding the past and current development of Brazilian design*. Lina imagined MAP as a "Museum for the 'Arts', that is, a place made of 'doings', of 'facts', of 'everyday events'. With its exhibitions and workshops, MAP's objective was to rescue and enhance popular culture of the Brazilian Northeast. Lina's proposal aimed to find in local culture the strength of design as "as inheritance and continuity" (ARNELLI, 2015).

Unlike the industrial design schools that were founded in the 1960s and that helped to characterize the "beginning" of design in Brazil, Lina Bo Bardi's efforts sought to establish, in Salvador, a school that would develop and improve design connected to traditional knowledge.

It is important to emphasize that Lina's project did not exclude industry; nor did it only consider local tradition. What she suggested was a transformation of tradition, framing tradition as an important heritage for the construction of a bright future for art and design. In other words, Lina wanted to maintain *project approach* towards teaching design, while design in big cities gradually surrendered to a *programmatic method*.

For Lina, traditional and popular design were part of an evolutionary process brought about by industrialization. She emphasized the Idea that progress would have had as its starting point in the original cultural roots of Brazil. That is very different from what actually happened: a development process that excluded these same cultural roots. Looking carefully at and incorporating the cultural bases of a country in design does not necessarily mean conserving forms and materials; it means evaluating original creative possibilities and evolving from them. Through this path, modern materials and modern production systems would later take the place of more primitive means, conserving, not the forms, but the deep structure of those cultural possibilities (LIMA, 2021, p. 221).

It is interesting to notice that Lina classified the production of popular artifacts in the Brazilian Northeast as a "pre-craft", since it is mainly an inheritance of craft activities, and not a form of social organization or a means of production/economic configuration, as it happened in Europe. The Brazilian handcraft noted by Lina Bo Bardi in the Brazilian Northeasst is characterized by isolated and occasional groups, mainly organized around a family structure, that would eventualy disappear (as it happened in the Southeast region of Brazil, for example), as soon as there was a minimum of economic development in the region (PERROTA-BOSCH, 2021).

VII. Conclusion

As designers and creative professionals question in recent years the originis and development of Brazilian design, suggesting that a decolonial approach,

[2] LINA BO BARDI, Salvador - http://revista5.arquitetonica.com/index.php/magazine-1/arquitetura/escada-de-lina-bo

that is, an alternative look to the modernizing thrust could reveal significant contributions to the understanding of the role played by material culture, a few learned points become imperative in this process.

The first point is realizing the enormous difference between *design as project* from *design as program*, and understanding that the second approach played a significant part in discarding the importance of social artifacts, popular and "unerudite" knowledge, not only in Brazil, but in most colonized regions of the globe. This affected not only design, but other creative, political, and scientific conceptions. Only recently have these forgotten tradicional beliefs been slowly incorporated in a various social activities and lifestyles. But these are incipient initiatives. There is still a long way to go.

The second point crucial to design history is recognizing the fact that innovative minds from time to time saw the importance of traditional and popular culture for the development of different areas of knowledge. One of these inspirational minds (among several), was architect Lina Bo Bardi.

Lina's contribution to architecture, design and the arts in Brazil is enormous. But for the discussion presented in this article, perhaps her greatest achievement was to plan the Museum of Popular Art and the school of industrial design. Despite Brazil experiencing an industrialization impulse in the 1960s, the political context was troubled, mainly due to the establishment of the civil-military dictatorship. These ingredients contributed to the fact that MAP and the school of industrial design envisioned by Lina were never actually established.

Today, however, one can understand the importance of Lina's plan. Faced with an inevitable process of technological evolution and industrialization, the Museum of Popular Art (MAP)and the school of industrial design would establish an alliance between the modernization of society and its cultural identity. If implemented, they would very likely eliminate (in Lina's words) the project-execution *fracture* in the field of industrial design, "aiming to eliminate the anonymous and demeaning nature of manual work, compared to the excessive intellectualism stripped of any direct connection with lifestyle practice." It would certainly also contribute to lessening the predominance of the project over the program.

In recent years, there has been great discussion about the role, the responsibility and contribution of tradicional and popular culture in various Brazilian creative, scientific and technological professional activities. This discussion is especially important in places lacking original, low-budget and concrete solutions for so many economic and life-challenging problems. Design has an important part to play in creating fairer and more sustainable forms of production. A decolonial approach to design has an even greater offering. One just has to understand it in its depths, so that socioeconomic and political practices can actually propose significant changes in society.

Bibliography

1. ANELLI, Renato et alli. Lina Bo Bardi: Brazil's alternative path to modernism. Hatje Cantz Publishers, 2015.
2. ARGAN, Giulio Carlo. História da arte como história da cidade. São Paulo: Martins Fontes, 1998.
3. _____. Projeto e destino. São Paulo: Ática, 2004.
4. BARTHES, Roland. História e Sociologia do vestuário. In: BARTHES, R. Imagem e Moda. Inéditos Vol. 3. São Paulo: Martins Fontes, 2005.
5. BAUHAUS IMAGINISTA: aprendizados recíprocos. Guia de exibição. São Paulo: Sesc Pompeia – 25 de outubro 2018 – 06 de janeiro 2019.
6. CARDOSO, Rafael. O Design brasileiro antes do design. São Paulo: Cosac & Naify, 2005.
7. LUPTON, Ellen. ABC da Bauhaus. São Paulo, Cosac & Naify, 2009.
8. LIMA, Zeuler R. Lina Bo Bardi: O que eu queria era ter história. São Paulo: Companhia das Letras, 2021.
9. MOTA, Maria Dolores de Brito. A roupa como artefato social: por uma sociologia da moda. https://www.academia.edu/27511519/A_roupa_como_artefato_social_por_uma_sociologia_da_moda#:~:text=A%20roupa%20artefato%20%C3%A9%20um,22).
10. PATER, Ruben. Políticas do design: um guia (não tão) global de comunicação visual. São Paulo: Ubu editora, 2020.
11. PERROTA-BOSCH, Francesco. Lina: uma biografia. São Paulo: Todavia, 2021.

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Service Quality and Brand Experience as Factors Affecting Repurchase Intention through Word of Mouth in a Mexican Hotel Chain during the Pandemic Covid-19

By María de Los Dolores Santarriaga & Francisco Carlos Soto

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Abstract- Prior empirical research suggests that guests visiting a hotel chain during the Covid-19 pandemic are susceptible to have future behavioral intentions such as repurchase intention provided that they perceived a high service quality from the hotel chain. While service quality is important, also the paper discuss the relevance of brand experience define by (Brakus et al., 2009; Meyer & Schwager, 2007) "as consumers' internal subjective and behavioral responses induced at different levels of interaction, both direct and indirect, with brand-related stimuli" and repurchase intention through word of mouth. We develop a conceptual model base on prior research (Gómez-Suárez. and Veloso, 2020; Prabowo, Astuti, and Respati, 2020). A quantitative research method was used; 351 useful questionnaires were obtained from three different locations of the Mexican Hotel Chain located in the Pacific Coast during the pandemic. Our results provide confirmation that positive evaluations of the service quality and a favorable brand experience increases behavioral intentions such as repurchase intention through word of mouth.

Keywords: *service quality, brand experience, word of mouth, repurchase intention.*

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María de Los Dolores Santarriaga [α] & Francisco Carlos Soto [σ]

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Keywords: service quality, brand experience, word of mouth, repurchase intention.

I. Introduction

In the hospitality arena, specifically in the hotel industry offering a home away from home means, providing the best experience possible. The hospitality and tourism industry is a vast sector, one of the economic drivers in some countries, in Mexico between 2013 y 2019 tourism share in the GDP range between 8.5 and 8.7 of the national GDP (INEGI, 2019), in 2020 the tourism was 1.5 billion Mexican pesos. Hotel businesses in Mexico are a mixture of independent brands, and national and international chains. The last two decades resulted in a significant expansion of the local hotel market, as well as of operations of international hotel chains. According to information from the Ministry of Tourism, at the end of 2021 there were 836,300 hotel rooms in 23,699 establishments. Establishments with a category of one to five stars constitute 61.5% of the total and have 80.2% of the available rooms (Secretaria de Turismo, 2021).

Over time, the presence of hotel chains has been strengthened in the country. According to the information available, in 1994 there were only 59 operating chains and by 2021 the volume increased reaching 120 hotel chains. (Secretaria de Turismo, 2021). The average annual growth rate of establishments that operate in chains is greater than that of the total number of establishments in the country 7.4 % vs. 4.1% (Flores, F., 2021). The Top 10 hotel chains concentrate 64.5% of the total identified establishments. This includes both new players in the industry, as well as consolidated leaders. Most of the mother brands present in the country (57.5%) have their origin in Mexico. The remaining percentage comes mainly from countries and territories located in America, Europe and finally from Asia (Flores, F., 2021).

In order to succeed in this fierce market, hotel chains in search to stand out and differentiate from the competition, have developed branding strategies in order to gain a better position in the market García et, al., (2018) acknowledge the importance of the hotel industry, recognizing "the hotel" as a fundamental provider for tourists' psychological well-being (García et al., 2018).

Experiences are generally evaluated on both cognitive and emotional levels, (Serra –Cantallops et, al., 2018) established that in the case of tourist´s, that are travelling for pleasure, this process of evaluating the experience is predominantly emotional. In this regard chain hotel brands must generate a unique, emotional and unforgettable experience, that will elicit desirable consumer behaviors such as purchase intention, word of mouth or loyalty (Kang, Kang, 2015; Khan and Rahman, 2015; Sukhu et al., 2018). Brands play an important role for firms' visibility on the market, it is important to recognize, and understand the factors that affect the creation of consumer behavior.

One very distinctive Mexican hotel chain, that at their request the brand name will remain anonymous. It is a leading hotel company in Mexico with a history of solid growth since the opening of its first hotel in the seventies. With an aggressive development plan in recent years, almost one hotel per month and an additional 100 hotels operating within the next 5 years. This hotel chain operates more than 150 hotels and more than 24,000 rooms under its 7 brands, achieving efficient centralized management and high-level

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economy of scale (Grupo Posadas, 2019). Geographical coverage is vast, offering different brands, each brand appointed to a different market segment. The negative impact of Covid-19 in the hotel industry growth was affected. Worldwide, the impact on the tourism industry was devastated. It also had a negative impact on Mexican hotel chains.

The World Tourism Organization in its 2021 annual report indicated that more than 100,000,000 million jobs had been lost worldwide. The hotels had to stop operations. But the hotel industry resurface, hotel chains in México implemented strategies directed specifically to make sure guests feel confident to travel again. Hand in hand with the government authorities (Plan de Regreso Seguro reapertura de actividades hoteleras, 2020) they develop a safety protocol. This protocol included deep sanitizing actions, fogging of rooms and common areas, safety handling of food both in restaurants and in room service, QR menus, minimizing personal contact, as well as social distancing and protective measures, the use of face masks by both guests and employees among other safety actions. Modifying some of the high contact services offered by the hotel.

At the beginning of the year 2022, Torruco Márques, Minister of Tourism, affirmed that in "Mexico the tourism industry remains in the process of clear recovery, with figures that are encouraging".

Among the data that supported this affirmation was: the arrival of 31 million international tourists, 28.1 percent more than in 2020 and 46.1 percent less than in 2019; and 18 thousand 428 million dollars of economic benefit, 67.6 percent higher than 2020 and 55.3 percent less than in 2019. (Marques, 2022).

Nonetheless, visitors were still afraid to resume their tourist activities for fear of COVID; others have resume their travelling, knowing hotels have established a safety protocol that meant modify services offer from the hotel, with this in place, they felt confident and start travelling. In this sense, word of mouth recommendation WOM in the hotel industry, is very useful in promoting communications to attract customer traffic (Delgado Ballester & Fernández, 2011). Because of its informal and noncommercial nature, WOM has high credibility and persuasive power. Positive experience of guests staying at the hotel chain during Covid-19, from now on refer as "Mexican hotel chain"; translates in positive perception and affects the behavior to recommend it to others or return again and again. In this sense, brand experience can favor the generation of WOM. A positive brand experience is directly associated with a positive influence on WOM recommendations. Unforgettable experiences, can promote the existence of free promoters of the hotel chain. (Serra-Cantallops et al., 2018). Service quality and brand experience have a positive and significant effect on word of mouth (Gómez-Suárez. and Veloso., 2020; Prabowo, Astuti, and Respati, 2020). Furthermore, previous research has demonstrated that a positive perception of the service quality increases repurchase intention. (Haryono, Suharyono, Achmad, Fauzi, and Dan -Iman, 2015).

Increasing competition, and the fact that recovery in the hotel industry has been slow, to try to understand the implications that service quality, and brand experience have on WOM and repurchase intention is vital. The aim of this research is to examine the relation between brand experience and WOM recommendations (Gómez- Suárez; M. and Veloso, M., 2020). Secondly, examine the relationship between service quality and WOM, as well as to analyze the role of WOM in the repurchase intention in "Mexican Chain hotels", during the Covid -19 pandemic, and the reopening of the hotel sector in Mexico. We feel that studying these variables develop from prior research (Gómez-Suárez. and Veloso, 2020; Prabowo, Astuti, and Respati, 2020), can make a significant contribution to our academic understanding of WOM, repurchase intention and its relationship with service quality and brand experience. Our study is also relevant from a managerial perspective, it provides insight to hotel chains, and helps them understand customer´s intentions during Covid-19.

II. Literature Review

Service quality and word of mouth. Service quality (SQ) plays a central role for organizational growth with focus on influencing success which is also a significant strategic matter for management (Sahney, S., Banwet, D. K., & Karunes, S., 2006). According to Zeithaml & Bitner (2006) service quality is a comparison of what customers feel a service provider should offer (expectations) and what really was provided (perceptions). Therefore, when a service is evaluated positively, it has a direct impact on WOM, and repurchase intention (Kim et al., 2009; Cantallops & Salvi 2014; Liu & Lee, 2016). Word of Mouth has a positive effect on repurchase intention (Delgado Ballester and Fernández, 2011), in a sense those hotel guests who perceive the service quality performance of the Mexican hotel chain, exceeded their expectations will have a tendency to spread their experience and positive impression and ultimately recommend services to other prospective hosts. Positive impressions of the service are not only beneficial to other potential guests, but to themselves because they also have influence on their future repurchase intentions The most widely accepted framework for measuring service quality is SERVQUAL (Schiffman and Kanuk, 2010). Parasuraman (1985) developed SERVQUAL model, it is used as an instrument for measuring service quality. Prior research, provided support that perceived service value is likely to be the best determinant of visitors' behavioral intentions (Chang and Wildt 1994; Jayanti and Ghosh 1996; Petrick 2002; Subha, N., 2020; Boon-itt and Rompo,

2012). Servqual has five dimensions to measure service quality they are: tangibility, reliability, responsiveness, assurance and empathy. We hypothesize:

H1: A positive evaluation on service quality of the hotel chain has a direct and positive influence on word of mouth.

H2: Service quality and brand experience has a direct and positive influence on repurchase intention, through word of mouth.

a) Service quality and repurchase intention

The literature reviews incorporated sources that assess and found empirical evidence that service quality is related to consumer post-purchase intention, known as repurchase intention; this means costumers' choose services from the same hotel chain (McDougall & Levesque, 2000). Therefore, repurchase intention depends on the evaluation of the service quality they received at the service, in this case the hotel chain (Kumar, 2002; Zhang et al., 2011; Liu & Lee, 2016; Urbashi, Ravi, Ash, 2017; Tjhin, Rayhaan, & Pasaribu, 2021). It could be argued that Perceived quality is one of the best predictors of customers' purchase intention (Azize, Cermal, & Hakal, 2012; Li, 2017; Suhud & Willson, 2019; Zahid & Dastane, 2016; Suhud, Allan, Rahayo & Prinhandono, 2022). If the evaluation of service quality exceeds consumer expectations, then the consumer will repurchase the services, otherwise if the evaluation of service quality is lower than consumer expectation it will give the opposite effect. Repurchase intention is a very important factor for hotel chains given the complexity of travelling during Covid. The consumer's decision to keep using the same hotel chain service will provide assurance to the company for business sustainability and ensure that consumers do not switch to other hotel chains, this means a regular influx of travelers. Overall, a positive evaluation of the service quality will increase repurchase intention. We hypothesize:

H3: A positive evaluation on service quality of the hotel chain has a direct and positive influence on repurchase intention

b) Brand Experience and repurchase intention

In the 1980´s, the concept of consumer experience emerged (Holbrook & Hirschman, 1982) looking to overcome limitations generated by traditional consumer behavior theories. Brand experience was defined by Brakus (2009) "as consumers' internal subjective and behavioral responses induced at different levels of interaction, both direct and indirect, with brand-related stimuli "(Brakus et al., 2009; Meyer & Schwager, 2007). As Brakus (2009) establish, sensations, feelings, cognitions, and behavioral responses evoked by stimuli that comes from the brand are a result of a brand's design and identity, packaging, communications, and environments (Brakus et al., 2009). Experience with a brand related stimuli, should be understood as subjective and internal responses ay each point of interaction during the service delivery process. Consider that the contact with de brand experience can occur directly or indirectly during the purchase process. (Ramirez and Merunka, 2019). In this sense, all consumer responses to the symbolic, aesthetic, imaginative and fantasy meanings of the hotel chain brand, are a result of multi-sensory experience aspects (Addis & Holbrook, 2001; Hansen, 2005; Holbrook & Hirschman, 1982, 1989; Tsai, 2005). Repurchase intention had to do with the positive evaluation of the brand experience (Addis & Holbrook, 2001). We hypothesize that:

H4: A positive evaluation of brand experience of the hotel chain has a direct positive influence on repurchase intention.

c) Brand experience and Word of mouth

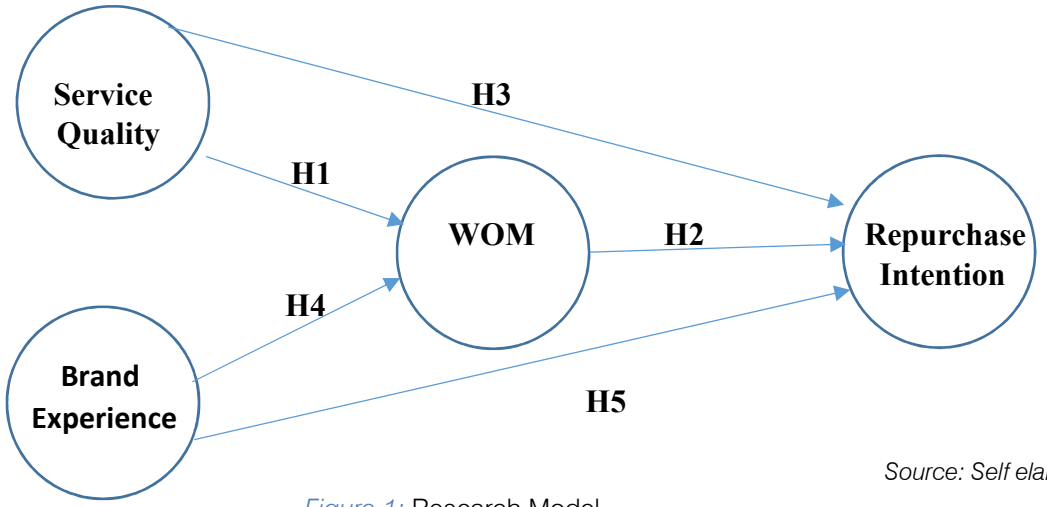
Brand experience is defined as "consumer's internal subjective and behavioral responses induced at different levels of interaction, both direct and indirect, with brand-related stimuli" (Brakus et al., 2009; Meyer & Schwager, 2007). Brand experience is a different related concept from other brand constructs.in a sense, brand experience differs from evaluative, affective, and associative constructs, such as brand attitudes, brand involvement, and brand attachment also customer delight, and brand personality (Brakus, Schmidtt, Zarantonello, 2009; Azize, Cemal & Hakal, 2012. Brand experience captures the sensorial, emotional, intellectual, behavioral (Brakus et al., 2009), social (Chang & Chieng, 2006; Schmitt, 1999). Brand experience can favor the generation of WOM. Consumption situations that are highly emotional such as an interaction with the hotel services, producing tensions to hotel guests, can be relieve through WOM communication (Delgado Ballester and Fernández, 2011). Word of mouth (WOM) is known as the process of telling people about a product or service, with the intention to encourage them to try the service. Previous empirical literature has shown that a positive WOM is associated with repurchase intention, WOM are informal communications about an object, brand or service with the characteristic of having high credibility and persuasive power. It is a means to attract traffic especially those that are service-oriented, such as hotel chains (Delgado Ballester and Fernández, 2011). In this sense, hotels that are capable of providing a unique and unforgettable brand experiences, can obtain brand promoters and co-creators of value through positive recommendations (Serra-Cantallops et al., 2018). With this in mind, we propose:

H5: A positive brand experience in the hotel chain has a direct and positive influence on WOM.

