DIAGNOSTIC REVIEW
OF DESIGN IN BRAZIL

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Brasília – 2014

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ABD – Associação Brasileira de Designers de Interiores

ABDI – Associação Brasileira de Desenvolvimento Industrial

Abedesign – Associação Brasileira de Empresas de Design

Abepem – Associação Brasileira de Estudos e Pesquisas em Moda

ABEG – Associação Brasileira de Empresas de Projetos e Consultoria em Engenharia Geotécnica

Abergo – Associação Brasileira de Ergonomia

Abradi – Associação Brasiliense de Designers de Interiores

Abraweb – Associação Brasileira de Webdesigners e Webmasters

ABRE – Associação Brasileira de Embalagens

ACDesign – Associação Ceará Design

Adegraf – Associação dos Designers Gráficos do Distrito Federal

ADG – Associação de Designers Gráficos do Brasil

ADP – Associação de Designers de Produto

AEND-Brasil – Associação de Ensino e Pesquisa e Nível Superior de Design do Brasil

AIGA – The Professional Association for Design

ANTAC – Associação Nacional de Tecnologia do Ambiente Construído

APCI – Agence pour La Promotion de La Création Industrielle

APDesign – Associação de Profissionais de Design do Rio Grande do Sul

Anpei – Associação Nacional de Pesquisa e Desenvolvimento das Empresas Inovadoras

Apex-Brasil – Agência Brasileira de Promoção de Exportações e Investimentos

BNDES – Banco Nacional de Desenvolvimento Econômico e Social

CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

CBDI – Centro Brasileiro de Design Industrial

CBrD – Coletivo Brasil Design

CBO – Classificação Brasileira de Ocupações

CCJ – Comissão de Constituição e Justiça e Cidadania

CDU – Cámara de Diseño de Uruguay

Cefet – Centro Federal de Educação Profissional e Tecnológica

CGI – Common Gateway Interface

CIIU – Clasificación Industrial Internacional Uniforme

CNAE – Classificação Nacional de Atividades Econômicas

CNCT – Catálogo Nacional de Cursos Técnicos

CNI – Confederação Nacional da Indústria

CNPC – Conselho Nacional de Política Cultural

CNPq – Conselho Nacional de Desenvolvimento Científico e Tecnológico

CNDI – Conselho Nacional de Desenvolvimento Industrial

Critt – Centro Regional de Inovação e Transferência de Tecnologia

CTASP – Comissão de Trabalho, de Administração e Serviço Público

DBA – Design Business Association

DCE – Divisão de Temas Educacionais

DME – Design Management Europe

IPR – Intellectual Property Rights

DZNW – Design Zentrum Nordrhein Westfalen

TBC – Technology-Based Company

EDC – European Design Center

EBA/UFBA – Escola de Belas Artes da Universidade Federal da Bahia

EIS – European Innovation Scoreboard

ESDI – Escola Superior de Desenho Industrial

FAAP – Fundação Armando Álvares Penteado

FAU / USP – Faculdade de Arquitetura e Urbanismo da Universidade de São Paulo

Finep – Financiadora de Estudos e Projetos

Fiesp – Federação das Indústrias do Estado de São Paulo

Firjan – Federação das Indústrias do Estado do Rio de Janeiro

FNC – Fundo Nacional de Cultura

Fucapi – Fundação Centro de Análise, Pesquisa e Inovação Tecnológica

Fumin/BID – Fundo Multilateral de Investimentos do Banco Interamericano de Desenvolvimento

