Research Paper

Sustainable architectural and urban design: a tool towards resilient built environment

Milan SIJAKOVIC, TT Architects, London, UK

Ana PERIC, ETH Zurich, Institute for Spatial and Landscape Development, Zurich, Switzerland;
University of Belgrade, Faculty of Architecture, Belgrade, Serbia

Abstract

Simply understood as 'seeking opportunities out of crises', resilience seems to be a universal approach to cope with contemporary global challenges, such as changing climate, rapid urbanisation, loss of biodiversity, migrations, etc. As a majority of the current problems are of urban origin – i.e. they emerge in cities, where they also cause significant consequences on people, ecosystems and infrastructures, it is a city and its territorial sub-elements (district, neighbourhood, site, and building) that provide a prolific field for exploring the mechanisms towards resilient governance, planning and design. Under such an overarching agenda of urban resilience, in this paper, we focus on exploring the components of architectural and urban design as a tool for mitigating climate change. More precisely, as carbon dioxide emitted from the built environment is released into the atmosphere at an unprecedented rate, we explore the design patterns that help reduce CO₂ emissions to finally lessen the vulnerability index of urban systems. Scrutinising the relationship between the climate change and construction industry, we elucidate the concepts like sustainable construction, green buildings, and design for climate, among others. Finally, through the assessment of the adaptive reuse project in London, this paper identifies strategies of sustainable architectural and urban design aimed at curbing the effects of climate change and helping increase urban resilience.

Keywords

Urban resilience, adaptation, climate change, construction industry, urban and architectural design

1. Introduction

Out of all resources consumed across the planet fifty per cent are used in construction, as shown in Figure 1, which makes it one of the least sustainable industries in the world. However, contemporary human civilization depends on buildings for its continued shelter and existence even though our planet cannot support the current level of resource consumption (Edwards, 2005). Hence, the topics such as sustainable construction, sustainable architecture, sustainable design and similar, come to the fore and have been explored by numerous research bodies and professional organisations (Szokolay, 2004; Cepinha et al., 2007; Steffen et al., 2015).

Figure 1. Global resources used in buildings and global pollution. Source: Authors according to Edwards, 2005.

The link between sustainable development and the construction industry is extremely important considering the impact of this sector on all dimensions of the sustainable development. On the one hand, the benefits are seen in the enlargement of national wealth, and increased number of work ranks, thus addressing economic and social sustainability aspects. On the other hand, the construction industry clearly affects greater consumption of natural resources that, consequently, raises environmental loads (Cepinha et al., 2007; Edwards, 2005; OECD, 2003). More precisely, about 50 per cent of the natural virgin materials at the world-wide level are consumed by the construction industry that is far beyond the sustainable level. More than 40% of the produced energy is consumed in the Organisation for Economic Co-operation and Development (OECD) member countries, throughout the live cycle of the buildings, and approximately one third of the GHG emissions are produced by the built environment. Namely, 60 per cent of all resources globally go into construction (roads, buildings, etc.), nearly 50 per cent of energy generated is used to heat, light and ventilate buildings and a further 3 per cent to construct them. Further, 50 per cent of water used globally is for sanitation and other uses in buildings; 80 per cent of prime agricultural land, lost to farming, is used for building purposes; 60 per cent of global timber products end up in building construction and nearly 90 per cent of hardwoods. The environmental capital locked in buildings is enormous, as is the waste footprint from both the construction and demolition activities, making them one of the most significant users of raw material, but also a great waste streams producer. Given that buildings and cities are long-lived (Figure 2), they play a fundamental role in the realisation of sustainable development (Edwards, 2005).

Figure 2. Typical lives of different aspects of construction. Source: Authors according to Edwards, 2005.

The concept of sustainable construction appeared with the gradual recognition of the environmental responsibility of the construction sector. According to Cepinha et al. (2007), the sustainable construction aims at fulfilling two main objectives: (1) to minimize the negative impact of the constructions on the environment and, simultaneously, (2) to create and maintain healthful environmental conditions for the users of buildings or surrounding populations to the develop project. Consequently, the sustainable construction considers the materials, the ground, the energy and the water as its main resources. Kibert (2008) defines five basic principles of the sustainable construction in the following way:

- Reduce the consumption of resources;
- Reuse the resources to the maximum;

- Recycle materials of the end of life of the building and to use recycled resources;
- Protect the natural systems and its function in all the activities; and
- Eliminate the toxic materials and by-products in all the phases of the life cycle.