III. Methodology

The current paper presents the results of quantitative analysis drawn from data collected. A guest intercept survey was used to collect the data. Guests of 3 different hotel locations (hotel chain), from the same category, in the pacific coast of México were approached with the request to participate in the study, all safety protocols were followed. Data was collected from actual guests travelling for pleasure during the pandemic staying at the "Mexican Hotel chain" in the format "hotel interception" it is worth to mention that all safety protocols were followed, in order to maintain social distance and protect students and guests, if they accepted to enter the study, an email with the questionnaire link was provided, this guarantee confidence from the guests. The surveys were administered by graduate and undergraduate students, well trained and instructed in interception techniques. Following procedures recommended by Sudmann (1980) even though his sampling technique was develop for shopping intercept surveys, it was considered appropriate for the study, collecting data at all times, all days of the week during summer break 2021. In order to be included, guests should be travelling for pleasure. The population of the study was guests staying at one of three locations of the hotel chain. Using a convenience sample, knowing the implications, but considered the most appropriate, the total usable sample attained was 351.

Questionnaire: The questionnaire consisted of four scales, measuring service quality, using Servqual (Parasuraman et al., 1988) the original statements were used and rephrased the items in order to be relevant to the context, and ensuring content validity. Using a seven-point scale where 1=totally disagree and 7 totally agree. The brand experience, and word of mouth, measures were adopted from Khan and Ranham (2017), seven-point scale where 1=totally disagree and 7 totally agree. Finally, repurchase intention was measured, by three items from a scale developed by Hellier, Heusen y Cal (2003) where 1=totally disagree and 7 totally agree. The last part of the questionnaire seeks to measure demographics. Figure 1. Presents the proposed research model.



Source: Self elaborated

Figure 1: Research Model

IV. Analysis and Results

Of the 351 usable questionnaires, the sample shows that all were travelling for pleasure, 65 per cent (228) were men, with an age $\bar{x}$=39 years, and 35 percent were women with an age $\bar{x}$=37 years; 69 per cent were men and women from families travelling with children under 18 years of age; 31 per cent were young couples. The length of stay at the hotel chain was $\bar{x}$=4 nights.

Exploratory factor analysis (EFA) was used with principal component analysis (PCA) and VARIMAX orthogonal rotation for item reduction. The items with low commonality of less than 0.5 or loads on two or more factors with values exceeding 0.4 were candidates for deletion (Field, 2005). The results show the load of items being scales from prior research loaded on their respective factors, which account for 73.8% of the total variance. These factors represent service quality (tangibles, reliability, responsiveness, assurance, empathy) brand experience (staff, location, web, ambiance) Wom and repurchase intentions (e.g. Brakus et al., 2009; Kim, Magnini, & Singal, 2011). Accordingly, service quality was measured by the average of the items loading together as one factor.

a) Measurement

We tested our hypotheses with structural equation modeling procedures using AMOS 17. SEM approach was used using AMOS software, the proposed model achieved adequate fit indicators, with (chi-square at 531.4 and 319 degrees of freedom, significant the level of $p < 0.005$. The other fit indices were within the acceptable range ($\chi 2/df = 1.4$, GFI =

0.91, AGFI = 0.83, IFI = 0.89, CFI = 0.89, RMSEA = 0.047). The composite reliability indicators were greater than 0.7, as Hair, (2006) proposed. Of the 5 hypotheses, all were supported results are shown on. Table 3 summarizing the results of the hypotheses testing. In table 1, the composite reliability of constructs is shown, all of which were above the threshold of 0.7 (Hair et al., 2010), indicating a good reliability, as shown in Table 1. The value of each indicator was above 0.50, indicating this were the variables to study.

Table 1: Factor Loadings for the variable indicator

Constructs	Factor loadings
Service Quality	
Tangibles	0.721
Reliability	0.719
Responsiveness	0.711
Assurance	0.709
Empathy	0.705
Brand Experience	
Staff	0.702
Location	0.766
Web	0.734
Ambiance	0.717
WOM	
Recommendation of the hotel chain	0.732
Advising to stay in the hotel chain	0.701
Telling positive things about the hotel chain	0.728
Repurchase Intention	
value	0.733
Believing it is worthwhile to stay in the future at the hotel chain	0.746
Will stay in a hotel from the hotel chain in the next stay	0.796

Source: Self elaborated

The results confirmed all hypotheses, table 2 presents the results for hypotheses testing, also provides the results associated with the various hypothesized paths. H1 suggests that when guests perceived a higher service quality, guests are more susceptible to make word of mouth recommendations. The standardized path between service quality and word of mouth is statistically significant, therefore supporting H1(0.389; C.R.=2.363, $p \leq 0.05$); H2, which indicated that there should be a positive relationship between word of mouth and repurchase intention was also supported H2(0.487; C.R.3.121, $p \leq 0.05$); H3, that stated: "A positive evaluation on service quality of the hotel chain has a direct and positive influence on repurchase intention" was also supported, H3(0.301; C.R. 1.969, $p \leq 0.05$); H4, suggested that: "A positive evaluation of brand experience of the hotel chain has a direct an positive influence on repurchase intention" was supported, H4(0.312;C.R.2.253; $p \leq 0.05$) finally H5 that stated: "A positive brand experience in the hotel chain has a direct and positive influence on WOM" was statistically significant H5(0.468; C.R.2.943; $p \leq 0.05$).

Table 2: Results of structural equation modeling for hypothesis testing.

	Research Variable	Standardized Regression Weight	C.R	*p*-value
H1	Service Quality → Word of Mouth	0.389	2.363	0.016
H2	Word of Mouth → Repurchase Intention	0.487	3.121	0.002
H3	Service Quality → Repurchase Intention	0.301	1.969	0.049
H4	Brand Experience→ Repurchase Intention	0.312	2.253	0.230
H5	Brand Experience → Word of Mouth	0.468	2.943	0.048

Source: Self elaborated fFt indicators, with (chi-square at 531.4 and 319 degrees of freedom, significant the level of $p < 0.005$. The other fit indices were within the acceptable range ($\chi 2/df = 1.4$, GFI = 0.91, AGFI = 0.83, IFI = 0.89, CFI = 0.89, RMSEA = 0.047)

Table 3 presents the results that analyze the direct and indirect effect that service quality has on repurchase intention through word of mouth, the direct effect was (0.293 direct effect, while the indirect effect was =0.142, and the total effect=0. 435, $p \leq 0.05$) and brand experience on repurchase intention through Word of mouth, presented a (0.290 direct effect, while the indirect effect was=0.225, and the total effect=0. 15, $p \leq 0.05$). Concluding that the hypotheses H2 was accepted.

Table 3: Analysis of direct and indirect effect for hypotheses H2

Variable	Direct Effect	Indirect Effect	Total Effect
Service Quality on repurchase Intention through Word of mouth	0.293	0.142	0.453
Brand Experience on repurchase Intention through Word of Mouth	0.290	0.225	0.515

Source: Self elaborated

V. Discussion

This study contributes to the existing body of literature by investigating the relationships among service quality, brand experience; repurchase intentions through word of mouth, in a Mexican hotel chain during the pandemic, Covid-19. First the results highlight the critical role of the evaluation of the service quality offered by the hotel during the pandemic. In particular, tangibles and reliability are useful to determine purchase intention through word of mouth example of this is, guests take into consideration (the appearance of physical facilities, equipment, personnel and communication materials as well as the ability to perform the promised service dependably and accurately no matter the conditions of the pandemic) in order to recommend the hotel, and to have future intentions of revisit. Similar results found by (Kumar, 2002; Zhang et al., 2011; Liu & Lee, 2016; Urbashi, Ravi, Ash, 2017; Prabowo, Astuti & Respati, 2020; Tjhin, Rayhaan, & Pasaribu, 2021). Secondly, service quality and brand experience had a positive and significant effect on word of mouth at the Mexican hotel chain, where service quality was the dominant factor affecting word of mouth.

Third, another purpose of this research was to examine the relation between brand experience and WOM recommendations (Gómez-Suárez; M. and Veloso, M., 2020) comparing the results to the above authors, it concurs with their findings, that brand experience in a hotel setting differs from that of products, Khan and Rahm, (2017). Consumers are more likely to make a WOM about the Mexican hotel chain when they have develop emotional ties. These emotional ties can be a result of having experiences that have been impregnated in their memory, which were very intense. (Gómez-Suárez; M. and Veloso, M., 2020).

VI. Managerial Implications

In order to fully recover, before pandemic demand, hotel managers from the Mexican Hotel Chain should provide a superb service quality and offer strong good experiences to last long in the memory of the hotel guests. Regardless, the sanitary protocol in place during the Covid-19 pandemic, which have severe repercussions in maintaining quality standards, because among other things it restricted the offering of some activities. Findings in this research have shown that, service quality is the factor that has the power to provoke WOM as well as repurchase intention, therefore hotel physical facilities and environment, as well as to fulfill what they promise to do timely is of the utmost importance.

Because of the implementation of the safety protocol, all personnel within the hotel should be aware that it is possible, that problems are certainly to arise, and they should show sincere interest in solving the problem as quickly as possible. Low scores were obtain in this matter. Highlighting the importance of the hotel staff in managing incidents, and creating good

experiences, means the need to incorporate courses that develop new abilities to manage difficult situations during the pandemic. (Gómez-Suárez; M. and Veloso, M., 2020). Hotels must work directing their efforts towards the creation of daily experiences, translated on their web pages, facilitating the process of search and purchase, first contact, first impression, all of this constitute the starting point to create a great experience (Brakus et al., 2009)

VII. Limitations and Future Research

Our conclusion should be considered in light of certain limitations. First, the use of a convenience sample, and only sampling 3 hotels in the Pacific Coast of the total number of different locations and different classes of service provided by the Mexican hotel chain.

Second, aspects of the reasons of why the guests choose this hotel chain, besides the location may be related to other variables not addressed in this study, variables such as price, reputation, etc.

Third, we focused on service quality, brand experience, repurchase intention through WOM, future research should explore not only the above variables, but include variables such as attachment, brand reputation, brand image, for example, also should include and compare data from different hotels including beach, city, historical etc., from different class services provided by the hotel chain. Future research can also explore variables such as country of origin, because some guests from the sample indicated that they choose the Mexican hotel chain because it was a Mexican company.

References Références Referencias

1. Addis, M. and Holbrook, M.B. (2001) On the Conceptual Link between Mass Customization and Experiential Consumption: An Explosion of Subjectivity. *Journal of Consumer Behavior*, Vol.1, pp. 50-66. Retrieved from: http://dx.doi.org/10.1002/cb.53
2. Anderson, E. W. (1998). Customer satisfaction and word of mouth. *Journal of service research*, Vol.1, pp. 5-17.
3. Azize, Ş., Cemal, Z., & Hakan, K. (2012). English. African Journal of Business Management, 6(45), 11190–11201. https://doi.org/10.5897/AJBM11.2164
4. Bickart, B., & Schindler, R. M. (2002). Special Session Summary Expanding the Scope of Word of Mouth: Consumer-to-consumer Information on the Internet. *Advances in consumer research*, Vol. 29, pp. 428-431.
5. Bill Xu, J., & Chan, A. (2010). A conceptual framework of hotel experience and customer-based brand equity: Some research questions and implications. *International Journal of Contemporary Hospitality Management*, Vol. *22*, pp.174-193.
6. Boo-itt, S. & Rompho, N., (2012) Measuring Service Quality Dimensions: An Empirical Analysis of Thai, Hotel Industry *International Journal of Business Administration*, Vol. 3, No. 5.
7. Brakus, J.J., Schmitt, B.H. and Zarantonello L. (2009), "Brand Experience; What Is It? How Is It Measured? Does It Affect Loyalty?", Journal of Marketing, May 2009, pp. 52-68
8. Brown, T. J., Barry, T. E., Dacin, P. A., & Gunst, R. F. (2005). Spreading the word: Investigating antecedents of consumers' positive word-of mouth intentions and behaviors in a retailing context. *Journal of the Academy of Marketing Science*, Vol. *33*, pp.123-138.
9. Casielles, R. V., Álvarez, L. S., & del Río Lanza, A. B. (2013). The Word of Mouth Dynamic: How Positive (and Negative) WOM Drives Purchase Probability: An Analysis of Interpersonal and Non-Interpersonal Factors. *Journal of Advertising Research*, Vol. 53, pp. 43-60
10. Chang, P., & Chieng, M. (2006). Building consumer–brand relationship: A cross-cultural experiential view. Psychology & Marketing, Vol. 23, No.11, pp.927–959
11. Chang, T. Z., and A. R. Wildt (1994). "Price, Product Information, and Purchase Intention: An Empirical Study." *Journal of the Academy of Marketing Science*, Vol. 22, No.1, pp.16–27.
12. Crompton, J. L., & MacKay, K. J. (1989). Users' perceptions of the relative importance of service quality dimensions in selected public recreation programs. *Leisure Sciences,* Vol.11, No.4, pp. 367–375. Retrieved from https://doi.org/10.1080/01490408909512233
13. De Matos, C. A., & Rossi, C. A. V. (2008). Word-of-mouth communications in marketing: a meta-analytic review of the antecedents and moderators. *Journal of the Academy of Marketing Science*, Vol. *36*, pp. 578-596.
14. Delgado Ballester, M.E. and Fernández, E. (2011), "Marcas de experiencia: marcando la diferencia1", *Estudios Gerenciales*, Vol. 27 No. 121, pp. 59-77.
15. Ebrahim, R., Ghoneim, A., Irani, Z., & Fan, Y. (2016). A brand preference and repurchase intention model: the role of consumer experience. *Journal of Marketing Management*, Vol. 32, No. (13-14), pp. 1230-1259.
16. Ennew, C. T., Banerjee, A. K., & Li, D. (2000). Managing word of mouth communication: empirical evidence from India. *International Journal of Bank Marketing*, Vol.18, pp.75-83.
17. Glynn Mangold, W., Miller, F., & Brockway, G. R. (1999). Word-of-mouth communication in the service marketplace. *Journal of Services Marketing*, Vol.13, pp. 73-89.
18. Gómez-Suárez M. & Veloso M. (2020). Experiencia de marca y vinculación afectiva como antecedentes

de las recomendaciones boca-oído (WOM) *Spanish Journal of Marketing* Vol. 24 No.2, 231-246.
19. Hair, J.F. Jr, *(2006), 'Multivariate Data Analysis, 7th ed., Pearson Education, NJ.*
20. Hansen, J.G. & Liu, J. (2005) Guiding Principles for Effective Peer Response. *ELT Journal,* Vol. 59, pp. 31-38. Retrieved from: http://dx.doi.org/10.1093/elt/cci004
21. Harrison-Walker, L. J. (2001). The measurement of word-of-mouth communication and an investigation of service quality and customer commitment as potential antecedents. *Journal of service research*, Vol. 4, pp. 60-75.
22. Haryono, S., Suharyono, Achmad Fauzi, D.H. & Dan Iman, S. (2015) The Effects of Service Quality on Customer Satisfaction, Customer Delight, Trust, Repurchase Intention and Word of Mouth. *European Journal of Business and Management*, Vol.7, pp. 36-48.
23. Hellier, P. K., Geursen, G. M., Carr, R. A., & Rickard, J. A. (2003). Customer repurchase intention: A general structural equation model. European Journal of Marketing, Vol.37, No. (11/12), pp.1762–1800. doi: 10.1108/03090560310495456
24. Holbrook, A. Morris, B. & Hirschman, E. (1982), "The Experiential Aspects of Consumptions: Fantasies, Feelings and Fun," *Journal of Consumer Research*, Vol. 9, pp. 132-140
25. Karjaluoto, H., Munnukka, J. and Kiuru, K. (2016), "Brand love and positive word of mouth: the moderating effects of experience and price", *Journal of Product & Brand Management*, Vol. 25 No. 6, pp. 527-537. https://doi.org/10.1108/JPBM-03-2015-0834
26. Jayanti, R. K., & A. K. Ghosh (1996). "Service Value Determination: An Integrative Perspective." *Journal of Hospitality and Leisure Marketing*, Vol. 3, No.4, pp. 5–25.
27. Kang, A. (2015), "Brand love – moving beyond loyalty an empirical investigation of perceived brand love of Indian consumer", *Arab Economic and Business Journal,* Vol. 10 No. 2, pp. 90-101.
28. Khan, I. and Fatma, M. (2017), "Antecedents and outcomes of brand experience: an empirical study", *Journal of Brand Management*, Vol. 24 No. 5, pp. 439-452.
29. Khan, I. and Rahman, Z. (2015), "A review and future directions of brand experience research", *International Strategic Management Review*, Vol. 3 Nos 1/2, pp. 1-14.
30. Khan, I. and Rahman, Z. (2017), "Development of a scale to measure hotel brand experiences", *International Journal of Contemporary Hospitality Management*, Vol. 29 No. 1, pp. 268-287.
31. Kumar, P. (2002). The impact of performance, cost, and competitive considerations on the relationship between satisfaction and repurchase intent in business markets. *Journal of Service Research*, Vol.5, No.1, pp. 55-68
32. Leonnard, Leonnard & Comm, M. & Thung, Feby. (2017). The relationship of service quality, word-of-mouth, and repurchase intention in online transportation services. *Journal of Process Management. New Technologies.* Vol. 5, pp. 30-40. 10.5937/jouproman5-15210.
33. Li, C.-P. (2017). Effects of brand image, perceived price, perceived quality, and perceived value on the purchase intention towards sports and tourism products of the 2016 Taichung international travel fair. The Journal of International Management Studies, Vol. 12, No.1, pp. 97–107
34. Liu, Chih-Hsing Sam & Lee, Tingko, (2016). Service quality and price perception of service: Influence on word-of-mouth and revisit intention, *Journal of Air Transport Management*, Elsevier, Vol. 52, No. C, pp. 42-54.
35. Madrid, F. (2021). Documento 26, Centro de Investigaciones de Competitividad Turística, Vol. 26, pp.1-35
36. Mazzarol, T., Sweeney, J. C., & Soutar, G. N. (2007). Conceptualizing word-of-mouth activity, triggers and conditions: an exploratory study. *European Journal of Marketing,* Vol. 41, pp.1475-1494.
37. McDougall, G.H.G. and Levesque, T. (2000), "Customer satisfaction with services: putting perceived value into the equation", *Journal of Services Marketing*, Vol. 14 No. 5, pp. 392-410. https://doi.org/10.1108/08876040010340937
38. Meyer, C. & Schawgger, A., (2007) Understanding Customer Experience, *Harvard Business Review*. Retrieved from https://hbr.org/2007/02/understanding-customer-experience
39. Petrick, J. F., and S. J. Backman (2002). "An Examination of the Construct of Perceived Value for the Prediction of Golf Travelers' Intentions to Revisit." *Journal of Travel Research*, Vol.41 No.1, pp.38–45.
40. Prabowo, H., Astuti, W. and Respati, H. (2020) Effect of Service Quality and Brand Image on Repurchase Intention through Word of Mouth at Budget Hotels Airy Rooms. *Open Journal of Business and Management*, Vol.8, pp.194-207 https://doi.org/10.4236/ojbm.2020.81012
41. Reham, E., Ahmad, G., Zahir, I. & Ying, F. (2016) A brand preference and repurchase intention model: the role of consumer experience, Journal of Marketing Management, Vol. 32, No.13-14, pp. 1230-1259, DOI: 10.1080/0267257X.2016.1150322
42. Reza Jalilvand, M. and Samiei, N. (2012), "The effect of electronic word of mouth on brand image and purchase intention: An empirical study in the automobile industry in Iran", *Marketing Intelligence & Planning*, Vol. 30 No. 4, pp. 460-476.