GCI – Global Competitiveness Index

GNN – Global Businnes Network

PHPC – Personal Hygiene, Perfume and Cosmetics

IBGE – Instituto Brasileiro de Geografia e Estatística

ICSID – Internacional Council of Societies of Industrial Design

STI – Science and Technology Institution

IDS – International Design Scoreboard

IECON – Annual Conference of IEEE Industrial Electronics Society

IEL – Instituto Euvaldo Lodi

HEI – Higher Education Institution

iF – International Forum Design

INEP – Instituto Nacional de Estudos e Pesquisas Educacionais

INPI – Instituto Nacional de Propriedade Industrial

INT – Instituto Nacional de Tecnologia

Itdesign – Incubadora Tecnológica de Design de Produto

IxDA – Interaction Design Associationde Interação
KDPI – Korea Institute of Design Promotion
KTPs – Knowledge Transfer Partnerships
LABDIS – Laboratório de Design, Inovação e Sustentabilidade
LDSM – Laboratório de Design e Seleção de Materiais
MCTI – Ministério da Ciência, Tecnologia e Inovação
MDIC – Ministério do Desenvolvimento, Indústria e Comércio Exterior
MEC – Ministério da Educação
MinC – Ministério da Cultura
MinCIT – Ministerio de Comercio, Industria y Turismo
MOCIE – Ministério de Comércio, Indústria e Energia
MTE – Ministério do Trabalho e Emprego
TIC –Technological Innovation Center
OCDE – Organization for Economic Cooperation and Development
P&D Design – Congresso Brasileiro de Pesquisa e Desenvolvimento em Design
PACC – Programa de Competitividad de Conglomerados y Cadenas Productivas
Paiss – Plano BNDES-Finep de Apoio à Inovação dos Setores Sucroenergético e Sucroquímico
ParqTec – Fundação Parque de Alta Tecnologia São Carlos
PBD – Programa Brasileiro do Design
PBM – Plano Brasil Maior
RD&E – Research, Development and Engineering
RD&I – Research, Development and Innovation
PDE – Plano de Desenvolvimento da Educação
PDP – Política de Desenvolvimento Produtivo
PDR – Product Design and Development Research
PITCE – Política industrial, Tecnológica e de Comércio Exterior
SME – Small and Medium-sized Enterprises
PNC – Plano Nacional de Cultura
PNDI – Programa Colombiana de Diseño Industrial
PNPD – Programa Nacional de Pós-Doutorado
ProDesign>Pr – Associação para o Design do Paraná
Pronac – Programa Nacional de Apoio à Cultura
Pronatec – Programa Nacional de Acesso ao Ensino Técnico e Emprego
PUC-RJ – Pontifícia Universidade Católica do Rio de Janeiro
RAD – Red Academica de Diseño
RAIS – Relação Anual de Informações Sociais
RDAs – Agências de Desenvolvimento Regional

Redetec – Rede de Tecnologia

RHAE – Programa de Formação de Recursos Humanos em Áreas Estratégicas

SBDI – Sociedade Brasileira de Design da Informação

SCDesign – Associação Catarinense de Design

Sebrae – Serviço Brasileiro de Apoio às Micro e Pequenas Empresas

SEC – Secretaria de Economia Criativa

Senac – Serviço Nacional de Aprendizagem Comercial

Senai – Serviço Nacional de Aprendizagem Industrial

Senai – Cetiqt – Centro de Tecnologia da Indústria Química e Têxtil

Sesi – Serviço Social da Indústria

Setec – Secretaria de Educação Profissional e Tecnológica

Sibratec – Sistema Brasileiro de Tecnologia

SITRA – Finnish National Fund for Research and Development

SPC – Secretaria de Políticas Culturais

Sudene – Superintendência do Desenvolvimento do Nordeste

TCS – Teaching Company Scheme

Tekes – Finnish Funding Agency for Innovation

UAM – Universidade Anhembi Morumbi

UDESC – Universidade do Estado de Santa Catarina

EU – European Union

UEMG – Universidade do Estado de Minas Gerais

UERJ – Universidade Estadual do Rio de Janeiro

UFMA – Universidade Federal do Maranhão

UFPE – Universidade Federal de Pernambuco

UFPR – Universidade Federal do Paraná

UFRGS – Universidade Federal do Rio Grande do Sul

UFRJ – Universidade Federal do Rio de Janeiro

UFRN – Universidade Federal do Rio Grande do Norte

UFSC – Universidade Federal de Santa Catarina

UnB – Universidade de Brasília

Uneb – Universidade do Estado da Bahia

UNESP / BAU – Universidade Estadual Paulista "Julio de Mesquita Filho" Campus de Bauru

Unicenp – Universidade Positivo

UNIP – Universidade Paulista

Uniritter – Centro Universitário Ritter dos Reis

Unisinos – Universidade do Vale dos Sinos

Univille – Universidade da Região de Joinville

UWIC – University of Wales Institute, Cardiff	
WIPO – World Intellectual Property Organization	

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1. INTRODUCTION

This study presents a survey on the state of the art of Brazilian design, with the objective of increasing the understanding of this field and pointing out possible paths to strength the design sector. It also aims to serve as a basis for the development of actions and public policies geared towards boosting the Brazilian industry's competitiveness, with design as a strategic factor for gaining market share.