The 7th Environment Action Programme (1386/2013/EU) considers implementing sustainability in the construction sector as a tool towards a resource-efficient, green and competitive low-carbon economy. Notably, to improve resource efficiency beyond GHG emissions and energy means to reduce the overall lifecycle environmental impact of consumption. The way towards sustainability in the built environment and meeting the changing needs of the users is through informed design. According to Kincaid (2002: 94), physical sustainability objectives are concerned with the level at which energy transformation, material extraction and ecosystem impact can be allowed to occur in perpetuity in the creation and use of buildings and infrastructure. Therefore, sustainability and sustainable design should undoubtedly be one of the guiding strategies behind all future briefs.

The paper is structured as follows. After introductory remarks, the components of sustainable architectural design as a tool towards urban resilience are discussed in greater detail. Furthermore, they are empirically examined on the case of adaptive reuse of the hotel Z, Trafalgar in London. Finally, the paper identifies strategies of sustainable architectural and urban design aimed at curbing the effects of climate change and helping increase urban resilience.

2. Sustainable architectural design: the main components

Starting from the definition of the sustainable design as according to the “Declaration of Interdependence for a Sustainable Future” (IUA/AIA, 1993), to the overarching study on sustainable architectural design by De Garrido (2010), which provides a variety of the goals, strategies, objectives, and principles of sustainable architecture, the most comprehensive overview related to the built environment’s response towards the needs of its occupants, in any time and place, without jeopardizing the welfare and development of future generations is given in the “Whole Building Design Guide” (WBDG), setting out the objectives and principles of sustainable design. WBDG’s objectives are to (Kubba, 2012):

- Avoid resource depletion of energy, water, and raw material;
- Prevent environmental degradation caused by facilities and infrastructure throughout their life cycle; and
- Create liveable, comfortable, safe, and productive built environments.

Principles defined in the WBDG are as follows:

- Optimize site potential;
- Optimize energy use;
- Protect and conserve water;
- Use environmentally preferred products;
- Enhance indoor environmental quality; and
- Optimize operations and maintenance procedures.

The above prove that only parallel consideration of site, energy, materials and wastes can enable sustainable architecture. These four components constitute an overarching basis of a sustainable architectural design that goes beyond the features of an individual building to grasp the conditions of its immediate surroundings.

Site. All building activity disturbs the land which is a non-renewable resource. These disturbances should be minimized and its use should be avoided whenever possible, thus directly leading to the biodiversity

preservation (Szokolay, 2004). The use of already disturbed derelict land or the rehabilitation of neglected resources, should become a key strategy in all major developments. Protection and reuse of land and sites, and the need for brownfield development are powerful drivers for new approaches to sustainable city planning, while recycling of the building stock secures efficient design at the individual scale (Roaf et al., 2004; Sijakovic, 2015).

Energy. The energy conservation appears as a central concern in the quest for sustainability. As by 2050, the world is expected to double its use of energy, one of the main points in order to achieve sustainable construction should address the improvement of the energy performance in buildings (Edwards, 2005). Thus, we first have to recognize the amount of energy used to construct the building, and minimize it through good practices, as well as consider the renewable energy sources. By improving the energy performance of buildings a vast set of objectives can be reached (Cepinha et al., 2007: 116): (1) reduction of the global needs of energy production; (2) reduction of the emissions of carbon dioxide, and consequently of GHG emissions; (3) improvement of comfort in households and workplaces; (4) contribution for cleaner cities; (5) improvement of urban regeneration; (6) improvement of the health of the population and promotion of the social inclusion; and (7) increase the standards of living of the European citizens. As buildings are responsible for about 40-50% of the energy use in each member state of the EU, this makes them the main users of final energy (Cepinha et al., 2007). Furthermore, the residential sector is responsible for two thirds and the commercial sector for one third of the use of the energy in the buildings.

The energy in buildings is used at two levels, as: Operational energy (O), annually used for heating, cooling, ventilation, lighting and servicing the building, and Capital energy (C) or energy embodied in the materials and building processes. Regarding the latter, building materials can be divided into three broad categories: low, medium and high energy materials (Szokolay, 2004), as shown in Figure 3.