43. Rus, R. Annisa, I. Surjandari and Zulkarnain, (2019) "Measuring Hotel Service Quality in Borobudur Temple Using Opinion Mining," *16th International Conference on Service Systems and Service Management (ICSSSM)*, pp.210-225.
44. Sahney, S., Banwet, D. K., & Karunes, S., (2006), "An integrated framework for quality in education: Application of quality function deployment, interpretive structural modelling and path analysis", *Total Quality Management*, Vol.17, pp. 265 – 285.
45. Secretaria de Salud, (2020) Plan de regreso seguro a las actividades de hospitalidad. Secretaria de Turismo, 2021
46. Serra-Cantallops, A., Ramon-Cardona, J. and Salvi, F. (2018), The impact of positive emotional experiences on eWOM generation and loyalty, Spanish *Journal of Marketing – ESIC*, Vol. 22 No. 2, pp. 142-162.
47. Schiffman, L., & Kanuk, L.L. (2010). Consumer Behavior, Global Tenth Edition. United States of America: Pearson Education, Inc
48. Shaw, Colin and John Ivens (2002), Building Great Customer Experiences. New York: Palgrave/ Macmillan.
49. Subha, N. (2020), A Study On Service Quality and Customer Satisfaction in Hotel Industry – An Empirical Study with Special Reference to 3 Star Hotels in Coimbatore, *International Journal of Research in Engineering, Science and Management* Vol 3 No.2, pp. 316-321.
50. Sudmann,S. (1980) Improving the quality of shopping center sampling, *Journal of marketing Research,* Vol.17, No.4,423-432
51. Suhud, U., Allan, M.,Rahayo, Sr. & Prihandono, D. (2022) When Brand Image, Perceived Price, and Perceived Quality Interplay in Predicting Purchase Intention: Developing a Rhombus Model, *Academic Journal of Interdisciplinary Studies* Vol.11, No.1, pp. 232-245
52. Suhud, U., & Willson, G. (2019). Low-cost green car purchase intention: Measuring the role of brand image on perceived price and quality. International Journal of Economics and Business Administration, Vol. VII, No.3, pp. 238–249
53. Sukhu, A., Choi, H., Bujisic, M. and Bilgihan, A. (2018), Satisfaction and positive emotions: a comparison of the influence of hotel guests beliefs and attitudes on their satisfaction and emotions, *International Journal of Hospitality Management,* Vol. 77, pp. 51-63.
54. Sweeney, J. C., Soutar, G. N., & Mazzarol, T. (2008). Factors influencing word of mouth effectiveness: receiver perspectives. *European Journal of Marketing*, Vol. 42, pp. 344-364.
55. Tjhin, T., Rayhaan, F., & Pasaribu, L. H. (2021). The effect of perceived service quality, word of mouth and price quality on repurchase intention and customer satisfaction on instagramable restaurant in Jakarta Utara. Enrichment*: Journal of Management*, Vol.12, No.1, 808-815. Retrieved from https://enrichment.iocspublisher.org/index.php/enrichment/article/view/309
56. Urvashi Tandon, Ravi Kiran, Ash N. Sah (2017) Customer Satisfaction as Mediator Between Website Service Quality and Repurchase Intention: An Emerging Economy Case. *Service Science* Vol.9, No.2: 106-120. Retrieved from https://doi.org/10.1287/serv.2016.0159
57. Venkatesh, V., Morris, M.G., Davis, F.D., & Davis, G.B. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, Vol.27, pp. 425-478.
58. Yu, C., & Tang, X. (2010). The Construct and Influence of Word of Mouth: Receiver Perspectives. *Journal of Chinese Marketing*, Vol.3, pp.13-18
59. Zahid, A., & Dastane, O. (2016). Factors affecting purchase intention of South East Asian (SEA) young adults towards global smartphone brands. ASEAN Marketing Journal, Vol.8, No.1, pp. 66–8
60. Zhang Y, Fang Y, Wei KK, Ramsey E, McCole P, Chen H (2011) Repurchase intention in B2C e-commerce—A relationship quality perspective. *Inform. Management* Vol.48, No. 6, pp.192–200.
61. Zeithaml, V. A., Berry, and Parasuraman, A. (1996). "The Behavioral Consequences of Service Quality." *Journal of Marketing*, Vol. 60, No.4, pp. 31–46

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On Slowing Climate Change with Ecological, Thermo-Active Building Systems

By Mark Bomberg, Malgorzata Fedorczak-Cisak & David Yarbrough

Foreword- In the early days of energy conservation (1980s) several countries took the need for energy efficiency seriously enough to sponsor some demonstration buildings. For instance, a US university design concept was built in Regina, Canada in1978. The *Saskatchewan Energy Conservation* house [1s] demonstrated a new, passive technology. It had super-insulated and airtight walls, large windows on the south facade, evacuated solar pipes for domestic water heating, and a heat recovery ventilator. Despite of all the technology demonstrated there, as Bomberg et al [2] explains, the passive measures were not accepted in the Canadian marketplace because the builders modified the heating system and thereby changed the air flow pattern in the house.

The 1995, German passive house was accepted in marketplace because the built system could be duplicated as it was demonstrated. In this case, saving from the elimination of expensive boiler were used to improve the level of thermal insulation and air tightness. These developments led to acceptance of a few points from building science [2-4], namely: (1) any building is a system, (2) a design team should work together starting with the conceptual stage, (3) heat, air, and moisture flows are not separable, and their interactions must be recognized, (4) excellent air tightness and a high-level of thermal insulation are required in all climates.

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On Slowing Climate Change with Ecological, Thermo-Active Building Systems

Mark Bomberg [α], Malgorzata Fedorczak-Cisak [σ] & David Yarbrough [ρ]

Foreword- In the early days of energy conservation[1] (1980s) several countries took the need for energy efficiency seriously enough to sponsor some demonstration buildings.[2] For instance, a US university design concept was built in Regina[3], Canada in1978. The *Saskatchewan Energy Conservation* house [1s][4] demonstrated a new, passive technology. It had super-insulated and airtight walls, large windows on the south facade, evacuated solar pipes for domestic water heating, and a heat recovery ventilator. Despite of all the technology demonstrated there, as Bomberg et al [2] explains, the passive measures were not accepted in the Canadian marketplace because the builders modified the heating system and thereby changed the air flow pattern in the house.

The 1995, German passive house was accepted in marketplace because the built system could be duplicated as it was demonstrated. In this case, saving from the elimination of expensive boiler were used to improve the level of thermal insulation and air tightness. These developments led to acceptance of a few points from building science [2-4], namely: (1) any building is a system, (2) a design team should work together starting with the conceptual stage, (3) heat, air, and moisture flows are not separable, and their interactions must be recognized, (4) excellent air tightness and a high-level of thermal insulation are required in all climates.

By the year 2021 the building science community accepted four effects of passive house approach [4-7]: (1) dwellings with high air tightness and a high-level of thermal insulation require cooling in the summer even in cold climates. (2) reliance solely on the passive house approach in energy conservation leads to diminishing returns (3) energy efficiency can be further improved only when the building is integrated with solar energy and ground thermal storage (4) changing the current ventilation type is needed to reduce transmission of SARS-coV2 (covid 19).

Thus, starting this review paper, one must consider that indoor environment in buildings is affected by two different but interacting subsystems: (a) factors related to mechanical devices producing heat, coolth, ventilation, and (b) structure of the building. Furthermore, one knows that climate can be defined as stochastic or cyclic but rarely as steady state.

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I. Introduction to the Nature-Centered Cluster of Buildings

The objective of this paper is to show that a significant market disruption must take place in the US construction industry and the sooner it takes place, the better is for our society. This is a socio-economic statement that needs to be supported with facts and technical details, but our position statement may be easier understood if we start our discussion from the viewpoint of nature. After all, the nature-centered analogy is now often used in human activities.

a) Insight into the instincts of social insects

As children, we were told how well ants collaborate in building their stacks. Yet, scientists explain the same statement with help of statistics and state that straws are pulled when there is a larger number of ants on one side. We, therefore, will talk about different social insects, namely termites. Termites in Africa, build tall structures above ground, a sort of a chimney by using air buoyancy change with temperature to draw air from the underground channels. The hot outdoor air enters a system of underground channels to be cooled ("pre-conditioned") and is being sucked to the inner area of the mound. In the middle of the mound, termites are able to keep temperature constant *within plus or minus one degree* despite of huge outdoor temperature swings between day and night.

This phenomenon is well known, but the fact that Mexican termites can use cooling from evaporation of the surface absorbed water are less known. While roof cooling with water ponds is used in hot weather construction, the phase change of thermally driven water in materials, as yet, has not been commercialized in the construction. Thus, Mexican termites (Figure 1) are still ahead of us.

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[2] Director Lesser Poland Center for Energy Efficiency, Cracow University of Technology, Poland

[3] VP R&D Services, Inc., Watertown, TN, Emeritus Professor, Tennessee Technological U., USA

[4] In this article we use two types of references, a standard reference [1] that is worth consideration and secondary reference listing [*1s*] for a contribution significant to the progress of science but not necessarily a primary reference.

Figure 1: Mexican termites maintain constant temperature inside the center of mound while ambient conditions vary dramatically. The axis of the mound indicates an afternoon time of heat flow reversal (see explanation in Figure 2).

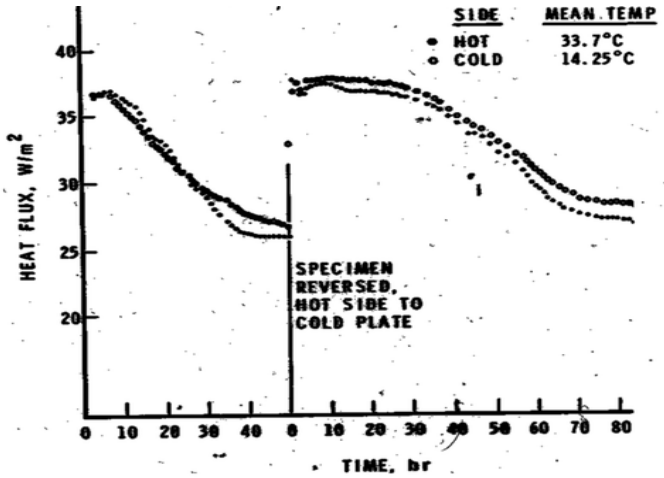

Figure 2: Sealed moist specimen of aerated concrete is placed under a constant temperature difference and its position is reversed at time zero to highlight the significance of the phase change [6].

Interim Conclusion: Both the African and Mexican termites use interaction of different physical phenomena:

(1) Thermal buoyancy of air above ground sucks air from the underground channels and the thermal mass of the mound combined with it porous structure reduces radiative heat transfer (thermal insulation) protecting the cold air from heating during its passage, though the mound.

(2) High air humidity and presence of water absorbed to the strains of fibrous material used for the mound structure combined with change of thermal gradient at a given time. Thermal gradient drives water in one direction and in afternoon in the other to provide a convective cooling by evaporation of water.

We could continue this review with analysis of many other cases such as the fur on a polar bear, feather on a duck or the structure of a human foot, but we believe that our conclusion is already clear, namely *nature always uses a holistic approach.*

b) The cycling in nature and technology

Solar energy, in the form of shortwave radiation (because of the high temperature source) is about 1 000 W/m^2. Soil, exposed to sun for some time becomes dry (and good insulator) while moist soil will dissipate the heat by downward movement of water vapor. In regions with high frequency of solar radiation the depth of solar energy penetration is much larger than in those regions where cloudy days prevail.

The Earth's atmosphere absorbs heat from the earth's surface but the air temperature is reduced by

about 5.5 K per each 1,000 m of distance from the surface of the earth. It means that in a clear night, the earth and building surfaces are re-radiating energy to the sky in the form of a longwave radiation (low temperature source).

Now, how are we told about the nature in the engineering school. Thinking about three terms that we have most frequently heard during our engineering education, we might say: (1) steady state, (2) superposition of phenomena and (3) linear dependance. Translating these terms into a plain English, it means that we disregard effects of time, or interaction between phenomena and we approximate functional relations with a constant first derivate of the function. Then, when working in applied physics, we have learned that "steady state" means an apparent equilibrium between energy or mass flows in opposite directions [6]. We have also learned that during the cycling of weather, some neglected interactions may cumulate errors that after some time can overweight the initial situation, and that exponential or logarithmic processes are more frequent than linear [2, 8]. In effect, all issues related to climate can be defined as stochastic or cyclic but seldom as the steady state [6].

c) *Can our system become a nature-centered man-made system?*

Differences between logistics of the traditional construction and structures of social insects are large: when buildings are constructed, they are supposed to function without modifications (it is not true, but people think so), buildings are operated with constant indoor climatic conditions, their efficiency is calculated using steady state approximations. Several individually designed components, each optimized to their own standards and controls, are put together and assembled into a building. With other words, our construction represents fragmentation that disregards conditions of use and seldom addresses adaptation to the climate [6].

The energy performance of buildings has recently been improved by introduction of IDP (integrated design protocol) [3] and BIM (building information program) but those measures are still insufficient. Taking average total energy use in small houses as 100 percent, the dwellings in multi-unit residential housing show in field 25 – 40% higher energy use primarily caused by poor handling of air flows in high-rise buildings [9-11]. With optimized ventilation, the energy use per unit area should be lower in the multiple unit buildings.

Ecological, Thermo-Active (ETA) system [12,13] considers building as a system operating under transient outdoor and indoor conditions and uses adaptable indoor climate approach. This contrasts the current pattern of construction. Furthermore, the ETA uses field monitoring data and may use simple artificial neural network (ANN) models to assist in HVAC optimization. i.e., improvement based on actual performance data in contrast to parametric analysis made with uncalibrated energy models. Note that during the execution of High Environmental Performance house project [14s -16s] we have calibrated two energy models with initial differences about of 20% and were able to use these models for further analysis.

The main reason for using the ANN characterization [17s - 20s] of the building is a reduction of effort. A "gray" model needs less information to characterize building structure and the increased volume of data for statistical handling is not a problem as HVAC performance must be characterized over all seasons in a full year. Note that energy ratings in the first year of the building operation are preliminary. In summary, the next generation of building technology discussed in this paper, expands the passive house [21, 22] with a vision of nature centered system.

II. The History of Ecological, Thermo-Active Systems

In this section we will discuss four already published building cases:

- Hungarian demonstration of active thermal insulation (ATI) technology [13]
- US test house called GEST (geo-solar exergy storage and technology) [23s,24s]
- Canadian multi-stage construction process in Atelier Rosemont, Montreal [25]
- Japanese thermo-active system in the "Shogakukan" building in Tokyo [12]

allowing us to generalize lessons derived from these investigations.

a) *Hungarian demonstration of active thermal insulation (ATI) technology*

A term "active" thermal insulation was introduced by some people to highlight presence of a heat source or sink in the system. While in physics, presence of source or sink does not affect performance of the insulation, in a common language one use it to contradict the term "passive" that is used in energy conservation. Tamas Barkanyi patented in 2012 components for active insulation of buildings that provides a direct hydraulic linkage between two heat exchangers, one placed in the ground and the second one in the building exterior enclosure. For this reason, we use the term thermo-active system to replace the active insulation while using the existing terminology.

The concrete house used for demonstration, was built with a raised, livable attic space forming the second floor. The floor area was 187 m^2, wall area 573 m^2 and area of hydronic tubing in walls and roof was 393 m^2. Thermal storage was designed as a separate

construction and placed under the building as shown in Figure 3.

Figure 3a: Hydronic tubing before concrete pouring. Photo T. Barkanyi

Figure 3b: Edge thermal insulation and covered tubing Photo T. Barkanyi

The total length of tubing in the heat storage was 145 m with 11 independent links to walls and roof. An electrical pump works continuously pushing glycol through 20 mm diameter tubing that is placed with a typical distance of 200 mm between lines. Temperatures on entry and return to both wall and storage heat exchangers are recorded in 20 seconds intervals.

In addition to the hydronic heating/cooling there is a mechanical ventilation system with capacity of 500 m^3/h with heat recovery ventilator. Preconditioning of ventilation air is achieved by 75 m long, 25 cm wide ground air heat exchanger placed on 1.6 m depth and water to water heat pump (Model: NIBE 1140) is used as a secondary source of heating and cooling. There are 10 solar panels on the roof (20 m^2 total area of panels) to heat domestic hot water and the energy storage that is located under the building.

The calculated energy use for the building is 144.5 kWh/(m^2·y) and primary non-renewable energy is12.1 kWh/(m^2·y). Methodology of monitoring of and modeling is discussed by Kisilewicz et al [13]. Overall heat transfer coefficient was calculated there about 0.070 W/(m^2 ·K) in winter of the analyzed year, while without the contribution of thermal storage the wall had the U-value 0.28 W/(m^2K).

Interim Conclusion: In the moderately cold climate of Hungary, a direct linkage between the ground source thermal storage under the house with heat exchanger located in about 50% of the wall and roof area and loading it with summer solar energy has significantly reduced the winter energy need but an additional heat pump was needed on the air supply line to satisfy energy requirement for the house.

b) US demonstration, GEST (geo-solar exergy science and technology) house

The Geo-solar Exergy Storage and Technology (GEST) was built in 2011 in Central New York to demonstrate that a dramatic reduction of purchased energy can be obtained without the implementation of a heat pump [23s]. This was accomplished by retrofitting the building envelope with a “dynamic skin” coupled to the ground heat exchanger. (Here the word “dynamic” skin or “ground coupled dynamic” wall represents the same concept of additional heat source as active thermal insulation).

Large thermal mass at the ground heat storage and large surface areas of the heat exchangers located in the exterior envelope of the building can provide low-grade energy to mitigate both diurnal and seasonal temperature changes in a building in a cold, northern climate. The review of design details shows how one can modify the technology to allow reduction of energy while maintaining a good indoor climate in the northern and southern climates.