The real contribution of design to the industry's development, as well as its importance for an increase in competitiveness, has become evident through several studies. This is the focus that guides the development of this document, which is intended to become a framework by gathering information relative to Brazilian design.

This study was carried out with the support of researchers and experts, as well as several Brazilian institutes involved with the development of the design sector. Both primary and secondary data were gathered for the preparation of this document.

Our research efforts faced challenges inherent to the lack of sufficient data on Brazilian design. This reinforces the importance of this study as a framework for future research, as well as the importance of carrying out studies and developing indicators which may help the design sector to grow.

This document is divided into four main parts which guided our research:

- Understanding design in the manufacturing and service industries.
- The Brazilian design sector and variables that affect the business environment.
- International standards, their metrics and indicators.
- Design scenarios for Brazil.

Upon compiling information both directly and indirectly related to design, the sector's magnitude and potential for growth can be observed. At the same time, its weaknesses can be seen. This study seeks to be free from biased opinions, or from segmented critical analyses, and offers a reflection on the state of the art of Brazilian design based on specific, referenced data.

Our hope is that this study will help to strengthen the design sector and broaden the understanding of its importance for the Brazilian industry's development. It is hoped that it will enhance opportunities, expertise and potential for the role of design; and that the document will truly become a reference document for the development of a public design policy in Brazil.

2. APPROACH

The approach used in this study is represented visually in FIGURE 1, which shows that it was carried out in two main stages: 1) understanding the current setting for design in Brazil and 2) establishing future settings for design in the country.

FIGURE 1: METHODOLOGICAL PROCESS
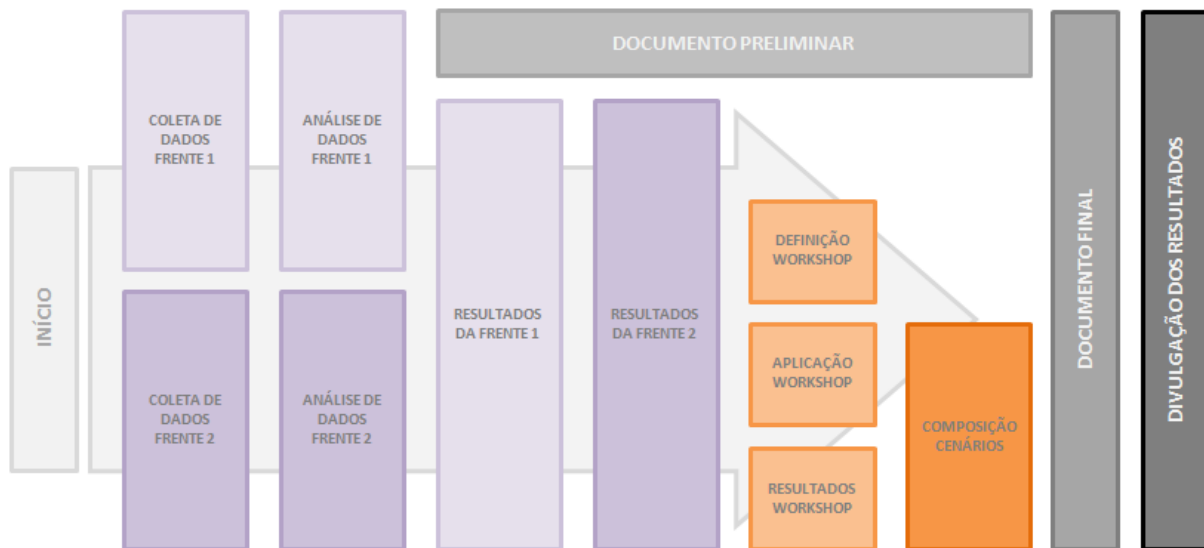
Source: The authors

The objective of the first stage was to enable the development of a situational diagnosis, i.e. to describe the landscape of the design sector and map its players, relationships and institutes using both quantitative and qualitative criteria. This diagnosis is to serve as a basis for planning public policies that foster the sector's growth in Brazil. This stage was carried out along two lines, which are described below.