<i>Low</i> <1 kWh/kg	Sand, gravel	0.01
	Wood	0.1
	Concrete	0.2
	Sand-lime brickwork	0.4
	Lightweight concrete	0.5
<i>Medium</i> 1–10 kWh/kg	Plasterboard	1.0
	Brickwork	1.2
	Lime	1.5
	Cement	2.2
	Mineral wool	3.9
	Glass	6.0
	Porcelain	6.1
	Plastics	10
<i>High</i> > 10 kWh/kg	Steel	10
	Lead	14
	Zinc	15
	Copper	16
	Aluminium	56

Figure 3. Embodied energy of some building materials in kWh/kg. Source: Szokolay, 2004.

The concept of embodied energy highlights the high energy transport costs of bulky materials as stone, aggregates, brick, and concrete products and the high energy processing costs of some commonly used lightweight materials like aluminium (Edwards, 2005). The research in building material ecology have been focused on the avoidance of known hazardous substances with negative ecological impact, and today, embodied energy is widely accepted as an evaluation parameter for the environmental

sustainability of different building materials (König et al., 2010). The strong link between people, buildings and climate, which defines our energy needs, is represented in Figure 4.

Figure 4. The three-way interaction between climate, people and buildings that dictates our energy needs.
Source: Roaf et al., 2004.

Material. Due to the exponential growth of the population, the search for and consumption of the materials increased to the limits of available resources (Yeang, 2001). Through the extraction, processing, transport, use, and disposal, materials used in construction industry have enormous environmental impact. Natural resources used in construction, as roads and buildings, account for about one-half of all resource consumption in the world (Edwards, 2005). Hence, material selection must be influenced by the embodied energy, but also by a number of other issues affecting sustainability of their use (Szokolay, 2004). Embodied carbon assessment altered the way we analyse and source materials based on their carbon footprint. It considers how many greenhouse gases (GHGs) are released throughout the supply chain, including first phases of production and construction to the end of life. One of the methodologies which facilitates the selection of materials based on their environmental impact is an Environmental Product Declaration (EPD). An EPD is an independently verified and registered document, defined by International Organization for Standardization (ISO), which communicates transparent and comparable information about the life-cycle environmental impact of products. The EPD follows Life Cycle Assessment (LCA) methodology.

Waste. As towns and cities produce huge amounts of waste, including solid (refuse or trash), liquid (product of our sanitary arrangements: the discharge of baths, showers, basins, kitchen sinks and laundry tubs) and gaseous (mostly motor vehicle emissions and the discharge of power stations) wastes, architects have a strong influence on how wastes are disposed. Furthermore, the average waste produced is about 1 kg/pers.day in the UK, 1.5 kg/pers.day in Australia and up to 2.5 kg/pers.day in the USA (Szokolay, 2004). Collection, handling and disposal of waste is a problem, given that we are running out of space for the creation of garbage dumps. Combination of cheap energy, technical sophistication and abundance have caused excessive waste, and according to some predictions, global waste production will double over the next twenty years (De Graaf, 2012).

3. Case study: the Z Hotel Trafalgar

The building is located between Covent Garden and the commercial end of the Strand, as one of Central London's most diverse and exciting commercial and entertainment areas. It is positioned within the Core Central Activities Zone (CAZ), but is neither listed nor located within a Conservation Area.

The existing building, constructed in 1991, is comprised of ground plus five upper floors. The lower floors were dedicated to office use, whilst the top floor is in residential use with a three-bed penthouse apartment. The building benefits from a small basement area located directly underneath the main stair core. The two passenger lifts serve all floors, which are broadly rectangular in shape, with an average floor plate of 430sq.m (Figure 5). The level of natural light is high throughout the building, with generous windows on all three elevations. The property benefits from a rear courtyard, situated at the north of the building.

Figure 5. Ground floor plan before the intervention. Source: Courtesy of TT Architects.

The external appearance of the existing building is characterised by its damson sandstone cladding to the first two floors and the very distinctive black marble doorcase and parapets on ground floor. From second floor up, the building is clad in orange brickwork, with the window surrounds in the same sandstone as the lower floors. The sandstone is used again for the prominent building cornice, forming the guarding for the fifth-floor terrace. The corner is completed with a higher structure above the main entrance that protrudes above the fifth-floor roof, emphasizing the significance of the corner within the city context (Figure 6).