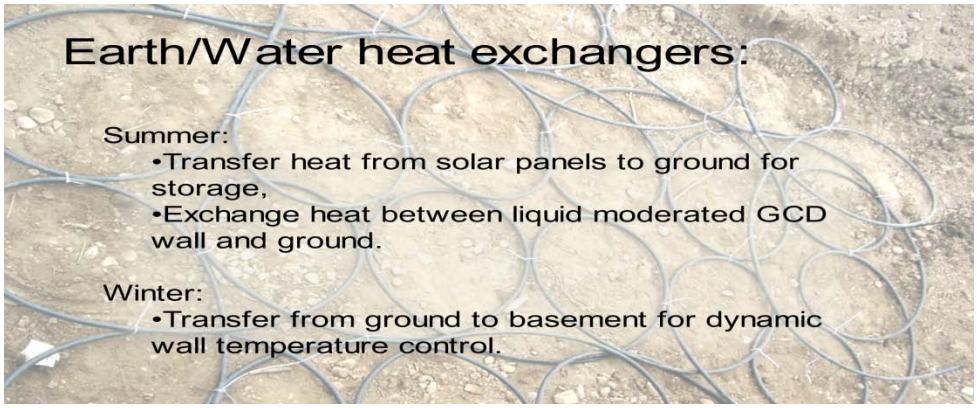

Figure 4: Transfer of energy from solar panels to ground thermal energy storage. (Note GCD = ground coupled dynamic wall)

Two of many tested setups are shown in Figures 4 and 5. Figure 4 shows liquid (glycol solution) operated heat exchange from solar panels to insulted ground storage and from ground storage directly to the building in the winter. This set up was simple to operate and effective. Conversely, air transfer shown in Figure 5 required a sophisticated control to operate and showed stratification of temperature in vertical direction by as much as 5 – 6 °C during a cold winter day.

Figure 5: Cavity between existing wall and added interior insulation in wood frame construction is used for convective heating or cooling.

Interim Conclusions: This test house was used for different investigations, such a direct linkage between a horizontal, shallow, heat exchanger and the wall or using air convective, forced air heat exchanger. A hydronic ground heat exchanger with water sourced heat pump were the preferred options [24s].

c) *Multistage construction in Atelier Rosemont cluster, Montreal, Canada*

Two previous sections focused on the key to the next generation technology, namely an underground thermal energy storage. This section discusses the other side of the coin, namely economics. As retrofitting is needed for slowing the climate change rate one must understand why all the whole progress in construction takes place in new buildings construction and noting happens in retrofitting.

Traditionally, retrofitting is based on the return-on-investment thinking. Yet, as building performance and repair costs are unknown, the economic calculation is made on one item at the time leading us to the inefficiencies discovered in 1970s weatherization programs. The break-through came from designers of a Montreal settlement "Atelier Rosemount" [25] that created a new economic model of retrofitting process. By planning the construction process in several stages and starting from the least expensive initial building and going through retrofitting stages until reaching zero energy building, they combined new construction and retrofitting These designers introduced a risk-free mortgage system for all stages following the first one.

Let us identify critical decisions in their process.

1. Design the process of retrofitting to zero energy level and select number of construction stages. The minimum is two but if the cost of the next stage is too high make it three or four. Set the period of first mortgage short e.g., less than 10 years. Stage 1 of construction or retrofitting must satisfy the code and standards and your investment conditions.
2. Perform stage 1 of the new construction or retrofitting and pay the mortgage from your specific mortgage account. You will continue the same payment when the stage one and subsequent stages are completed. You will re-mortgage the property when you reached zero energy level.
3. When the stage one is completed, use the physical value of the property as the basis for the next step (re-mortgage and payment on anniversary, add second mortgage, extend the mortgage payment to increase the rate of saving in your mortgage saving account.
4. When you have sufficient funding available, perform the stage 2 of your construction or retrofitting. If you have reached 90 % reduction of the space heating/ cooling, ventilation, and air conditioning cost, you have achieved the needed objectives. If not continue to stage 3 and with the next stage.
5. The actual case in Montreal Canada, re-financing case lasted 10 years when the difference between the cost of servicing the capital investment and the actual payment was growing with time allowing to perform improvements to the building settlement that in the current system of construction would require 30 or 50 years of simple return on investment.

With other words, this model of financing combined leasing the energy cost to the owners of the properties and bank. This approach permitted achieving zero energy for social housing! The Montreal project was designed for completion in 10 years and when completed it satisfied both the economic requirements of the bank and the technical requirements of the society giving the project a win-win-win to the owners, society, and bank. We are giving the specific details of the economic model because in some countries, some community, or user-friendly banks (Sweden in 1960s, the US now) are giving a lower interest rate to schemes involving the property improvements.

Figure 6 shows the buildings to which different stages of energy reductions that were applied from 2008 (0 % of total energy reduction) to 2018 (92 % of total energy reduction) [25].

- Stages of improvements from 2008 to 2018 in Atelier Rosemount, Montreal.
- High Performance enclosure, common water loops, solar wall resulted in 36 % reduction of total energy use per square meter and year.
- Gray water power pipes, incresed total reduction in energy use to 42%.
- Heat pump heating (planned with horizontal heat exchanger), increased the total reduction to 60%.
- *Renevable 1:* Evacuated solar panels for hot water, increased the total reduction to 74%.
- *Renevable 2:* Photovoltaics bring the total energy reduction in 2018 to 92 %.

Figure 6: An affordable, low rise, energy efficient multi-unit residential building “Atelier Rosemount” in Montreal, note the rain retention basin in the bottom right (credit Nikkol Rot)

Some issues related to installation of water-to water heat pump in this project did not work. A horizontal heat exchanger was not used in Hungarian and Canadian projects, therefore, the design of shallow, horizontal, underground, heat exchanger require more research. Yet, despite of different time and locations the same magnitude of the passive measure impact is observed in the US, Hungary, and Japan (next section), namely we see that passive measures may reduce total energy by 60%.

Interim Conclusions: The new economic model developed in this project is a key to the next generation technology. The unwritten effect of this economic model is that the difference between new buildings and retrofitting disappears.

d) Thermo-active system in the Shogakukan building in Tokyo, Japan

In 2020, Shogakukan was awarded with a first place in the ASHRAE Technology Award that recognized outstanding achievements in innovative design of buildings for occupant comfort, indoor air quality, and energy efficiency in a Shogakukan building in Tokyo, Japan [12]. A special box-like construction of the floor replaced a suspended ceiling construction, and a hydronic radiant cooling was installed in the ceiling. The exhaust air from the room was used to cool the floor making an additional cooling system. Post-occupancy optimization of the HVAC (he second requirement of EQM technology) was completed in 2018 and energy used by the building for cooling was reduced to 12 kWh/(m^2·y). This building used the adaptive climate approach for air temperature. The night temperature was initially 19 °C. It was increased to 20 °C in the morning and during the period from 9:00 to 15:00 allowed to increase up to 26 °C. Note that the layer of exterior thermal insulation in Shogakukan was very thick, namely 450 mm. because the water cooling was only 50% of the total cooling load.

Note that in residential building one can go to more than 90 percent of heating load being taken by the hydronic system. As one of co-authors was a project manager in 2006/7 NY project (High Environmental House [14s]), knowing a long response time of the hydronic system, an additional, rapid response air heating system was designed. Yet, this air system was never used during the full year monitoring period.

e) Summary of the reviewed Ecological, Thermo-Active Systems

Today, the functional definition of a building system includes both solar panels and ground thermal storage. For this reason, the GEST (geo-solar exergy storage and technology) was selected for a PhD thesis [23s]. To be brief, we refer to a few of our network publications during the last 15 years. We started with a research project [14s - 16s] called High Environmental Performance (HEP) house, carried out in years 2005-2008, with objective to determine the level of energy saving possible without using renewable energy in a cold climate. The project demonstrated that 50% reduction in energy use in comparison to New York energy code was achievable without renewables. The lessons from the HEP project and the thesis [23s] justified introduction of a second air gap between the old and new construction [26]. This air gap can function as source of sink for thermal energy and water and becomes a key to interior renovation.

While next few years were focused on materials and moisture performance side [27s-32s], the concept of the construction system was developed in a preliminary series of papers [33 - 35] and final concept description [36- 38] under the name of environmental quality management (EQM) technology. Another important research that was incorporated in the EQM technology analyzed such aspects as comfort [39 - 41], retrofitting practice [42 - 45], computer modeling [46 -49] and significance of air gap [50].

The other co-author participated in years of research and tests of ground thermal storage in Cracow that resulted in a few basic rules for design of ventilation system [36]. An important recommendation from this source is that to optimize air intake effect one must use two independent type of air intake for ventilation. It explains why one can observe differences in efficiency of a single source used for heating and ventilation in Hungarian test house [51].

Montreal project is interesting not only because it introduces a new economic model, but also because it deals with a full district of 3-story houses. They differ in many respects, some are luxurious with cross ventilation between north and south, other are social buildings of the city and yet an average energy reduction without renewable sources of energy is 60 percent. Note that in this project care was taken about many details typically not considered in a standard construction, e.g., heat recovery from hot water pipes when delivering it to the gray water container. Secondly such a high percentage is only possible when one considers a cluster of buildings with significant volume of soil surrounding buildings and well controlled ventilation system.

Note that the Montreal project broke the boarders between new construction and retrofitting and between a single building and a cluster of buildings. In conclusion of this paper, we will provide a new environmental definition of the building as an ecological system.

III. Next Generation of Ecological, Affordable Retrofitting Systems

Using an example of patented ETA (Ecological, Thermo-Active Systems) we have introduced a broader concept of generic EQM (Environmental Quality Management). The six main characteristics of the next generation of these ecological and affordable buildings are:

- *Use of all technical measures from passive house approach*

We recommend moderate requirements for thermal transmission e.g., U-value 0.25 for walls and air tightness e.g., 0.2 l/(m^2s) on assembly (75 Pa difference) or 1.5 l/(m^2s), measured in situ (50 Pa difference). Practical experience showed that this type of criteria, used during 1990s, were easy to achieve and economically justified.

- *Use of solar panels, heat pumps and ground thermal storge*

We recommend using hybrid solar panels, and electrical water-sourced heat pumps (HP) coupled with

ground storage, in all climates. A split-level HP coupled with large indoor thermal mass can also be used. Generally, in cold and moderate climates we use of two water tanks, inground exterior, cold water tank and interior hot water tank. Sometimes, the gray water is also used as lower terminal of HP. In hot climates, shallow exterior water tank requires special design to increase heat dissipation.

- *Use of a hybrid, flow through, ventilation system*

We recommend preconditioning of ventilation air either in a ground heat exchanger or through coil immersed in water tank. Such a system of mechanical ventilation is required for all residential buildings in all climates that provides either a flow through instead of dilution or dilution with additional M13 filtration. Research experience from California indicates that the rate of ventilation must be adjustable. For coping with air-borne viruses, one recommends the range from 0.3 to 3.0 air change per hour. Furthermore, as optional solution one may generate air pressure gradient in a habitable space. Yet to do it, one must have a moisture management system that drying moisture from the existing walls. (Note that the practical details of such a system requires more research).

- *Use of a two-stage construction process*

To alleviate a conflict between society and investor we propose a two-stage construction process. In the first stage one achieves performance level possible for the selected initial cost while the second stage continues to optimize cost for the selected performance level. In the first stage the building is completed at a minimum performance level that is acceptable to both the building code and the investor. The designer predicts continuation to zero energy level that may be initiated a few years later.

At this stage we have no more practical experience from the buildings already constructed. Yet we propose two additional characteristics for EQM (ETA) technology:

- *Use of adaptable indoor climate*

This approach implies:

(a) That to control thermal mass contribution to the indoor climate the hydronic heating/ cooling tubing must be placed on the interior side of thermal mass of the building. It is also recommended that the total thermal mass should be sufficient to achieve thermal lag time between 12 and 16 hours. These controls, combined with dynamic operation of thermal storage would reduce or eliminate peak loads.

(b) Adjust the capacity of thermal storage for the use of technology in relation to building type and climate.

Until now, simple individual controls were used in all discussed cases, but lessons from GEST house indicate significance of optimization of the HVAC system.

- *Capability of post-construction HVAC optimization*

A concept of field monitoring and modeling for HAC optimization has been evaluated with Modular Statistical Software and simple artificial neural network (ANN) models [17s -20s]. These or similar models will be used to calibrate energy models used for optimization of HVAC performance.

An EQM/ETA technology was assembled from the best pieces of proven and tested solutions and while some issues need yet to be developed, it has been tested in a few countries. Is there any problem in introducing it to the marketplace?

There is no problem in terms of business; sooner or later we will get there. Yet, right now we need to institute a major and rapid action against climate change and retrofitting existing buildings is one of the best practical solutions for a rapid action, so the problem is of a different nature.

The problem is that the currently used, passive house technology, was demonstrated in Canada during year 1978 i.e., two generations ago. An adage says that human being is a creature of habits and humans also need slogans in addition to daily bread.

Thus, in search for the solution we must go back, exactly for 100 years, to the time of Dale Carnegie.

IV. Understand Before you Simplify or Simplify to Understand

Scientists always had to understand the complexity of many interacting factors before that could derive measures controlling one specific aspect of the matter. So, the statement "understand before you simplify", described well the scientific method of analysis. Yet after the WWI a trend, exemplified by books of Dale Carnegie (how to win your friends) appeared in public. One would focus on one or a few selected critical issues, often taken out of context, and use them to represent the complex situation. We call this action, *simplify to understand.*

With time, this trend to easy simplification replaced the scientific method of examination in journalism and politics. While Einstein, supposedly said "make it simple but not simplified, not any people knew where the border between simple and simplified is. As a next generation of people learn the simplified picture of science or technology, we now have proliferation of semi-educated engineers, who may have only a narrow range of their specialty.

Let me give some examples from the construction area. In the last 4 decades we had spent huge amounts of taxpayers' money on weatherization programs, solar panel installation, now on heat pumps. All of them are based on good intention and one single factor at the time while buildings are like a sieve, when

clogged in one place -water goes to another. Politicians always talk about renewable energy, and this is correct but before you put icing on the cake you need to have a cake. In 2008 we showed in NY that after increase of the design requirements for 30 years we still had 50% of energy loss that could be eliminated by a better design. But design was limited by the cost of design.

Today small houses are OK but actual energy performance of multiple residential buildings has not been improved for last 30 years. At the same time politicians promise that soon our buildings will be zero energy and zero emission. This a dangerous schism between the good wishes and the construction practice.

V. Are Construction Markets Ready for Disruption?

Speaking for American market one may say with a degree of certainty – yes, the marketplace is ready for disruption. Samuel Raskin in his seminal course on Housing 2.0 [52] lists four types of crises:

1. Affordability of housing slowly diminishing over last two decades became drastically reduced in effect of covid
2. Retirements of skilled workers and lack of their replacements in trades
3. Growing productivity gap between other manufacturing branches of industry and stagnated construction (the gap is now about 70% in the US)
4. Digitalization, construction is slow to accept digital processing and off-site manufacturing e.g., off-site construction is less than 20% in the US while more than 80% in Sweden.

Those are not new factors. They would not cause the scientific revolution, but a background necessary, as taught by S. Kuhn [53], that together with the urgency of social response to dangers brought by the climate change and public realization that inadequate type of ventilation system in residential buildings and luxury cruise ships multiplied the spread of covid 19 pandemics. Traditional ventilation systems relied on dilution while ventilation used in hospitals uses flow through (flushing) the air. Furthermore, it becomes clear that a slow air movement is needed in all dwellings in all climates and opening windows (except in the cross ventilation) will not provide such effect.

There is also a difference between an expected and real energy performance of buildings. Thermal resistance of material slab is defined as a ratio between a steady difference of temperatures on its both surfaces and heat flux through the slab. So, it you take an average temperature difference on the wall surfaces, area of exterior enclosure, and total energy used for space heating you should get something comparable with the average thermal resistance of the walls. Yet expressed in this way effective index is 50 – 60% smaller than the laboratory measured thermal resistance of the walls (roof is much higher than walls). The approximation in this comparison is huge but we make it to highlight how little we know about differences between the actual and estimated exchange of air in large residential buildings. Yet, national standards of most countries continue increasing the required nominal (laboratory) thermal resistance and nominal air tightness of walls".

There is also one new market consideration in the globalized economy, digitized and optimized construction systems are easily to export and penetrate to those market that are unwilling to participate in the post-covid reconstruction. Thus, it is not a question if the construction market is to be disrupted but the question if the market changes will benefit the investor alone or the investor and the society.

VI. A National Retrofitting Program, a Win-Win-Win in Making

Published in 2008 white paper [54] quoted a United Nations report:

> *"The good news is we have got a huge source of alternative energy all around us. It is called energy conservation, and it is the lowest cost new source of energy that we have at hand. Since 1973 alone, improvements in energy efficiency resulted in a 50% reduction of our daily energy use, which is the same as discovering 25 extra million barrels of oil equivalent every single day. Clearly saving energy is like finding it".*

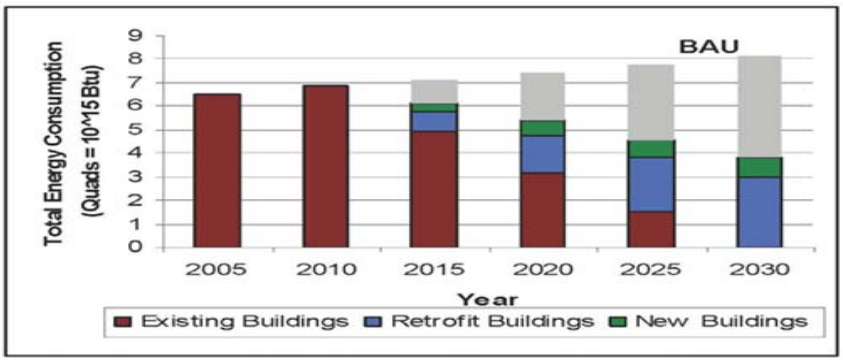

Figure 6: Forecast from 2008 on how to achieve 2030 targets, slide prepared in 2008 by the Lawrence Berkeley National Laboratory [54] (reprinted with permission).

Figure 6 showed building as usual (BAU) and with assumption that all new buildings will have 90% energy reduction and concluded that we must reduce the energy use in *all existing buildings by 50% before 2030.*

In 2022 we may say that we are on all right with new construction; but retrofitting is a dramatic failure. Of course, a progressive approach was used for new construction it was ignored in retrofitting of existing buildings.

The 2008 white paper stated:

> *"At the far end there is an AIA commitment to achieve a 2030 carbon neutral future. There is a chasm that must be bridged if the goals are to be achieved and there is confusion on how we can accelerate the process of renewal. Despite the large amount of knowledge and industrial know-how available, we realize that the old vision has ceased to be valid.* ***We need to create a new vision because the stakes are high."***

Yet, 14 years later, we do not have the vision because construction is not a priority in any of the industrial countries. Yet, each of these countries are fully committed to slowing the climate change, We need to design such a program in the context socio-economic changes in our society and review the role of buildings in this program.

a) A vision for the next generation of retrofitting technology

It has been established that a combination of passive measures with solar engineering and geothermal heat storage is necessary for low energy housing in all climates. The significance of the individual components will vary with climate and socio-economic conditions of the country but the demonstration house in Hungry showed that there is no one component that will satisfy all the needs for energy and both the source of energy (sun) and storage of energy (geothermal) are equally valid in different countries. Obviously in the extreme cases our energy handling is strictly opposite. In cold climate one deals with heavily insulated seasonal thermal storage while in the hot climate one deals with ground as means of energy dissipation in the heat pump technology.

We are dealing with the 4th industrial revolution. The first was based on steam generated by burning the second of coal, the second on use of other fossil fuels, the third used power plants for manufacturing electricity and the current revolution uses distributed sources of electricity and computer power to control the system. In this revolution buildings changed their role from the biggest users of electricity they become the biggest producers of electricity.

The changing role of building also requires a change in paradigm of thinking. Sustainability involves harmony between different aspects of the environment, society, and economy. The broadening of the scope of considerations affects the field of the building science in North America (building physics in Europe). Now, in the quest of improving building performance, the building science merges concepts of passive houses with solar engineering and integrates building shell with mechanical services, but the focus is still missing. The focus of the building science must be reestablished on occupants. In doing so, one will combine indoor environment with aspects such as energy efficiency, ventilation, indoor air quality or thermal comfort with durability of the shell and affordability or resilience of building on the other side.