Line 1 – Collection and Analysis of Primary and Secondary Data: this included gathering data and documents from November 2013 to January 2014. The process was divided, carried out, and is presented in two sections:

Collection of primary data on design from the manufacturing and service industries, including the following sectors: Machinery and equipment; medical and hospital; personal hygiene, perfume and cosmetics (PHPC); furniture; food product packaging; footwear; textile and clothing; wall and floor tiles; and audiovisual.

Collection of primary and secondary data on the design sector, including the following essential and structural aspects: breakdown of design companies by field of operation; number and approximate distribution of design companies in the country; number of designers and positions; training; designer profiles; number of graduates; continuing education; promotion initiatives; support bodies; professional associations; scheduled design events and awards;

specialized publishers and magazines; electronic bulletins; academic journals; international references, their metrics and indicators.

For the first section, the information was obtained from primary data, using the Design Staircase questionnaire published by the Danish Design Center, to determine the level of use and the presence of design in the indicated sectors.

In the second section, the selected data were taken from official sources, studies previously conducted, and other secondary sources listed in the presentation of results. For items related to the number and approximate distribution of design companies in the country, and the number of designers and positions, a field study was conducted through an online form.

Line 2 – Analysis of Variables Affecting the Business Environment: this contains an analysis of variables which affect the business environment in the design sector.

This analysis was carried out through review of national and international literature, conference proceedings, websites and journals specializing in design and, when relevant, consultation with design institutes and/or experts, including the following topics: market; technology; talent; investments; lines of financing and technical and management support; production of knowledge; and the political-institutional environment.

Literature and database information was required to be scientific in nature, come from reliable entities, and found in references published in the past ten years. The information was critically analyzed, processed, organized, summarized in tables, and georeferenced. Based on evidence from this work and analysis of the information contained in the materials that were researched, we were able to map the actual status of design in Brazil.

In order to understand future scenarios for design in the country, the second stage used information gathered in the first stage. Then, after several technical and economic factors had been weighted, future perspectives were created for the sector considering at least three cases that range from conservative to optimistic. The development of the scenarios was divided into eight phases:[1]

- Identification of the primary issue.
- Identification of key factors (microenvironment).
- Identification of driving forces (macroenvironment).
- Ranking of critical uncertainties.
- Definition of the logic of the scenarios.
- Description of the scenarios.
- Analysis of the implications and options.
- Selection of primary indicators and signposts.

In addition to the information gathered through the study, a questionnaire was created and sent to 40 experts all over Brazil in order to establish the basis for the development of a workshop with

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[1] SCHWARTZ (1996)

designers. Twenty-five of them responded to the questionnaire, highlighting fundamental issues for the growth of Brazilian design. The information was compiled and served as a reference to design the workshop.

On March 20 and 21, 2014, a workshop was conducted, which included experts representing diverse fields of Brazilian design. The several scenarios which emerged from the workshop underwent a SWOT (strengths, weaknesses, opportunities and threats) analysis, with a view to analyzing the results.

The two stages of the study and their different phases and approaches resulted in this document, which presents a detailed study on Brazilian design, from its current structure up to a future vision of the sector's sociopolitical and economic system, enabling new advances to be consciously realized. Programs and indicators were also studied, allowing us to compare the national context with relevant international studies and contexts.

The results aim to support the federal government in its decision-making process for the formulation of objectives, guidelines and institutional strategies to consolidate and develop a design policy meant to further the domestic industry's competitiveness.

3. DESIGN IN THE MANUFACTURING AND SERVICE INDUSTRIES

This part of the project includes, firstly, a review of the use of design by Brazilian industry; secondly, an overview of the relationship between design management and exports; and thirdly, the 'International Design Scoreboard', which utilises seven specific indicators to compare the national design capabilities and skills of several countries.