Figure 6. Chandos Place and Bedfordbury Elevations – materiality. Source: Courtesy of TT Architects.

3.1. Adaptive reuse scheme

This development has been designed for the change of use from an office spaces to a hotel for The Z Hotels Group. The Z Hotels provide a new concept of hotel focused on delivering a high-quality product, accessible to all, through the efficient use of space. The hotel intends to provide a feeling of comfort, luxury and relaxation in a compact floor area. This involves making efficient use of the existing building whilst retaining a significant amount of the building fabric, modifying only where required to create the room spaces. The proposed scheme re-uses an existing building through refurbishment and maximises the use of the site through the proposed rear infill, providing 139 vibrant and innovative hotel bedrooms.

The proposed use works well within the existing building, with minimal alterations to the external appearance and optimal use of the existing internal spaces. The floor plate is particularly well-suited to the introduction of hotel rooms around the perimeter of the building, maximising the number of spaces with windows benefiting from daylight. The reception and small food and beverage area are located at ground floor, connecting the main level access to the vertical circulation cores (Figure 7).

The main structure of the existing building was retained, offering many advantages: 1) avoiding the need for demolition works, 2) significantly reducing the time, noise and disruption of the works, and 3) embracing sustainable principles through reuse. The scale of the existing building was maintained and little change was proposed to the external appearance of the property. Externally, new openings were added on the Bedfordbury elevation, replicating the existing windows in size, position and elevation rhythm.

The rear courtyard extension upgrades the visual properties by using high quality materials and improves the biodiversity of the area by introducing vertical living walls. The organic configuration of the proposed massing helps integrating the rear facade of the building to the adjoining properties and softens the appearance of this northern elevation. Furthermore, introducing green wall design and placing natural elements within the courtyard also produces significant environmental benefits. Trees, shrubs, flower plants, as both garden and green-wall elements, within a courtyard significantly improve both thermal and visual comfort.

Figure 7. Ground floor plan after the intervention. Source: Courtesy of TT Architects.

Green walls can result in local reductions in concentrations of particulate matter, reduction in sound levels from emergent and traffic noise sources, and reduction of Urban Heat Island (UHI) effect in dense urban city centres. The proposed living wall uses lightweight, semi-hydroponic, modular panel system constructed from a patented, advanced Fytotextile® fabric. Each square metre holds up to 49 plants in individual pockets and each panel incorporates a dripline to irrigate the plants through the system (Figure 8).

Figure 8. Green wall - Fytotextile multilayer system (Source: Courtesy of TT Architects)

3.2. Sustainability strategy

The sustainability strategy for the proposed development focuses on the implementation of sustainable systems for site, energy, waste management and the use and choice of materials. The design team has considered the sites potential environmental impacts and how those impacts have been managed and mitigated in line with the prevailing spatial planning policies. The following planning policies have been used to inform the strategy and to ensure that the proposed development meets all requirements applicable to the site:

- European Policy - EU Sustainable Development Strategy (SDS)
- National Policy - National Planning Policy Framework Document (NPPF)
- Regional Policy - London Plan 2015 Policy 5.3 Sustainable Design and Construction
- Local Policy - Westminster City Plan: Strategic Policies: 2013

Some of the key implemented sustainable design strategies, observed through the lens of its main components – land, energy, material, and waste – are provided below.

Site. London has a large population and a comparatively small land area. Land is a therefore a precious, finite resource. The efficient use of land requires that developments optimise the carrying capacity of land, that previously developed land is reused and that green spaces within London are protected and the opportunities for the provision of new open space are maximised.

Through the refurbishment, the usage of the building has been substantially increased without any adverse impact on neighbouring occupiers. The scheme achieves a high-density rating in an area with very good accessibility to public transport and makes good use of an existing underused building. The density has not been increased from the existing conditions. The footprint of the building represents the site boundary and as such there is no vacant land around the development site. As the scheme is a refurbishment, there were no changes to the existing conditions on site and no ground works and, therefore, the contamination risks were very low.