The methods of building evaluation are also refocused because today we pay attention to interactions between different functions of the building. Now, eenvironmental design process comprise of five steps:

1. We address passive measures and factors affecting indoor environment such as temperature, indoor air quality, acoustics, daylight, illumination, hot and sewer water management, aesthetics and building resilience in disaster situations.
2. We integrate heating, cooling, ventilation, solar means for energy generation and geothermal storage thorough the building automatic control systems.
3. Parallelly, we perform an economic analysis to determine the level of investment for the initial building design or the initial stage of retrofitting. For example, one must decide to what extent should photovoltaics be included in stage one.
4. Finally, we design monitoring and recording of information provide the design and cost for stage 2 of new construction or retrofitting and develop a comprehensive operational manual for the building.
5. During the first year of data collection, we optimize HVAC, develop model of energy for the building and verify the carbon emission and other critical elements in the operational manual.

In this work we *define a zero-carbon building (ZCB) as:* "A zero carbon building is a highly energy-efficient building in which carbon-free renewable energy or high-quality carbon offsets ae used to counterbalance the annual carbon emissions from building materials and operations so that with time, it offsets the carbon emissions embodied in the original construction process. Without an accepted ZCB definition, one cannot analyze the building as a system and without a verified carbon emission during the operation of the building the carbon calculations are not realistic. To minimize the GHG emissions from the generation of electricity requires re-evaluation of the way we do modeling and the way we design the building operation. As today decarbonization is not included in the cost calculations, one must be prepared for inclusion of decarbonization in the next generation of

buildings. For this reason, we postulate rethinking the fundamentals of the retrofitting technology.

b) A social, economic, and individual winning scenario

During 2021 Climate Conference it became clear that the establishment perpetuates the old thinking while young people demand a new approach to mitigate the impact of climate change. The authors also believe that it is time to replace the old approach to buildings, where hundred pieces were designed separately, and someone had to assembly them, with a new, holistic approach.

We see technical progress in hydronic systems based on electric heat pumps and hybrid solar panels, we see that next field of building automatics will be to link controls for operation of HVAC and modification of air distribution systems with smart buildings, but we also see that unless we create *broad public-private educational programs with demonstration of a new generation of retrofitting we will get nowhere.*

Currently, it appears that the is a scientific vacuum in the field of environmental engineering in construction. By default, the codes and standards took the lead. Yet, code and standards are created to normalize already proven and accepted technology and we still have not achieved any public and acceptable consensus. As during last decade of the previous century research has been redirected to serve industrial competition, no country today has a building science organization capable of providing lead. Many countries, however, made commitments to slow the climate change and there is a strong need for a paid action. It appears inevitable that solutions used in 1980s must be used again.

In that time, we had no illusion about the inability of the old approach to sever the socio-economic needs and creating national programs of public-private mixture with a strong component of building consensus via education and field demonstrations appeared normal. Programs like R-2000 in Canada, Building America in the US, Japan-Canada joint forum for introduction of increased thermal insulation in Japan were very successful in involving brad public participation.

While the change in environmental control is urgently needed, this change requires understanding of building is a system and this part must come from the scientific community. This vision must have occupant in control of indoor environment and design focused on the system while materials will be judged upon fulfilling the requirements for assembly and subsystems. Yet, builders listen only to their clients and if public is not convinced that these issues are critical to climate change, nothing will happen. We had significant IEA annex [55] and student thesis work [56] that had only minor impact. Meadows [57] produced a list of most important factors that modifies people motivation. On the first place he lists transcending paradigms an on the last (11th place) numbers, parameters such as subsidies, taxes, or standards. She defined transcendent paradigms

> "*The shared ideas in the minds of society, the great big unstated assumptions, constitute that society's paradigm, or deepest set of beliefs about how the world works. These beliefs are unstated because it is unnecessary to state them - everyone already knows them" ….*

and criticized the *sustainability research*

> *"Notice, however, that most of the current sustainability research…is focused on the least effective leverage points like the economic aspects …. politicians believe that sustainability is mainly an economic problem. So, "Numbers" … and parameters such as subsidies, taxes, and standards become the focus.*

Change from the current dealing with retrofitting as a matter of payback time to the critical step in slowing climate change may appear as being trivial, while we belie that this change of thinking paradigm should motivate all involved in building science to mobilize the public and explain to politicians that the importance of post-covid changes in technology. In doing so the society wins new market of retrofitting created by two-stage construction process, dramatic reductions of energy savings and carbon emission, reduction of SARS-coV-2 rate of domestic infection spread (if ventilation is overhauled), and significant job creation market and occupants gain better living conditions. This review shows that it is not the gas emission or the energy saving but that an *emerging holistic vision* that must be communicated to the broad public. The only way to accelerate the green revolution is not through green materials but through a broad public-private programs of education and demonstration about the need for reinvesting into the next generation of retrofitted buildings.

c) The need for action

While this paper is about the way we deal with technology rather than about technology itself, the repeated question that comes to mind is why it is so difficult to start from the first principle rather than continue the small increments that we were doing for the whole life until now.

So, let us reiterate the key issues that we have highlighted in the paper. We define the near zero energy building as a system that must comprise of solar panels and geothermal energy storage. Solar panels may be on the roof, built in walls or located somewhere else. The geothermal storage can be under the building, near to the foundation or somewhere else, e.g., be a part of district water heating. The building may supply energy to, or receive energy from, the smart grid or even be independent of the grid. Thus, the border between the building and a cluster of buildings became vague. Furthermore, an optimization of the building cluster is

easier with local district heating if one deals with a cold climate.

To alleviate conflict between investor and the society, we have introduced the two-stage construction approach. This causes the border between new construction and retrofitting to disappear. Now you can see that the scientific revolution takes place in construction precisely as described by Kuhn [53]. We can also see how building science by placing stress on mechanically ventilated air gap facilitated a concept of double-glazed cavity in which air goes up and down to achieve facade cooling with 60% summer load reduction or how a broader analysis of the Hungarian demonstration house [51] showed winter energy saving of 60% of the total energy.

We do not question the technology role in changing our perception of reality. We only question that technology alone works too slow. To achieve changes that we talk about, it may take two generations instead of two years. If we really want to slow the climate change, we must right now create a national, public-private initiative for a mass retrofitting with an occupant wellbeing in center of the holistic and sustainable vision of built environment.

References Références Referencias

We provide two types of references, standard, recommended for reading, and secondary, marked with a number and letter s, that are provided to acknowledge contribution to science but not necessarily treated as recommended reference.

1. Saskatchewan Energy Conservation house, pamphlet, government of the Canadian province.
2. Bomberg M, Romanska-Zapala A, and Yarbrough DW, Towards a new paradigm for building science (building physics), World, 2021, 2, 194-215,. https://doi.org/10.3390/ world2020013
3. Bomberg M, Romanska-Zapala A., and Yarbrough, D W, 2020, History of American Building Science: steps leading to scientific revolution, J of Energies,
4. Yarbrough, D.; Bomberg, M.; Romanska-Zapala, A., 2019, On the next generation of low energy buildings. Adv. Build. Energy Res., DOI /10.1080/ 17512549.2019.1692070
5. Bomberg, M.; Kisilewicz, T.; Nowak, K., 2016, Is there an optimum range of airtightness for a building? J. Build. Phys., 39, 395–420
6. Bomberg, M.; Kisilewicz, T.; Mattock, C. Methods of Building Physics; Cracow University Press: Warszawa, Cracow, 2017; pp. 1–301.
7. Nembhard M D, Burton J D and Cohen J M, Ventilation use in nonmedical settings during COVID-9 Cleaning protocol, maintenance, and recommendations Toxicology and Industrial Health, 2020, Vol. 36(9) 644–653, https://doi.org/10.1177 /0748233720967528
8. Fadiejev, J.; Simonson, R.; Kurnitski, J.; Bomberg, M. Thermal mass, and energy recovery utilization for peak load reduction. Energy Proceedia, 2017, 132, 38
9. Lstiburek, J.W. Toward an Understanding and Prediction of Air Flow in Buildings. Ph.D. Thesis, University of Toronto, Toronto, ON, Canada, 1999.
10. Lstiburek, J.W.; Pressnail, K.; Timusk, J. Transient interaction of buildings with HVAC system—Updating the State of the Art. J. Bldg. Phys. 2000, 24, 111–131.
11. Lstiburek, J.W.; Pressnail, K.; Timusk, J. Evaluating the air pressure response of multizonal buildings. J. Build. Phys. 2002, 25, 299–320
12. Kosuke Sato, Eri Kataoka; Susumu Horikawa, Thermo-Active Building System Creates Comfort, Energy Efficiency, J, ASHRAE, March 2020,62(3), p42-50, ASHRAE.org
13. Kisilewicz, T.; Fedorczak-Cisak, M.; Barkanyi, T. Active thermal insulation as an element limiting heat loss through external walls. *Energy Build.* 2019, *205*.
14. Bomberg M., Brennan T., Henderson H., Stack K., Walburger, A., Zhang J., 2009, High Environmental Performance (HEP) — residential housing for NY state. *A Final Report to NY State Energy Research and Development Agency and National Center of Energy Mgmt and Building technology,* manuscript, 2009, USA
15. Brennan, T.; Henderson, H.; Stack, K.; Bomberg, M., 2008, Quality Assurance and Commissioning Process in High Environmental Performance (HEP) demonstration house in NY State. 2008. Available online: www.thebestconference.org/best1 (October 12, 2019).
16. Walburger, A.; Brennan, T.; Bomberg, M.; Henderson, H. 2010. Energy Prediction and Monitoring in High Performance Syracuse House. online: http://thebestconference.org/BEST2 (accessed on 28 Dec. 2020)
17. Romanska-Zapala, A.; Bomberg, M. Can artificial neuron networks be used for control of HVAC in environmental quality management systems? In Proceedings of the Central European Symposium of Building Physics, Prague, Czech Republic, 23–26 September 2019.
18. *Dudek, P.; Górny M, Czarniecka L, Romanska-Zapała, A. IT system for supporting the decision-making process in integrated control systems for energy efficient buildings. In Proceedings of the 5th Anniversary of World Multidisciplinary Civil Engineering – Architecture - Urban Planning Symposium—WMCAUS 2020, Prague, Czech Republic, 31 August 2020.*
19. Dudzik, M.; Romanska-Zapala, A.; Bomberg, M. A neural network for monitoring and characterization of buildings with Environmental Quality

Management, Part 1: Verification under steady state conditions. Energies 2020, 13, 3469.]
20. Dudzik, M. Toward characterization of indoor environment in smart buildings; Part 1: Using the Predicted Mean Vote criterion. Sustainability 2020, 12, 6749.
21. Klingenberg, K.; Kernagis, M.; Knezovich, M. Zero energy & carbon buildings based on climate specific passive building standards for North America. J. Build. Phys. 2016, 39, 503–521
22. Wright, G.; Klingenberg, K., 2015, Climate-Specific Passive Building Standards; U.S. Dept. of Energy, Building America, Office of Energy Efficiency and Renewable Energy: USA,
23. Lingo E.L, Jr, 2016, A dynamic dual skin envelope for new and existing structures, paper, and presentation in China (from PhD at Syracuse U, 2010)
24. Lingo E.L, Jr, 2016, A dynamic dual skin envelope for new and existing structures, paper, and presentation in China (from PhD at Syracuse U, 2010)
25. Atelier Rosemount, 2016, Canada Mortgage and Housing Corporation, Newsletter, 2016
26. Bomberg, M. A concept of capillary active, dynamic insulation integrated with heating, cooling and ventilation, air conditioning system. Front. Archit. Civ. Eng. China 2010, 4, 431–437
27. Bomberg M and Pazera M, 2010, Methods to check reliability of material characteristics for use of models in real time hygrothermal analysis. In: Res. in Building Physics—Proc.1st Central Eur. Symp. Building Physics (eds Gawin and Kisielewicz), Cracow–Lodz, Poland, 13–15 September 2010, pp. 89–107.
28. Kumaran, M.K.; Ojanen, 1996, T.R. Effect of exfiltration on hygrothermal behavior of a residential wall assembly, J. Build. Phys. 1996, 19, 215–228
29. Häupl, P.; Grunewald, J.; Fechner, H. Moisture behavior of a "Gründerzeit" -house by means of a capillary active interior insulation. In Proceedings of the Building Physics in the Nordic Countries, Gothenburg, Sweden, 24–August 1999; pp. 225–232 F
30. Simonson, C.J.; Salonvaara, M.; Ojanen, T, 2004, Heat and mass transfer between indoor air and a permeable and hygroscopic building envelope: P. II, Verification, and numerical studies. J. Bldg. Phys. 2004, 28, 161–185.
31. Vereecken E, Roels S. 2015. Capillary active interior insulation: do the advantages really offset potential disadvantages? Materials and Structures, 2015, 48(9): 3009-3021.
32. Fort J, Kocí J, Pokorný, Podolka L, Kraus M and Cerný R, Characterization of Responsive Plasters for Passive Moisture and Temperature Control Appl. Sci. 2020, 10, 9116 http://dx.doi.org/10.3390/app10 24911
33. Bomberg M, Gibson M, and Zhang J, 2015, A concept of integrated environmental approach for building upgrades and new construction: Pt 1—setting the stage, J. of Building Physics, 2015, Vol. 38(4) 360–385
34. Bomberg, M.; Wojcik, R.; Piotrowski, Z, 2016a, A concept of integrated environmental approach, part 2: Integrated approach to rehabilitation. J. Build. Phys, 39, 482–502.
35. Thorsell, T.; Bomberg, M. Integrated methodology for evaluation of energy performance of the building enclosures. P3: Uncertainty in thermal measurements. J. Build. Phys. 2011, 35, 83–96.
36. Romanska-Zapala, A.; Bomberg, M.; Fedorczak-Cisak, M.; Furtak, M.; Yarbrough, D.; Dechunk, M. Buildings with environmental quality management (EQM), part 2: Integration of hydronic heating/ cooling with thermal mass. J. Build. Phys. 2018, 41, 397–417.
37. Yarbrough, DW, Bomberg, M.; Romanska-Zapala, A. Buildings with env. quality management (EQM), part 3: From log houses to zero-energy buildings. J. Build. Phys. 2018, 42, 672–691.
38. Romanska-Zapala, A.; Bomberg M, Yarbrough DW, Buildings with Environmental Quality Management (EQM), part 4: A path to the future NZEB. J. Build. Phys. 2018, 43, 3–21
39. Piasecki M', Kostyrko K and Pykacz S,2 017, Indoor Environmental Quality assessment Part 1: choice of the IEQ sub-component models Journal of Building Physics, 2017, 409
40. Piasecki, M.; Fedorczak-Cisak, M.; Furtak, M.; Biskupski, J. Experimental confirmation of the reliability of Fanger's thermal comfort model—Case study of a near-zero energy building office building. Sustainability 2019, 11, 2461.Energies 2020, 13, 1027
41. De Deer, R.; Zhang, F. Dynamic environment, adaptive comfort, and cognitive performance. In Proceedings of the 7th International Building Physics Conference, IBPC2018, Syracuse, NY, USA, 23–26 September 2018; pp. 1–6.
42. Grunwald J, EU Project CAL GRD1-1999-11149, INSUMAT, Development of insulation mat. with specially designed properties for building renovation, Final rep. IBK, Dresden U. of T.,
43. Perepelitza, M, Petterson L and Turpin K, Performance validation case study: Federal office building with an integrated façade, Journal of Building Physics, 2016, 39:
44. Steffen M P. (2016) Five Not So Easy Pieces - Designing and Building the Passive House Enclosure, Session 2.2 – Next Generation of Integrated Building Enclosures, BEST 4, http:// www.thebestconference.org/best4 (own archives)

45. Mattock, C. Harmony house Equilibrium project. In Proceedings of the Canada Green Building Council, Annual Conference, Vancouver, Vancouver, BC, Canada, 8–10 June 2010
46. Walker, I., Less, B and Casquero-Modrego, N, 2021, Emerging Pathways to Upgrade the US Housing Stock: A Review of the Home Energy Upgrade Literature, Lawrence Berkeley National Laboratory, *https://escholarship.org/uc/item/5rs2t6zs*
47. Klõšeiko, P.; Kalamees, T. (2016). Case Study: In-situ Testing and Model Calibration of Interior Insulation Solution for an Office Building in Cold Climate. CESB 2016 – Central Europe Towards Sustainable Building 2016:
48. Klõšeiko, P., Kalamees, T. (2018). Long term measurements and HAM modelling of an interior insulation solution for an office building in cold climate. 7th International Building Physics Conference (IBPC2018); Syracuse, NY, USA; Sept. 23-23, 2018, Syracuse, U, 1423−1428.
49. Heibati, RS, Maref, W.; Saber, H.H. Assessing the energy and indoor air quality performance for a three-story building using an integrated model, P1: The need for integration. Energies 2019, 12, 4775.
50. Gnoth, S.; Häupl, P.; Fechner, H. (OL) New Aero-Thermo-Hygric Behavior of Building Structures with Open and Closed Cavities, retrievable from sgnoth@abv.fh-lausitz.de
51. edorczak-Cisak et al 2022, Active thermal insulation to reduce heating of the building, paper still in the review, Buildings, 2022
52. Ruskin S, 2021, "Housing 2.0 – A Disruption Survival Guide, Green Builder Media (Sept. 15, 2021)‚ English, 416 pages, order through Amazon
53. Kuhn, T.S. The Structure of Scientific Revolution; The Chicago U. Press: Illinois, IL, USA, 1970
54. Bomberg, M.; Onysko, D, 2008, Energy Efficiency and Durability of Buildings at the Crossroads; White Paper; Building Enclosure Technology and Environment Council, The National Institute of Building Science: Washington, DC, USA, http://the bestconference.org/BEST1 (25 Feb 2020).
55. IEA HPT Annex 40 (OL). IEA HPT Annex 40 is a Corporate Research Project on Heat Pump Application in Nearly Zero Energy Buildings (HTP = the Heat Pumping Technologies, IEA = International Energy Agency). Available online: http://www. annex40.net (accessed on 28 December 2020),
56. *s*. Hu, X.; Shi, X.; Bomberg, M. Radiant heating/ cooling on interior walls for thermal upgrade of existing residential buildings in China. In Proceedings of the In-Build Conference, Cracow TU, Cracow, Poland, 17 July 2013, p314.
57. Meadows, 2009, (The Limits to Growth", see: G. Zurlini · 54.14 .101.61 · University del Salento

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Climate-Induced Migrations and Changing 'Households' in Bangladesh: An Analysis of New 'Householding' Structures from Gender Perspectives

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Abstract- Migration is influencing people's livelihood choices as well as their household arrangements in various ways. This research aims to explore the livelihood changes and shifts in household structures and management systems among the families of migrating people through a gender lens. In this qualitative research systemic literature review and content analysis, methods have been used to fetch the secondary data for analysis. The discussion section shows that losing traditional livelihoods, men are shifting to day labour, rickshaw pulling, or other alternative sources of livelihood and women are increasingly engaging in agriculture, garments, or domestic work. Therefore, people's migration to other areas restructuring household structures. This study found some emerging structures of households, such as families of women with children, grandparents with grandchildren or group living of working girls in their working areas. These changing structures are also impacting gender roles and interactions within families as well as society. Findings show that, where male members migrate outside and/or women engage in income-generating activities, women enjoy more mobility, bargaining and decision-making powers, economic freedom, and exercise their agency. However, the benefits of migration and new householding structures have some associated costs along with some dilemmas and subverting aspects.