Energy. A number of energy conservation measures have been incorporated by the design team to reduce the overall energy load for the proposed development. The improvement to the building fabric reduced heat loss from the building and the low G-value of the glazing limited the solar gains. The hotel only has a heating/cooling during period of occupations which is in the evening and to some degree during the night. As the proposed lighting is from high efficiency LED lights, which will generally only be on in the morning and evening the lighting load will be limited. During the summer months the building will have a substantial cooling load, therefore heat will have to be rejected from the building. This rejected heat is then used to heat the domestic hot water. As the building has a south facing façade with a pitched roof, this was ideal for mounting PV panels, which were installed at an optimum inclination of 35°. The following energy efficiency measures have been implemented:

- Retention of the existing sub and super structure and load-bearing concrete elevations
- New efficient secondary glazing to all windows
- Replacement of all the existing plant with contemporary efficient equipment
- Reduction in the U-Value of the building fabric
- Improved air tightness
- High efficiency VRF/VRV air source heat pump systems
- Heat recovery ventilation systems with high efficiency heat exchanger and fans with a low specific fan power (SFP)
- 100% LED lighting with automatic lighting control and daylight dimming
- Heat reclaim from the air conditioning system to the domestic hot water

- Photo Voltaics

Material. Materials have been sourced from suppliers covered by an accredited environmental management system (EMS) such as ISO 14001 or BS8555 at extraction and process stages. This ensured that the environmental impacts of the materials have been measured and minimized, where possible, in the products manufacture. Similarly, recycled materials were utilized wherever possible to minimize the amount of raw material that would need to be obtained, and also to reduce waste. Re-used and reclaimed timber has been used for hording and shuttering for poured concrete. The insulation materials with a Global Warming Potential (GWP) of less than 5 and a low embodied impact relative to their thermal properties, determined by the Green Guide to Specification ratings, have been specified.

The demolition waste of the existing building has been re-used where appropriate. In addition, the design team reused materials produced during construction work and obtained additionally required aggregates from waste processing sites within a 30km radius of the site. Implementation of an asbestos management plan that minimizes the potential for future damage of the asbestos materials has been adopted. Asbestos materials have been removed prior to the commencement of any renovation or demolition works that may cause their disturbance.

Waste. The waste arising from refurbishment has been managed in line with the waste hierarchy. A pre-refurbishment audit has been completed to maximise the recovery of material. Wherever possible, the waste has been used on site partly as recycled aggregates. The materials were segregated prior to transportation to recycling centres. The strategy was to separate materials into 660ltr and 240ltr waste bins for the following: concrete; timber; glass; plasterboard; general waste. Recycling facilities were provided and the reuse and disposal of construction waste has been guided by a Site Waste Management Plan.

The hotel development minimized waste and ensured sustainable procurement of materials during construction and operation. Due to the nature of the hotel and the proposed energy efficiency improvements, the occupants during their stay will have a low carbon impact. Pollution arising from site activities has been targeted and minimized at all times. Overall, the proposed scheme achieves the high standards of sustainability as prescribed in planning policy and meets the criteria required by Westminster City Council.

4. Concluding remarks

There is a close link between the built environment and climate change. Rapid urbanisation, the spread of poverty in urban areas and the fact that most people live in cities have led to the ecological crisis reflected in the climate change, pollution and decrease of non-renewable resources.

The negative effects of the construction industry on our environment have been highlighted in this paper through the analysis of the impact of the building sector on the rational land use, energy consumption, use of natural material, and waste production. Given that 50 per cent of the global warming gasses and 40 per cent of the water pollution are building related, the building sector constitutes one of the biggest waste streams produced in Europe and is unquestionably the biggest polluter. Thus, it is beyond any doubt that the construction industry is one of the least sustainable industries in the world which significantly contributes to the climate change crisis.

The selected case of the Z Hotel Trafalgar is a successful example of an adaptive reuse due to the optimisation of the building site through the change of use from an office building to a hotel, and renovation of the existing building whilst maintaining its identity and contributing to the conservation of the entire neighbourhood area. The reuse of an existing building structure is far more sustainable than demolishing and rebuilding as it saves the embedded carbon stored in the building fabric and avoids a

considerable amount of disruption from demolition. The proposed scheme reuses an existing building through refurbishment and maximises the use of the available internal space.