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I. Introduction

Nowadays, in contemporary theories, researchers discuss migration as an integral part of life and an alternative way to adjust to the changing realities of life and the development process (Mallick & Siddiqui 2015). Therefore, the analytical discussions in migration discourse have changed from a pessimistic to an optimistic view. Bangladesh is a climate-vulnerable country. People are experiencing several climate change impacts such as frequent flooding, water scarcity and severe water surge in the coastal areas. Hence, people are migrating to different places across the country, especially to the cities (Gray & Mueller 2012). Thus, migration is changing the economic, social, and cultural contexts of households as well as society (Bernzen et al. 2019). In Bangladesh, climate-induced migration of people (both male and female) is changing the shape of household structures by adopting diverse livelihood choices and causing changes in the gender context of the household. Here, I have placed some arguments from secondary data sources to support my arguments as well as linked some examples from Bangladesh perspectives to analyse how changes are taking place within the household structure through migration.

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a) Research Objectives

The objective of this research is to identify the changing structures of households in Bangladesh due to climate change-induced migration. This study further intends to identify the livelihood changes and gender aspects of the changes in livelihoods and householding in migrating families.

b) Research Questions

- What are the existing household structures in traditional Bangladeshi society?
- How are the household structures transforming due to climate-induced migration?
- What are new forms of householding we are seeing now because of migrations and livelihood changes?
- How do gender roles and relations change in the new householding forms?

II. Conceptualization and Theoretical Aspects of Householding

Before going into the in-depth discussion of the research issues, here I have discussed the concept of 'Householding' that is taking shape in societies. Householding refers to the 'ways in which the processes of forming and maintaining household through time' (Douglass 2013). Householding provides a new analytical lens to analyse the household as a unit of analysis (Porio 2007). I have used this concept to analyse the transformations of the physical and structural changes of a household as well as power dynamics and how these are being affected by climate-induced migration in Bangladesh.

The term 'householding' is used to deliver the understanding that 'creating and sustaining a household is an ongoing, dynamic social process that covers all life-cycle stages and extends beyond the family' (Douglass 2006). Folbre (1986) mentioned that the household is the basic unit of social reproduction as well as nurtures social relations. It is not only for physical reproduction for human beings but also accommodates the material and emotional well-being and socio-cultural values of its members. Douglass (2006) suggested a few typical elements of householding in terms of household lifecycles. That includes-

- Marriage/partnering
- Bearing children
- Raising and educating children (and adults)
- Maintaining the household
- Dividing labour and pooling income from livelihood activities
- Caring for the elderly and other non-working household members

Householding, therefore, is a concept that means the mechanism and principles of a household to direct its physical and social reproduction, economic, social, and cultural activities and management and power exercise of household activities. It is also considered an income-generating or labour-sharing social unit. Householding also includes political, social, and economic functions done by its members and sharing the equal risk associated with these activities (Smith et al. 1984).

In this essay, this concept of householding has been used to analyse different types of households in Bangladesh that are currently forming as a result of climate-induced migration.

III. Methodology

In this research, I have applied qualitative research methodology for data analysis. I have collected and used data from secondary sources. The sources of secondary data are academic research articles, books, and grey literature. Due to the COVID-19 outbreak, access to physical library resources was limited, and sometimes was not possible. Therefore, given the COVID-19 pandemic circumstances, data collection completely relied upon online resources. Critical literature review and content analysis methods have been applied to analyse the research topic.

IV. Discussion and Analysis

Climate-induced migration is affecting different aspects of our life such as livelihood, economic & social status and gender contexts and relations in households as well as in society. In the discussion and analysis part, these changes and impacts of migration on householding will be discussed from three main aspects –

- Changes in livelihoods
- Changes in households & 'householding' and
- Changes in gender context & relations

Climate-induced migration and livelihood changes: migration as an alternative livelihood tactic reforming household structure in Bangladesh

Bangladesh has been experiencing significant climate change impacts and is listed as the fifth country which is facing high risks of disasters (Mucke 2014). The main livelihood sources of Bangladeshi people are agriculture, forestry, and fisheries, which are intensely dependent and responsive to climatic change. Due to climate change, these livelihood options are being squished and many people are losing their livelihood. For example, agricultural production, pattern and cultivation choices get affected due to salinity, soil fertility, water scarcity, and precipitation rate which are related to climatic changes and affect the agricultural sector of Bangladesh. Therefore, in coastal areas, people are changing their livelihoods, men's migration is increasing and shifting from one to another livelihood to find a suitable one, in that place women are involved more in agriculture to adapt (Chen & Mueller 2018). As coastal areas are more vulnerable to climate change, therefore, men are shifting from forest collection or farming to fishing, river fishing to shrimp cultivation or migrating to other areas for working as day labour in post-harvesting activities, as rickshaw pullers or hawkers. For women, their livelihood choices are also changing and being limited day by day. Women who used to work as a homemaker are now searching for a job and those who used to work in off-farm activities now shifting to fish processing, shrimp cultivation, and crab catching. Now, due to the loss of traditional livelihood options and migration has been accepted as an available option, more women are also going to city areas as domestic help or garment worker (Kartiki 2011). Therefore, livelihood changes are occurring all over the country, especially in more climate-vulnerable areas.

Thus, climate change is affecting people's livelihood arrangements and people are searching for alternative livelihood strategies to adapt to climate change situations. As a result, people are migrating to other areas, especially cities in search of new work and earnings. Hence, migration is established as an important way of livelihood activities (Afsar 2003). In the past environmental migration used to be considered as the failure to adapt to environmental stress but gradually, this is increasingly being perceived and getting support as a way of adapting with a new hope (Tacoli 2009). In Bangladesh, having negative consequences of environmental and climatic changes, people are also migrating to different places as an adaptation measure to find new jobs, places to live, maintain household expenses and meet up fundamental rights of family members. But this migration scenario is not linear and has a gender dimension. Males migrate more frequently and cover long distant areas and, are also high in number compared to female migrants. Usually, women's migration decision depends on many socio, economic, domestic and cultural factors and also happens in severe environmental or other extreme conditions (Evertsen & Geest 2019). These various types of migrations of male and female members of the family have long-term consequences concerning personal, household, social and community levels as

well as gender relations and power structure of the family that results in new householding structures.

V. Migration and Changing Householding in Bangladesh

As discussed above, migration and searching for alternative livelihoods change the household structure of Bangladeshi families. Based on the literature, in Bangladesh, several types of households (but not limited to) are being prominent in response to the environmental, climate change, economic and socio-cultural contexts, livelihood options and migration trends. These new types of householding are presented in the following table and show the changing features within household structure compared to the traditional household structure.

Table 1: Types of householdings in Bangladesh

Category No.	New Family structures	HH head/ decision making power	Transformation/ migration dimension	Changing features of householding compared to traditional structure
1	Husband, wife with children	Husband, partly women	From root to migrated area	Women's agency practice (decision of migration), join paid workforce, double/ triple burden
2	Husband wife only	Husband, partly women	Root to migrated area (no children/leaving children at root area)	Women's agency practice (migration decision), wage earner, double/ triple burden
3	Young men/women with their aged parents	Male member, partly women	Young men/women (mostly unmarried) migrate to city areas for work, parents live at root areas	Split family, migrate independently, enjoy autonomy, decision making power, dilemma of coming back or settling down
4	Children with grandparents	Aged male member	Parents migrate keeping children to grandparents in root areas	Split of family, new family composition, increasing in number, Bad women- social and emotional challenges for women
5	Group living (young girls/ young boys)	Shared living	Root to migrated areas in group	New format of householding, independent decision making, agency and autonomy exercise, wage earner, sending money to family in root place and share family expanse, group leaving, dilemma of settlement and marriage (especially for girls)
6	Women with children	Primarily women, consulting with male member	Male member migrates	Shift of householding pattern, power exercise, decision making, gendered allocation of resources, access to agriculture, market and other livelihood opportunities
7	Men with children	Men, partly women	Female member migrates temporarily for work	Few in number, consists during extreme/ exceptional conditions (gendered opportunity of work, men's inability / unwillingness to migrate)
8	Widowed or separated women (with or without children)	Women	Migrate to other areas or remain in the root areas and find alternative livelihoods opportunities	Shift of householding pattern, power exercise, decision making, gendered allocation of resources, access to agriculture, market and other livelihood opportunities

**This table is based on the author's analysis of secondary data*

From this table, it is seen that there are transformations in the household structure that are happening in response to the migration and changing life situations of people.

The typical elements of householding that Douglass (2006) mentioned (see in the 'Householding' concept section), all these elements may not be present in each family structure but contains a combination of some of these elements that also change the family structure over time as well. Marriage/ partnering, childbearing & caring, and financial activities are the most common elements in almost all the household structures (1,2,3,4,6,7 no categories of the table), on the other hand, marriage is not present in some structures like group living of young girls/boys (5 no category) where a group of girls or boys live as a family (may migrate from same or different areas) and work in different spheres.

Not only men but a huge number of women migrate to different cities for their livelihood and to support their families. Evertsen & Geest 2019 identified three categories of migrating women in their research in Bangladesh, these are (1) women who migrate with their husbands, (2) women of female-headed households, typically divorced or widowed, and (3) young unmarried women who had migrated alone to provide for

themselves and their families back in the village. Mostly young unmarried girls join in the garment sector and they form a new householding system living in a group that is very common in Dhaka city slum areas. Tacoli & Mabala (2010) depicted in their article, that before migrating these girls usually do not move independently in rural areas but migrating to new city areas they get involved with income-generating activities. They move independently, enjoy economic freedom and send remittances to parents in the village. Like them, Bangladeshi garment daughters also face similar changing cycles in their life and more confidently adapt to the new householding and life experiences.

Another study considers that the cycle of rural to urban, again rural migration allows these families to 'make the best of both worlds' (Nguyen & Locke 2014). These mostly happen when leave their parents in rural areas and migrate to cities (3, 4 & 5 no categories) for work and then return to the root area (sometimes) to settle or migrate again. In many cases, they do not permanently return to the rural areas but keep a strong connection with their parents and rural life. These households get divided (extended to nuclear or split family) into both rural and urban places, become able to choose among more livelihood options and create a safeguard to deal with any upcoming challenges like economic shock, changing social or environmental contexts or disasters. Similarly, Bangladeshi coastal people are building 'trans-local households' (as mentioned in Nguyen & Locke 2014) as a climate change adaptation strategy to find new livelihood options and build a house in nearby city areas (Khulna, Satkhira cities) while also keeping their parents at root villages (Kartiki 2011). If any disaster strikes, they move their family whichever is a comparatively safer place and depend on other livelihood options. That is also a new householding form that arises in response to climate hazards.

VI. Dimensions of Redefined Householding: Gender Perspectives

Migration and changes in livelihood patterns influence the lives of both men and women and gendered interaction within households, in both positive, subverting and sometimes unpredictable ways. Many pieces of literature show that migration and livelihood change increase women's power to make their own decisions, it also reduces men's traditional leading roles (Nguyen & Locke 2014; Antman 2015), on the other hand, these also create some dilemmas in migrant men and women's life (Mallick 2019; Jacka 2012).

Migration of male members allows higher bargaining power for women of the family that also reflects lower gender discrimination in the family among children where girls receive more allocation of budget for their education and clothes (Antman 2015). Another study also demonstrates that women's income and increasing bargaining power have a positive relation with better health, food, clothes, and education facilities for the girl child in a family (Duflo 2003). The scenario of Bangladesh is also closely similar to these studies. When women migrate, a great number of them enter into paid work sectors and earn money, thus they also enjoy comparatively more economic freedom than in their past life and also increased bargaining and expanse power (Evertsen & Geest 2019). That impact their decision-making process and the householding nature of a family. Women take participation in the allocation of family income, do some savings, and distribute facilities among family members. Thus, householding takes a modified shape under new circumstances and influences the gender status of the household.

Among migrating women, unmarried young women migrate to the city more than married women. Unmarried girls and women can take decisions independently or consult with family members to migrate and work. They also exercise more freedom on their income, expenditure, and savings. On the other hand, Married women have their obligatory gender and household responsibilities and take care of children and senior adult members. They are also tagged as 'bad mothers' if they don't perform traditional gender roles perfectly, leaving children to grandparents to migrate and work outside (Evertsen & Geest 2019). But also, staying under social pressure and stigmatization, women take bold decisions while needed. Under such circumstances as climate change or any unexpected problem of family, some studies show that women make the decision to migrate with, partly or without family members to change livelihood, tackle the challenge and find a better life (Singh 2019). Evertsen & Geest 2019 showed in their study on Bangladeshi slums, that it is married women who decided to move to the city, joining in wage work and comforting family to adjust to the new environment. So, this is also strong evidence of married women's agency practice to decide to migrate.

As a result of migration and the new householding process, women who choose or are compelled to live in root areas are also gaining some incremental perspectives within the existing social order. Existing power dynamics remain the same in society, but due to male migration women's roles and new activities change their status in the family as well as in society. In the article of Lahiri-Dutt and Adhikari (2016), they showed that women are getting involved with agriculture as de facto women-head of households and gradually changing shared farming systems from sharecropping to contract to farm. Usually, sharecropping benefits are shared equally, therefore, it is also risk-sharing. But in contract farming, the female head of household is doing in the absence of the male

member, profit is fixed through negotiation so profit and risk both are low.

This situational change can be understood from two points of view. On one hand, due to low bargaining positions, less access to assets and land and low experience in contract dealing, women get fewer benefits. On the other hand, this is a new crop production contract system they have introduced, and they choose to run agricultural activities and use lands for production in absence of male members and gradually enter into the formal agricultural market. In Bangladesh, this similar trend can be seen where women are getting involved with the formal agricultural system, market economy and buying and selling agricultural products while male members are away from home. This scene can be seen especially in char (river islands) areas of Bangladesh. One research article done in this context shows that women in chars are mostly involved in post-harvesting activities, but after the migration of male members, women either take responsibility for cultivation by themselves buying agricultural inputs, managing labour and cultivation activities or giving land to others to cultivate on contract for income and maintain a livelihood in chars (Chaity & Rahman 2017). Thus, women enter into formal agricultural activities and markets to adapt to the situation. Now in char areas, women's agricultural activities and dealings with the external market stakeholders are very common as char men frequently migrate in search of work and women stay at the chars to look after the family and resources. In this householding format, women exercise their household decision making power, control income, and expenses, manage agricultural activities, and profit and loss management while these also increase their knowledge and skills which results from the outmigration of men.

Migration also offers gendered opportunities in some cases. The garment sector in Bangladesh is well established and blooming day by day. This sector offers more working opportunities to women than men. Though this nature of work is questionable in that it is reinforcing women's subjugation and dominates the women's labour force (Afsar 2002) but on the other hand, this is also offering a huge working opportunity for women to enter into the professional working sector that also liberates women, giving economic and social empowerment. Working opportunity in the garment sector in Bangladesh acts as an economic full factor for women's migration to the city and perceive migration as an efficient way to cope with the risk that environmental stress poses to their previous livelihood (Evertsen & Geest 2019).

As earlier mentioned, in some cases migration and new householding may impact gender contexts negatively or in unpredictable ways. Mallick (2019) discussed from the Bangladeshi context that, disasters can also reduce mobility by detaching the required resources to migrate as well as creating a labour crisis in the affected place. Many families face greater problems to migrate as they neither have adult male family members who could work as labour migrants, the required resources to facilitate migration, nor access to the necessary migration networks. Mallick called them "trapped populations", who are mainly elderly and female-headed households because they are forced to live with the resources that are locally available to them. Their immobility is an additional source of their vulnerability and increases their suffering. Furthermore, left behind women face negative impacts due to the outmigration of husbands for the long term, such as heavy workloads, poor mental and physical health, insecurity and conflicted and unstable conjugal relationship with husbands though household income increases (Jacka 2012).

In addition, gender norms create social costs for women who migrate, therefore, they go through ambivalent feelings about migration. The challenges Jacka finds for some women, returning to the patriarchal cultural norms of their rural physical household can also be seen in Bangladeshi societies. They face greater problems adjusting to the rural lifestyle, finding life partners and entering into traditional housewife roles as well as the generational gap between the migrant and elderly people place additional challenges on their life (Cannon 2002; Mallick 2019).

VII. Conclusion

To conclude, it is evident in Bangladesh, that migration has been embraced as an adaptation strategy by the climate-vulnerable people and this process is influencing their livelihood options, gender relation, and householding process. Here, on one hand, climate change is compelling people to migrate, on the other hand, better income, more working opportunities and gendered work opportunities (garments and domestic help) act as incentives for migration thus transitions are happening in households in Bangladeshi societies. In the new householding structure, migration brings lots of impacts on the life of women and men. Firstly, it affects the traditional distribution of gender roles where men usually had more power to decide but gradually, women also take part in the decision-making process and power exercise. Second, it gives women a chance to hold power and initiates their own decisions, and third, it changes the existing economic, social and cultural structures of the household as well as the society starts a new phase of transition. These new households in Bangladesh also influence gender relations, women's empowerment and agency exercise within the household as well as the community.

References Références Referencias

1. Afsar, R. (2002). Gender dimensions of labour migration in Dhaka city's formal manufacturing

sector, In C. Miller & J. Vivian (Eds.), *Women's employment in the textile manufacturing sectors of Bangladesh and Morocco*, pp. 103–150, Switzerland: UNRISD. Retrieved October 11, 2021, from https://www.unrisd.org/80256B3C005BCCF9/(httpPublications)/2F73416DA5C10AE5C1256D55003406AE?OpenDocument

2. Afsar, R. (2003). *Internal Migration and the Development Nexus: The case of Bangladesh*. In Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia (pp. 22-24). Dhaka, Bangladesh. http://www.shram.org/uploadFiles/20131213045931.pdf
3. Antman, F. M. (2015). Gender discrimination in the allocation of migrant household resources. *Journal of Population Economics*, *28*(3), 565–592. https://doi.org/10.1007/s00148-015-0548-x
4. Bernzen, A., Jenkins, J. C., & Braun, B. (2019). Climate Change-Induced Migration in Coastal Bangladesh? A Critical Assessment of Migration Drivers in Rural Households under Economic and Environmental Stress. *Geosciences*, *9*(1), 51. https://doi.org/10.3390/geosciences9010051
5. Cannon, T. (2002). Gender and climate hazards in Bangladesh. *Gender & Development*, *10*(2), 45–50. https://doi.org/10.1080/13552070215906
6. Chaity, Z. Y., & Rahman, A. (2017). Agricultural Intervention of NGOs and its impact on Women in Char towards Economic Empowerment. *IOSR Journal of Humanities and Social Science*, *22*(9), 86-96. https://doi.org/DOI: 10.9790/0837-2209098696
7. Chen, J., & Mueller, V. (2018). Coastal climate change, soil salinity and human migration in Bangladesh. *Nature Climate Change*, *8*(11), 981–985. https://doi.org/10.1038/s41558-018-0313-8
8. Douglass, M. (2013). Global Householding and Social Reproduction in Migration Research Part Ⅰ: From the Peasantry to Feminist and Political Economy Critiques. *Ewha Journal of Social Sciences*, *2*(29), 5–68. https://doi.org/10.16935/ejss.2013.2.29.001
9. Douglass, M. (2006). Global householding in Pacific Asia. *International Development Planning Review*, *28*(4), 421–46. https://doi.org/10.3828/idpr.28.4.1
10. Duflo, E. (2003). Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa. *The World Bank Economic Review*, *17*(1), 1–25. https://doi.org/10.1093/wber/lhg013
11. Evertsen, K. F., & Geest, K. van der. (2019). Gender, environment and migration in Bangladesh. *Climate and Development*, *0*(0), 1–11. https://doi.org/10.1080/17565529.2019.1596059
12. Gray, C. L., & Mueller, V. (2012). Natural disasters and population mobility in Bangladesh. *Proceedings of the National Academy of Sciences*, *109*(16), 6000–6005. https://doi.org/10.1073/pnas.1115944109
13. Jacka, T. (2012). Migration, Householding and the Well-being of Left-behind Women in Rural Ningxia. *The China Journal*, *67*, 1–22. https://doi.org/10.1086/665737
14. Kartiki, K. (2011). Climate change and migration: A case study from rural Bangladesh. *Gender & Development*, *19*(1), 23–38. https://doi.org/10.1080/13552074.2011.554017
15. Mallick, B. (2019). The Nexus between Socio-Ecological System, Livelihood Resilience, and Migration Decisions: Empirical Evidence from Bangladesh. *Sustainability*, *11*(12), 3332. https://doi.org/10.3390/su11123332
16. Mallick, B. E., Bishawjit. (2015). *Climate Change and Internal Migration in Bangladesh—Country Profile Bangladesh*. bpb.de. http://www.bpb.de/gesellschaft/migration/laenderprofile/216109/climate-change-and-internal-migration-in-bangladesh
17. Mucke, P. (2014). Urbanization - trends and risk assessment. In *World risk index* (pp. 53–62). Bonn: United Nations University, Institute for Environment and Human Security <https://i.unu.edu/media/ehs.unu.edu/news/4070/11895.pdf>.
18. Nguyen, M. T. N., & Locke, C. (2014). Rural-urban migration in Vietnam and China: Gendered householding, production of space and the state. *The Journal of Peasant Studies*, *41*(5), 855–876. https://doi.org/10.1080/03066150.2014.925884
19. Porio, E. (2007). Global Householding, Gender, and Filipino Migration: A Preliminary Review. *Philippine Studies*, *55*(2), 211–242. JSTOR.
20. Singh, C. (2019). Migration as a driver of changing household structures: Implications for local livelihoods and adaptation. *Migration and Development*, *0*(0), 1–19. https://doi.org/10.1080/21632324.2019.1589073
21. Smith, J., Wallerstein, I., & Evers, H. (eds) (1984). *Households and the World-Economy*, Beverly Hills, Sage.
22. Tacoli, C. (2009). Crisis or adaptation? Migration and climate change in a context of high mobility. *Environment and Urbanization*, *21*(2), 513–525. https://doi.org/10.1177/0956247809342182
23. Tacoli, C., & Mabala, R. (2010). Exploring mobility and migration in the context of rural-urban linkages: Why gender and generation matter. *Environment and Urbanization*, *22*(2), 389–395. https://doi.org/10.1177/0956247810379935

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Sobre Antropología Cibernética de la Arquitectura

By Santiago Zubieta Davezies

Abstract- The present work aims to p ropose the necessary bases for an anthropology of architecture, from the cybernetic approach, that is, the science that studies the processes of communication and control, present in technical, biological and social devices. For this purpose, the cybernetic notion of self-organization is used at its different levels of complexity, according to the movement of reality to be addressed in its relations with architecture, that is, physical, biological and social reality (self-organization, self-eco-organization and selfecoproduction).

Keywords: cybernetic anthropology, communication and control, complexity, self-organization, self-eco-organization, self-eco-production.

GJHSS-H Classification: DDC Code: 006 LCC Code: Q175

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Sobre Antropología Cibernética de la Arquitectura

Santiago Zubieta Davezies

Resumen- El presente trabajo pretende proponer las bases necesarias para una antropología de la arquitectura, desde el enfoque de la cibernética, es decir, la ciencia que estudia los procesos de comunicación y control, presentes en los dispositivos técnicos, biológicos y sociales. Para tal efecto se recurre a la noción cibernética de *auto-organización* en sus diferentes niveles de complejidad, según el movimiento de la realidad a abordar en sus relaciones con la arquitectura, es decir, la realidad física, biológica y social (*auto-organización*, *auto-eco-organización* y *auto-eco-producción*).

Palabras clave: *antropología cibernética, comunicación y control, complejidad, auto-organización, auto-eco-organización, auto-eco-producción.*

Abstract- The present work aims to propose the necessary bases for an anthropology of architecture, from the cybernetic approach, that is, the science that studies the processes of communication and control, present in technical, biological and social devices. For this purpose, the cybernetic notion of *self-organization* is used at its different levels of complexity, according to the movement of reality to be addressed in its relations with architecture, that is, physical, biological and social reality (*self-organization*, s*elf-eco-organization* and *self-eco-production*).

Keywords: *cybernetic anthropology, communication and control, complexity, self-organization, self-eco-organization, self-eco-production.*

I. Introducción

El objetivo del presente trabajo, es proponer las bases necesarias para una antropología de la arquitectura, desde el enfoque de la teoría cibernética, es decir, la ciencia, que, sistémicamente, estudia los procesos de comunicación y control, presentes en los dispositivos técnicos, biológicos y sociales. Para tal efecto, en esta ocasión, se recurre específicamente, a la noción cibernética de *auto-organización* en sus diferentes niveles, es decir, según la complejidad, en el movimiento de la realidad, a abordar en relación a la arquitectura (realidad o sistemas físicos, biológicos y sociales).

En primer lugar, la teoría dominante y tradicional de la arquitectura, ha hecho el necesario énfasis en las consideraciones físicas, y propiamente técnicas de la disciplina, en el comportamiento ingenieril de los sistemas arquitectónicos tal cual artefactos, que organizan el medio físico, y controlan las fuerzas de la naturaleza, a medida que brindan protección y seguridad a los usuarios. Este primer universo de acción para la arquitectura, en su relación directa y cuasi disciplinar con los sistemas físicos y técnicos, se interpreta en esta ocasión, por medio de la noción cibernética de *auto-organización*.

En segundo lugar, la cibernética, explícitamente en su tradición, y la arquitectura implícitamente, trabajan con sistemas biológicos, trabajan con aspectos relativos al desarrollo, autonomía y reproducción de los organismos vivos, en el marco de la unidad ecológica que establecen éstos, con su medio físico. Así pues este segundo universo de acción para la arquitectura, en su relación con los aconteceres bio-ecológicos, es útil de interpretar por medio de la noción cibernética de *auto-eco-organización.*

En tercer lugar, se encuentra el modelo de cibernética más complejo, y de determinación fundamental para la arquitectura y sus medios de producción y dirección, el sistema de la sociedad, interpretado en esta oportunidad, por medio de la noción cibernética de *auto-eco-producción*. El enfoque complejo, antropo-social de la arquitectura, corresponde a este sistema.

Metodológicamente, a partir del método dialéctico y del enfoque complejo, se recurre indirectamente, a un sistema general de clasificación de las ciencias desde la arquitectura. Sistema de clasificación dado al considerar tres tipos básicos de subsistemas, o tres tipos de movimiento de la realidad, que de hecho plantean la línea metodológica actual: *lo físico, lo biológico y lo social*. Por razones de límites, los procesos referidos a un cuarto sistema, a las ciencias del pensamiento, al movimiento de los procesos de la conciencia y los roles del observador, de fuerte presencia en la teoría cibernética, son aspectos a desarrollar en otra oportunidad.

II. Auto-Organización. Lo Físico

La *cibernética* es la ciencia de la organización de los procesos de comunicación y dirección, de determinados tipos de sistemas, entre ellos los arquitectónicos[1]. Los arquitectos son por ende, diseñadores de sistemas; sistemas autoorganizados de comunicación y control (Pask, 1959). Un sistema es

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[1] "[…]. Dentro de los diversos sistemas que se pueden establecer, la arquitectura y el urbanismo son sistemas de tipo funcional, espacial, constructivo, formal y simbólico." (Montaner, 2008, p. 6). "Un edificio puede considerarse como un microsistema social para el arquitecto; una ciudad puede constituir un macrosistema social para el diseñador urbano. […]". (Sánchez, 1982, p. 567).

autoorganizado, cuando consume energía y orden disponibles de su ambiente, cuando vive a expensas de él, a través del intercambio de flujos de alimento, o señal constantes (Foerster, 1991).

El carácter cibernético de la arquitectura, reside en su capacidad, de intercambiar información con el entorno, por medio –pero no sólo– de un sistema construido, formalizado y tecnificado de organización y control del medio físico. Es decir, la arquitectura se entiende desde la cibernética, como un sistema dotado de altos niveles de organización, comunicación y dirección[2]. Los sistemas arquitectónicos son sistemas autoorganizadores, a medida que intercambian información y energía con el entorno, es decir, a medida que sistema y entorno, se nutren mutuamente, para desarrollarse, para sobrevivir, para establecer cada uno, una unidad compleja, su propia naturaleza.

Objetivamente, la naturaleza física del hecho arquitectónico implica organizar las fuerzas de la naturaleza, promover una unidad estructural, funcional y bioclimática a partir del conocimiento, registro, dirección y usufructo de las fuerzas naturales. En efecto, como en todos los sistemas, la noción de *auto-organización* implica organización interna y niveles de comunicación con el exterior, el tránsito entre *orden, desorden y organización*; *variedad*, *complejidad*, a medida que sistema y entorno, generan intercambios productivos de información.[3]

Un edificio en tanto sistema, y sistemas, en su constitución física y técnica –cuyo saber formalizado se especializa en las ciencias de la ingeniería– posibilita interpretar su estructura como un conjunto de funciones a cumplir, a organizar. De modo pues, que mientras más compleja es la estructura técnica del sistema, del edificio, más complejas son las funciones a desarrollar, que está proyectado a desarrollar (Sánchez, 1982). El enfoque sistémico es susceptible de aplicarse a la arquitectura, en la medida de que trabaja ésta, físicamente, técnicamente, como un conjunto artefactual de complejidad (es decir de organización interna, unidad múltiple y unidad con el ambiente, de *auto-organización*), a partir de sus elementos materiales, que "controlan" la naturaleza, a partir de sus componentes propiamente técnicos y físicos, en interacción y afectación.[4]

En los sistemas físicos (arquitectónicos), una acción compleja es aquella que introduce datos (diseño técnico, físico) considerando un gran número de combinaciones e interacciones, un gran número de variables que producen efectos, determinadas salidas, productos; de ese modo, aquellas órdenes con las que se dirige y regula la complejidad del ambiente, son un proceso de control de información, de organización de la comunicación, a partir de su dirección (Wiener, 1969). Arquitectónicamente, cuando se regula un hecho físico se comunica un mensaje, funcional y cultural, técnico y social, cuyo estado de situación es conocido en la medida de que es administrado, instrumentalizado; así pues, las órdenes que regulan el ambiente en forma de información, comunicación, dirección, hacen de medida para la organización.[5]

La arquitectura es un sistema dinámico, de complejidad, mientras consume información del entorno, mientras se desarrolla a medida que se desarrollan, y funcionan, sus componentes físicos en efecto, pero también ecológicos y sociales, es decir, como todo sistema, se organiza, a medida que incorpora el "desorden" del exterior, en el "orden" del interior, en el artefacto físico producido por la *racionalización*, por el diseño. Así, pues, mientras los sistemas, entre ellos, los arquitectónicos, presentan mayor complejidad[6], presentan mayor absorción de información desde el entorno, y por lo tanto mayor capacidad para tolerar el desorden. El desorden pues, es también propio de la organización, la cual se desarrolla básicamente a partir del juego dialéctico entre *orden* y *desorden*, presentes en los estados físicos, biológicos, sociales y/o arquitectónicos. La *complejidad* entonces (la variedad, la *auto-organización*), *resulta de la dialógica entre el orden, el desorden y la organización* (Morin, 2009a).

[2] "El objetivo de un sistema de comunicación consiste en asegurar entre una fuente de información y un destinatario una relación mediante la cual la primera afecte la conducta del segundo. […]. El principal objetivo del sistema será entonces lograr la exactitud de dicha transferencia." (Garretón, 1975, p. 11).

[3] Sobre *auto-organización*: "Así como en un producto semejante de la naturaleza, cada parte existe sólo mediante las demás, de igual modo es pensada como existente sólo *en consideración* –cursivas de Kant– de las demás y del todo, […], sino que ha de ser pensada además como un órgano productor de las otras partes (por consiguiente, cada una a su vez de las demás), tal como no puede serlo ningún instrumento del arte, sino sólo de la naturaleza, la cual proporciona toda materia para instrumentos (incluso los del arte), y sólo entonces y por eso puede semejante producto, como *ser organizado y organizándose a sí mismo*, ser llamado un *fin de la naturaleza*." (Kant, 2019, p. 328).

[4] "[…], así también creo yo que es muy verdadero que las sustancias actúan unas sobre otras, con tal que esto se comprenda en el sentido de que una es causa de los cambios de la otra, por virtud de las leyes de la armonía. […]". (Leibniz, 2014, p. 58). Kant (1724-1804) y Leibniz (1646-1716) son en efecto, referentes fundacionales en cuanto a los enfoques organizativos y comunicacionales en las ciencias.

[5] Mientras la *entropía* por el contrario, hace de medida de la *desorganización* de los sistemas. Las nociones de *entropía*, *desorden* y *sistemas abiertos*, son consecuencia, en gran medida, de las leyes de la termodinámica.

[6] La complejidad ingresa formalmente en la escena de la ciencia, con el matemático Norbert Wiener (1894-1964), y con el neurólogo William Ross Ashby (1903-1972). Por su parte otro pionero, el matemático John von Neumann (1903-1957) estableció que lo fundamental de la complejidad, es su relación con la *auto-organización*, sentando las diferencias entre las máquinas vivientes, que son autoorganizadoras, y las máquinas artefacto, que son simplemente máquinas organizadas (Morin, 1994). La arquitectura, puede pensarse como una máquina autoorganizadora, como se intenta en este trabajo, o como una máquina artefacto, como suele suceder, en la teoría tradicional y autorreferencial.

El *desorden*, en tanto parte de la *auto-organización*, hace parte de la organización física, biológica y antropológica de la arquitectura, a medida que la dinámica de la naturaleza y la sociedad, en su complejidad, producen los nuevos elementos de organización.

La ciudad genera información para su adaptación, para la adaptación a las nuevas condiciones de lo físico, en su interacción con lo natural y lo social. Así pues, se manifiesta el carácter complejo de la arquitectura desde una concepción antropológica, a medida que se materializa como sistema mecánico y provisto de complejidad, pero también, como sistema biológico y social.

En esa naturaleza compleja, física, biológica y social, pues, en la naturaleza de su comunicación, en el lenguaje, antropológicamente, cibernéticamente, lo que distingue al ser humano, del resto de seres vivos y animales, es la complejidad de sus formas de comunicación, de su lenguaje, de sus líneas de dirección, la complejidad de su proceso comunicacional, además de su *arbitrariedad*, en el marco de un desarrollo evolutivo y creativo de sus códigos lingüísticos, a medida que son también, códigos técnicos (Wiener, *Ibíd*.). La técnica entonces, al estar provista de leguaje, como forma de conciencia, de conciencia social[7], además de ser un proceso físico, autónomo en cuanto tal, es un proceso social. Un proceso autoorganizado, técnico y físico en efecto, pero que sólo es tal, como producto de la interrelación hombre-máquina, siendo este sistema, el sistema hombre-máquina lo que se auto regula (Sánchez, *op cit*.), lo que se coproduce.

III. Auto-Eco-Organización. Lo Biológico

En el periodo de formación temprana de la teoría cibernética, es el neurólogo William Ross Ashby (1970) quien se preocupa por las relaciones entre los sistemas biológicos y las máquinas. La noción cibernética de *máquina* pues, pone en escena la importancia de las *relaciones entre las partes* que componen los sistemas, el comportamiento organizativo de esas relaciones, y no así, fundamentalmente, las propiedades implícitas, en esas partes. Una máquina es pues, una relación entre partes, que permite transformar determinados tipos de energía, de información.[8]

En paralelo, la *teoría general sistemas*, hace su aparición en la ciencia, a partir de la noción de *sistema abierto* (Bertalanffy, 1989), el cual se caracteriza por la interacción dinámica entre componentes, por medio de ciclos en retroalimentación, a partir de lo cual, se establecen estados de organización cualitativamente superiores en el sistema. Así pues, a diferencia de los sistemas mecánicos, el estado característico de los sistemas abiertos –especialmente los sistemas vivos– es su necesidad imprescindible de intercambiar, *constantemente*, material con el ambiente, y de ese modo individualizar su proceso biológico, su continuidad biológica, produciendo en paralelo, la memoria orgánica de su propio desarrollo (Wiener, *op cit*.).

Así pues, *la vida*, como proceso biológico, es un fenómeno de *auto-eco-organización*, lo cual supone la reorganización permanente de sí misma en tanto conjunto orgánico y sistemas vivos[9], lo cual es imposible sin la relación ecológica que establecen éstos, los sistemas vivos, con el entorno que les caracteriza (Morin, 2009b).

La noción biológica de *autopoiesis*[10] (Maturana y Varela, 2003) es útil para comprender la organización autónoma de lo vivo.

Las máquinas vivas son *autopoiéticas*, transforman la energía que consumen en sí mismas, los productos que desarrollan, son *sí mismas*, de modo que son máquinas *homeostáticas* (en equilibrio), organizadas, que conectan sus componentes, y presentan relaciones de producción que son regeneradas por esos mismos componentes. Lo específico de los sistemas vivos pues, es que son *unidades autónomas*, diversas y capaces de reproducirse. Lo *viviente* implica de ese modo, también lo *autónomo*, y de hecho, en la naturaleza, en la realidad, dialécticamente, lo que demuestra ser autónomo, demuestra también su inmensa relación con el ambiente.

Sin embargo el proceso biológico y evolutivo de los organismos vivos, y de los seres humanos, no se realiza por sí mismo, en sí mismo.

Por ejemplo, así como el cerebro no se desarrolla ni cumple sus funciones al margen de un "exocerebro", los seres humanos no desarrollan sus

[7] "[…]. Ahora bien, la técnica y la conciencia son dos palancas de la arquitectura sobre la cual se apoya el arte de construir. […]". (Le Corbusier, 2001, p. 14).

[8] "[…]. De acuerdo con la forma en que usted entra en un cuarto, y de acuerdo con la posición de la puerta en la pared, usted tiene una impresión determinada y la pared que perfora toma características determinadas. […]. Recuerde que una casa es una máquina para vivir y una oficina o una fábrica es una máquina para trabajar." (Le Corbusier, *Ibíd*., p. 65).

[9] "[…]. La palabra orgánico se refiere a la *entidad* –cursivas de Wright–, y quizás por ello sería mejor emplear la palabra integral o intrínseco. Como se usó originariamente en arquitectura, orgánico significa *la-parte-al-todo-como-el-todo-a-la-parte*. Así *entidad como integral* es lo que se quiere decir en realidad con la palabra orgánico. INTRÍNSECO." (Wright, 1958, p. 250).

[10] *Autopoiesis* es el proceso (estrictamente molecular) de producción y reproducción de los organismos vivos por sí mismos. Para Maturana (1928-2021), parte de la tradición sociológica de sistemas, confunde equivocadamente *autopoiesis* con *auto-organización*. Parte de esa tradición, es el alemán Niklas Luhmann (2002), quien emplea la noción de *autopoiesis*, para describir a la sociedad, en su "capacidad" de producción y reproducción de sí misma.

procesos biológicos, productores de sí mismos (*autopoiéticos*) al margen de sus artefactos, de sus nichos, de un medio físico, de un medio ecológico, natural, transformado. Así pues, la noción de *exocerebro* (Bartra, 2014) es útil para pensar la "continuidad" del órgano cerebral y de la conciencia, fuera del cráneo, a través de los símbolos culturales, los cuales, hacen de "prótesis" indispensables para que el cerebro procese, *biológicamente*, la información del entorno, y se desarrolle como tal. En ese sentido, la *evolución cultural* y la *evolución biológica* (así como el cerebro y el *exocerebro*) funcionan de manera integrada, son inseparables una de la otra al grado que los "circuitos culturales", son integrados en la conciencia, en el cerebro, lo modifican, y modifican por ende, según las experiencias concretas, determinados tipos de circuitos neuronales (piénsese en las relaciones entre arquitectura y neurociencias).