The sustainability strategy focuses on the implementation of sustainable systems for site, energy, waste management and the use and choice of materials. Much attention has been drawn to reducing the environmental impact during operation as hotels are buildings with high occupancy and energy and water consumption and therefore have good potential for incorporating sustainable measures at that stage. The energy performance of an existing building was upgraded, and overall carbon reduced through energy efficiency improvements, along with the implementation of both low and zero carbon technologies. Photovoltaic panels have been specified to reduce CO₂ and provide electricity for the site while reclaiming heat from the air conditioning system has been used to heat the domestic hot water. Additional insulation and the introduction of secondary glazing to all windows improved the overall thermal performance of the existing building. Recycling facilities have been provided and the reuse and disposal of construction waste has been guided by a Site Waste Management Plan. The building has been designed to minimize air pollution over its lifetime and only environmental-friendly materials have been specified.

Adaptation strategies can help prepare the built environment to better withstand the effects of climate change. By combining various built environment strategies through complimentary policies and programs, multiple co-benefits emerge. Implementation of the sustainable design strategies across scales is an important step toward reducing GHG emissions, thereby mitigating climate change effects and promoting healthier living. Therefore, an integrated design process which disregards established discipline boundaries and combines various scientific fields, including architecture, physics, engineering, climatology, physiology and psychology must be implemented in order to conceive buildings able to ensure comfort and health for their inhabitants without impacting negatively on the environment.

5. References

- Cepinha, E., Ferrão, P. and Santos, S. (2007) 'The certification of buildings as an enterprise strategy of the real estate sector: a national scope analysis' in Bragança, L. and Cuchí, A. (eds.) *Portugal SB07. Sustainable construction, materials and practices: Challenge of the industry for the new millennium*. Amsterdam: IOS Press, pp.113-120.
- De Garrido, L. (2012) *La Práctica Proyectual del Nuevo Paradigma en Arquitectura: Teoría, Diseño y Proceso Constructivo [Design Practice of the New Architectural Paradigm: Theory, Design and Construction Process]*. Oviedo: Síntesis Arquitectura.
- De Graaf, R. (2012) 'Nothing New. On the Idea of Recycling' in Ciorra, P. and Marini, S. (eds.) *Re-cycle: Strategies for Architecture, City and Planet*. Milano: Electa S.p.A, pp. 50-63.
- Edwards, B. (2005) *Rough guide to sustainability*. London: RIBA Enterprises.
- Fischer, E. A. (2010) 'Issues in Green Building and the Federal Response: An Introduction', *International Journal of Energy, Environment and Economics*, 19(1), 149-181.
- IUA/AIA (International Union of Architects/American Institute of Architects) (1993) *Declaration of Interdependence for a Sustainable Future* [online]. Available at: http://www.comarchitect.org/wpcontent/architectsguide/declaration_of_interdependence_for_a_sustainable_future.htm (Accessed: 2 May 2020).
- Kibert, C. (2008) *Sustainable Construction: Green Building Design and Delivery*. New Jersey: John Wiley & Sons, Inc.

-
- Kincaid, D. (2002) *Adapting buildings for changing uses: guidelines for change of use refurbishment*. London: E & FN Spon.
- König, H., Kohler, N., Kreisig, J. and Lutzkendorf, T. (2010) *A Life Cycle Approach to Buildings*. Munich: Institut für international Architektur.
- Kubba, S. (2012) *Handbook of green building design and construction: LEED, BREEAM, and green globes.*, Waltham: Elsevier Butterworth-Heinemann.
- OECD (Organisation for Economic Co-operation and Development) (2003) *Environmentally Sustainable Buildings: Challenges and Policies*. Paris: OECD Publications.
- Roaf, S., Horsley, R. and Gupta, R. (2004) *Closing the Loop: Benchmarks for Sustainable Buildings*. London: RIBA Publications.
- Sijakovic, M. (2015) *Recycling Industrial Architecture: The Redefinition of Recycling Principles in the Context of Sustainable Urban Regeneration* (doctoral dissertation). Barcelona: Universitat Politècnica de Catalunya, BarcelonaTech.
- Steffen, W., Broadgate, W., Deutsch, L. Gaffney, O. and Ludwig, C. (2015) 'The Trajectory of the Anthropocene: The Great Acceleration', *The Anthropocene Review*, 2(1), 81-98.
- Szokolay, S. V. (2004) *Introduction to Architectural Science: the basis of sustainable design*. Oxford: Architectural Press.
- Yeang, K. (2001) *El Rascacielos ecológico*. Barcelona: Gustavo Gili.