El proceso *autopoiético* (molecular) de los seres humanos es propio de su proceso evolutivo, el cual es imposible sin un entorno, sin un "exocerebro", cultural, artefactual, arquitectural, en la medida de que la arquitectura no sólo representa la cultura, sino que la materializa, la edifica. Así pues, desde la cibernética biológica, es posible superar la idea de *adaptación pasiva* de los organismos a sus circunstancias, sino que tanto organismos, como circunstancias (entorno), cambian juntos, se coproducen, coevolucionan, se afectan. La selección natural, la evolución biológica compleja, eco-organizativa más que sólo *autopoiética* y molecular, implica pues la comunicación entre sistemas y entornos, la unidad entre los organismos vivos y sus nichos ecológicos, unidad ecológica, como unidad fundamental que hace posible la vida.[11]

En efecto, en este caso, se piensa pues, el *nicho ecológico*, como un proceso arquitectural[12], así como pensamos la *autopoiesis* molecular de naturaleza biológica, sólo en el marco de un contexto "exocerebral", en el marco de artefactos físico-técnicos, y culturales, que realizan y contribuyen, en el movimiento biológico, ecológico, además de social.

Así, como sistemas vivos y entornos, conforman una *unidad auto-eco-organizada*, arquitectónicamente, humanamente, sólo lo hacen a través de determinados medios de transformación del entorno, de diseño, es decir a través de la *mediación cibernética* (de comunicación y control) que se establece entre el artefacto y el ambiente. El diseño se dirige, entonces, hacia todo aquello que el entorno tiene de inseguro, de caótico, de imprevisible, es decir, *desordenado*, *entrópico*; de manera que los artefactos, implementados a través de las consideraciones mecánicas, anatómicas y ecológicas, en tanto diseño, sintetizan acoplamientos, unidades de vida, la búsqueda de acoplamientos evolutivamente eficaces, entre esos mismos artefactos y sus ambientes (Parente, 2010).

La arquitectura cibernéticamente, posibilita el nicho ecológico de la sociedad humana, establece unidades evolutivas de coproducción con ésta, y hace de "prótesis exocerebral" en tanto forma cultural, integrada, sin la cual las funciones propiamente *autopoiéticas*, neurológicas, biológicas, ecológicas, no pueden desarrollarse. Así pues los sistemas arquitectónicos, tal cual sistemas ecológicos, no sólo se desarrollan, sino que evolucionan, físicamente, socialmente, biológicamente, y parte de las preocupaciones de los arquitectos deben considerar esas propiedades evolutivas de las unidades que producen, en tanto "caparazones" biológicos y sociales, en el marco de procesos de comunicación, dirección y control de la información, la energía y el lenguaje (Pask, *op cit*.).

IV. Auto-Eco-Producción. Lo Social

Cuando Norbert Wiener (*op cit*.), uno de los fundadores de la teoría cibernética, lanzó su obra *Cibernética y sociedad* en 1950, planteó que únicamente es posible entender la sociedad, a partir del estudio de los mensajes que ésta genera; en consecuencia, la vida social del ser humano, la sociedad, está determinada, administrada, por procesos de comunicación y regulación de mensajes. A partir de entonces, tanto la cibernética como su primo hermano, la teoría de sistemas, harían énfasis en el análisis de la sociedad, sobre todo, ante todo, a partir de su naturaleza comunicacional.

Sin perder de vista esta cuestión, la noción de *auto-eco-producción* recuperada en esta ocasión, permite introducir el énfasis complejo de lo social en su relación con la arquitectura, es decir, la *capacidad productiva* de la sociedad, de regenerarse a sí misma, tal cual otro proceso de *auto-organización* cualquiera, pero en el marco de una *organización generativa*, es decir, una organización que garantiza la conservación,

[11] "[…]. La selección natural casi siempre edifica sobre lo que ya existe, de modo que un proceso básicamente simple se ve recargado con muchos artilugios auxiliares. […]. La complejidad resultante es la causa de que los organismos biológicos sean tan difíciles de descifrar. […]. Las leyes básicas de la física normalmente se pueden expresar de una forma matemática exacta, y probablemente sean las mismas en todo el universo. Por el contrario las «leyes» de la biología sólo pueden ser generalizaciones amplias, […]". (Crick, 2008, p. 15). Francis Crick (1916-2004), Premio Nobel de Medicina en 1962, por su contribución en el descubrimiento de la estructura del ADN.

[12] "[…]. El diseño de una casa no sólo es compatible con las constricciones ambientales, sino que además las internaliza, haciéndolas parte de la maquinaria. En este caso, los factores que usualmente son relacionados externamente (la dirección de la luz y la distribución de superficies de vidrio) están, de hecho, intencionalmente combinados para conseguir un efecto deseado. La casa opera en un nicho que ella misma crea por el ángulo que ocupa con respecto al sol. La concretización está involucrada, de este modo, con el ajuste de las tecnologías a sus entornos naturales y sociales. […]". (Parente, *op cit*., p. 208).

transmisión y reproducción de lo social, a partir de la producción de medios y objetos, a través de los cuales, se produce y reproduce la sociedad, y sus productores, las personas. Así pues, en la *organización generativa*, en la *auto-eco-producción*, el productor, el ser humano, es su propio producto (Morin, 1995).

Arquitectónicamente, la ciudad se muestra como *organización generativa*. La ciudad implica pues, concentración de funciones, de relaciones sociales, conjuntos de personas asociadas por variados y complejos procesos de comunicación, que son transmisores de información continua y variada, posibilitando así, la adaptación de la población, la producción y la reproducción de su vida social.

La ciudad hace de asiento de todas las comunicaciones posibles de producir, pues cuanto mayor es la cantidad de información transmitida, en, o desde las ciudades, tenderán éstas, las ciudades, a mostrar fuentes cada vez más especializadas de información, y de ese modo, a fortalecer su tendencia a la *centralización*, a la concentración. La ciudad, en su constitución compleja, transmite variedad de comunicación, y es en sí misma, una central de difusión esa variedad (Garretón, *op cit*.); y la variedad es, en efecto, supuesto y resultado de la complejidad.

Cibernéticamente, la información de la ciudad –en cuanto a las dimensiones que rigen la vida social– se convierte en *programa*, en instrucciones, órdenes, en el seno de un *ecosistema bio-antropo-social*. Es decir, en el marco de un entorno físico, biológico y social, la ciudad se coproduce con la sociedad, produciendo históricamente modelos de *antropocenosis urbana* (Morin, 2009b), tal cual una *biocenosis ecológica*, produce modelos de organismos vivos que viven y se reproducen, en un espacio y tiempo determinado, que cambia con éstos, y que según sus propiedades y relaciones, *antropocenosis urbana* y *biocenosis ecológica* se hacen imprescindibles para los modos históricos de la supervivencia.

Lo técnico, lo biológico y lo social componen en esa medida, una antropología cibernética de la arquitectura, un universo complejo de mutua necesidad entre esas dimensiones de la realidad, que son imprescindibles para el hecho arquitectural.

"[…]. Así la historia de la producción del hombre por el hombre es inseparable de una recreación y redescubrimiento de las potencialidades genésicas de la *physis* por y para su sojuzgamiento." (Morin, 2009a, p. 280); mientras las formas de diseño, que son lo propio de las varias formas del mundo animal –y sus propiedades estéticas en tanto éstas, no son casuales, sino que contribuyen en la reproducción de la vida (Mandoki, 2013)– en su más alto grado de expresión, y racionalización, se muestran como facultades humanas, como lenguaje social, como conciencia social y como autoconciencia; siendo sus artefactos, portadores de funcionalidad, de técnica, de medios de vida, a medida que son también, portadores de semiótica, de contenidos simbólicos, es decir, a medida que los artefactos, además de satisfacer necesidades prácticas, satisfacen necesidades de la cultura, son productos de cultura, mediadores de cultura (Parente, *op cit*.).

En la *auto-eco-producción*, el *hombre genérico*[13] produce al hombre, a sí mismo y al otro hombre, a medida que produce sus objetos técnicos y artefactos, en forma de bienes materiales, de formas históricas de la producción[14]. Es la sociedad pues, la maquinaria social, la que produce al ser humano en cuanto ser humano, y a la vez la sociedad, es producida por él; la sociedad es pues, la síntesis, histórica, evolutiva y compleja de la relación entre naturaleza y ser humano[15].

Mediante la producción material de objetos entonces, y de técnica, en tanto medios de objetivación, medios de vida, en tanto contenedores sociales, el ser humano, como *ser genérico*, exterioriza sus fuerzas genéricas, se humaniza y se materializa, se exterioriza como ser humano, por medio de la cooperación social que establece con los otros seres humanos (Marx, 1968).

Visto esto, el ser humano es complejo, multidimensional, de modo que una antropología compleja debe ubicar a la arquitectura y al urbanismo como sistemas[16], que están de hecho, condicionados, determinados por una estructura también

[13] "[…]. Yo incorporé su idea –Morin se refiere a Karl Marx– de hombre genérico a la idea de auto-eco-producción de la humanidad por ella misma. Pero ese hombre genérico se fue tornando complejo […], el *homo* no es sólo *sapiens* (racional) sino también *demens* (delirante); no es sólo *faber* (productor de útiles y de técnica) sino también *mythologicus*, productor de mitos y religiones; no es sólo *œconomicus*, movido por el interés material, sino también *ludens* (movido por el espíritu de juego y de gratuidad), e hice estallar la antropología restringida y mutilada de Marx por una antropología complejizada. […]". (Morin, 2010. pp. 11-12).

[14] "En la producción, los hombres no actúan solamente sobre la naturaleza, sino que actúan también los unos sobre los otros. No pueden producir sin asociarse de un cierto modo, para actuar en común y establecer un intercambio de actividades. Para producir, los hombres contraen determinados vínculos y relaciones, y a través de estos vínculos y relaciones sociales, y sólo a través de ellos, es como se relacionan con la naturaleza y como se efectúa la producción." (Marx, 1955, p. 75).

[15] La cibernética social, y la arquitectura en este caso, son modelos de *cibernética de segundo orden*, pues no únicamente se componen de sistemas físicos observados (de primer orden), sino de sistemas vivos y sociales, que son sistemas observantes, actuantes (Foerster, *op cit*.).

[16] "Entiendo por *arquitectónica* –cursivas de Kant– el arte de los sistemas. Puesto que la unidad sistemática es aquella que primeramente convierte al conocimiento común en ciencia, es decir, que de un mero agregado de ellos hace un sistema, […]. Aquello que llamamos ciencia no puede surgir técnicamente, en virtud de la semejanza de lo múltiple, […]; sino arquitectónicamente, […]". (Kant, 2014, pp. 844-845). El filósofo argelino-francés Jaques Derrida (1999), también recupera la noción de "arquitectónica" para pensar el arte de los sistemas, pero a diferencia de Kant, desde una posición explícitamente aplicable a la arquitectura.

multidimensional, por la estructura social, por el proceso económico, institucional, cultural, y por las formas comunicacionales subsecuentes, a través de las más variadas formas de conciencia social, de imaginarios, de *ideologías de lo técnico* que legitiman, que actualizan, *racionalmente*, técnicamente, formas de administración de la vida social (Zubieta Davezies, 2020).

Esto lleva a pensar pues, el carácter subordinado de los sistemas arquitectónicos, en tanto subsistemas que están insertos en otros superiores, entre ellos, el sistema económico, social, político-jurídico e ideológico-cultural, que determinan los roles y procedimientos de la arquitectura y el urbanismo (Segre y Cárdenas, 1982). Y así pues la arquitectura y el urbanismo operan como *campo social*, y en cuanto tal, operan como *estrategias de reproducción social*, a partir de la administración y la lucha, por la obtención de capital, por determinados *tipos de capital*[17] (Zubieta Davezies, 2021).

De lo último emerge pues, en la teoría cibernética, la idea contundente de la *subordinación de sistemas* (Pask, *op cit*.; Segre y Cárdenas, *op cit*.), de la *jerarquía de sistemas* (Boulding, 1956), de la ubicación de determinados tipos de sistemas que sólo son viables, *sistemas viables*, mientras interiormente, recursivamente, integran otros sistemas (Beer, 1967). Y en efecto la arquitectura, además de estar compuesta por subsistemas, es parte de sistemas mayores que la direccionan, que la determinan, y que a su vez, se insertan en ella, que la componen internamente, físicamente, técnicamente, biológicamente, social-mente.

V. Conclusiones

El argumento del presente trabajo, decanta en que la teoría de la arquitectura posee enormes posibilidades, para un amplio desarrollo desde el enfoque de la cibernética, sin embargo, la vinculación entre estos dos tipos de teorías, es históricamente exigua y contingente, en los medios de divulgación, teorización y enseñanza de la disciplina.

Como se ha visto, la cibernética implica trabajar con enfoques inter y transdisciplinarios, los cuales son fuentes importantes para la obtención de productos fecundos en las ciencias. Asimismo, el enfoque dialéctico y complejo, en el diálogo entre las ciencias, permite profundizar los conceptos que las disciplinas específicas por sí mismas, cercenan, limitan, entre ellos (como se ha visto), los conceptos de ciudad, ecología, organización, evolución, etcétera.

A pesar de las enormes potencialidades, el devenir histórico de la *cibernética*, la *teoría de sistemas* y la *complejidad*, como teorías integradoras de las ciencias, ha decantado en posiciones conservadoras, imponiéndose estos enfoques, a sí mismos, en sus versiones dominantes, límites propios e incompletudes, especialmente respecto a las ciencias humanas y sociales, y la naturaleza potencialmente política de su tratamiento científico. Es necesario recuperar pues, y desarrollar, el espíritu creador, y crítico de la teoría cibernética.

En el presente trabajo se ha desarrollado metodológicamente, un sistema básico de clasificación de las ciencias, a partir del análisis de tres tipos de movimiento de la realidad, a los cuales corresponden las diferentes disciplinas independientes: lo físico, lo biológico y lo social. Un cuarto modelo de ciencias, las del pensamiento y los roles del observador, será tema de otra discusión, sin embargo se adelanta que la cibernética en su tradición dominante, ha asumido con facilidad, aunque no en todos los casos, enfoques relativistas y especialmente idealistas al interpretar el rol filosófico del sujeto en relación al objeto.

En conclusión, se han propuesto las bases necesarias para una antropología de la arquitectura, desde el enfoque de la teoría cibernética. Se ha evidenciado pues, un horizonte gigante de nuevas posibilidades de acción, y teorización, para la arquitectura, el urbanismo y el hábitat, desde la cibernética, la teoría de sistemas y la complejidad; horizonte que es inaccesible desde la tradición dominante y autorreferencial, de la teoría tradicional.

[17] Capital económico, tecnológico, institucional, cultural, científico, etcétera.

References Références Referencias

1. Ashby, William Ross (1970). *Introdução à cibernética*. São Paulo: Editora Perspectiva.
2. Bartra, Roger (2014). *Antropología del cerebro. Conciencia, cultura y libre albedrío*. México: Fondo de Cultura Económica.
3. Beer, Stafford (1967). *Cybernetics and Management*. London: English Universities Press.
4. Bertalanffy, Ludwig von (1989). *Teoría General de los Sistemas. Fundamentos, desarrollo, aplicaciones*. México: Fondo de Cultura Económica.
5. Boulding, Keneth (1956). The general theory of systems. The internal structure of science. *Management Science*, Vol 2, pp. 197-208.
6. Crick, Francis (2008). *Qué loco propósito. Una visión personal del descubrimiento científico*. Barcelona: Tusquets Editores.
7. Derrida, Jacques (1999). *La metáfora arquitectónica*, en *No escribo sin luz artificial*. Valladolid: Cuatro Ediciones.
8. Foerster, Heinz von (1991). *Las semillas de la cibernética. Cibernética. Obras escogidas*, Barcelona: Editorial Gedisa.
9. Garretón, Jaime (1975). *Una teoría cibernética de la ciudad y su sistema*. Buenos Aires: Ediciones Nueva Visión.

10. Kant, Immanuel (2014). *Crítica de la razón pura*. Buenos Aires: Colihue.
11. Kant, Immanuel (2019). *Crítica del juicio*. Barcelona: Espasa Libros.
12. Le Corbusier (2001). *Mensaje a los estudiantes de arquitectura*. Buenos Aires: Ediciones Infinito.
13. Leibniz, Gottfried Wilhelm (2014). *Nuevo sistema de la naturaleza y de la comunicación de las sustancias, así como de la unión que existe entre alma y cuerpo*, en *Discurso de metafísica. Sistema de la naturaleza. Nuevo tratado sobre el entendimiento humano. Monadología. Principios sobre la naturaleza y la gracia*. México: Editorial Porrúa.
14. Luhmann, Niklas (2002). *Introducción a la teoría de sistemas*. México: Universidad Iberoamericana.
15. Mandoki, Katya (2013). *El indispensable exceso de la estética*. México: Siglo XXI Editores.
16. Marx, Karl (1955). *Trabajo asalariado y capital*, en *Marx-Engels Obras escogidas en dos tomos. Tomo 1*. Moscú: Editorial Progreso.
17. Marx, Karl (1968). *Manuscritos: economía y filosofía*. Madrid: Alianza Editorial.
18. Montaner, Josep María (2008). *Sistemas arquitectónicos contemporáneos*. Barcelona: Editorial Gustavo Gili.
19. Maturana, Humberto y Varela, Francisco (2003). *De máquinas y seres vivos. Autopoiesis: la organización de lo vivo*. Buenos Aires: Editorial Lumen.
20. Morin, Edgar (1994). *Introducción al pensamiento complejo*. Barcelona: Editorial Gedisa.
21. Morin, Edgar (1995). *Sociología*. Madrid: Editorial Tecnos.
22. Morin, Edgar (2009a). *El método 1. La naturaleza de la naturaleza*. Madrid: Ediciones Cátedra.
23. Morin, Edgar (2009b). *El método 2. La vida de la vida*. Madrid: Ediciones Cátedra.
24. Morin, Edgar (2010). *A favor y en contra de Marx*. Buenos Aires: Nueva Visión.
25. Parente, Diego (2010). *Del órgano al artefacto. Acerca de la dimensión biocultural de la técnica*. La Plata: Editorial de la Universidad Nacional de La Plata (EDULP).
26. Pask, Gordon (1969). The Architectural Relevance of Cybernetics. *Architectural Design*. John Wiley & Sons Ltd (London). September issue No 7/6.
27. Sánchez, Álvaro (1982). *Sistemas arquitectónicos y urbanos. Introducción a la teoría de los sistemas aplicada a la arquitectura y al urbanismo*. México: Editorial Trillas.
28. Segre, Roberto y Cárdenas, Eliana (1982). *Crítica arquitectónica*. Colegio de Arquitectos de Pichincha y Facultad de Arquitectura y Urbanismo (CAE-FAU). Quito: Editorial Fraga.
29. Wiener, Norbert (1969). *Cibernética y sociedad*. Buenos Aires: Editorial Sudamericana.
30. Wright, Frank Lloyd (1958). *El idioma de una arquitectura orgánica*, en *El futuro de la arquitectura*. Buenos Aires: Editorial Poseidon.
31. Zubieta Davezies, Santiago (2020). *Ideologías de la técnica. Discursiva arquitectónica de la modernidad*. La Paz: Fuerza Producciones.
32. Zubieta Davezies, Santiago (2021). Apuntes para una sociología bourdiana de la arquitectura y el hábitat. *Pierre Bourdieu, reflexiones en torno a su obra. Tlamelaua Revista de Ciencias Sociales*. Benemérita Universidad Autónoma de Puebla. Año 15, junio-agosto.

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Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

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Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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Global Journal of Human Social Science

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