3.1 DIAGNOSTIC REVIEW OF THE USE OF DESIGN IN INDUSTRY

This phase provides a detailed analysis of the current utilisation and management of design of nine Brazilian manufacturing and service sectors. Data was gathered directly from the following sectors:

- Machinery and equipment manufacturers.
- Medical/ dental/ hospital equipment manufacturers.
- Personal hygiene, perfume and cosmetics (PHPC) manufacturers.
- Furniture manufacturers.
- Food packaging manufacturers.
- Footwear manufacturers.
- Textile and clothing manufacturers and retailers.
- Wall and floor ceramic tile manufacturers.
- Audiovisual studios and consultancies.

Data gathering for the purposes of the analysis was performed through an online survey conducted between September 30, 2013, and January 27, 2014, with a total of 350 respondents. During the information-gathering period, participation was constantly monitored and all efforts were made to increase the number of participating companies, especially from sectors with a lower number of representatives. In addition, information in the same format from other Brazilian design surveys already in the possession of the researchers was added to the sample for analysis. During the entire stages of data analysis, processing and presentation, all of the data collected from the participant companies were kept and will continue to be kept anonymous.

3.1.1 THE SAMPLE

Once the data collection phase was completed, the data set was formatted and the total number of complete datasets was 266. TABLE 1 below shows the number of completed datasets by company size (measured by number of employees). The classification by company size was adapted in order to facilitate comparisons with the researchers' current database of design practices in Europe.

TABLE 1: NUMBER OF COMPLETE RESPONSES
COLLECTED ACCORDING TO COMPANY SIZE

No. of Employees	No. of Companies
1	14
2 to 9	36
10 to 49	70
50 to 249	67
250 to 499	24
500 to 4,999	23
Over 5,000	4
Size not stated	28
TOTAL	**266**

SOURCE: The authors, 2014

The next step involved the distribution of data according to the sectors previously specified for the study. The emphasis of this exercise was on compiling data sets which best represented their sectors. The majority of sectors were very well represented in the study due to the sample size that was obtained. However, some sectors should be analysed with caution since their sample size was smaller and, in such cases, generalisations in the analysis could lead to an error. Participants that did not fit within the sectors listed in the current study (a total of 58 companies) were designated as "Other". Within the analyses, this category was only used when the sample analysed included all 266 participants, and was named "Brazil".

Infographics are shown below, along with explanatory texts, representing the analysis of the data collected in the study.

The infographic in FIGURE 2 shows the datasets (companies) separated by their respective sectors and indicated by a circle, the size of the circle represents the number of employees. The following is a description of each of the sector samples.

- **Machinery and equipment (22 companies):** According to the project briefing, the sample only includes companies that manufacture products and machinery for the farming industry, and manufacturers of components and machinery used to make plastic components. This is a diverse range of companies, of which 45% represent agricultural equipment and 55% from the plastics industry.
- **Medical/dental/hospital equipment (42 companies):** This category is a combination of manufacturing companies representing key domains in this sector: dental instruments and disposable items, surgical equipment, electromechanical devices, laboratory equipment and disposable items, and hospital furniture and accessories. The majority of the sample consists of companies with between 10 and 250 employees, and operating for more than ten years in the market.
- **Personal hygiene, perfume and cosmetics (PHPC) (7 companies):** All companies are small in size, with fewer than 50 employees, with the exception of one participant, which has 6,000 employees. This small sample offers some indications and directions about the sector. However, care should be taken when analysing the data set due to the occurance of a very large company in a sample of small companies.

- **Furniture (59 companies):** The best-represented sector in the study includes a large representation from furniture manufacturers in Rio Grande do Sul. The majority of companies provide customised furniture solutions. However, there are some companies in the database that do not work with customized furnishings and operate different business models.
- **Food product packaging (8 companies):** This was a small sample size, but from a highly specialised sector. Half of the companies from the data set are part of multinational companies. All offer packaging for different sectors and not only for food and beverages.
- **Footwear (20 companies):** All participants but one are Brazilian companies. These are well-established companies, the majority of which have worked in the business for over 20 years.
- **Textile and clothing (19 companies):** All participants but one are independent Brazilian fashion houses. There is a strong representation from women's fashion, but there are also companies focused on baby clothes, sportswear and menswear.
- **Wall and floor ceramic tiles (6 companies):** This is a small sample. However, all responding companies are Brazilian, with between 300 and 500 employees. Although small, the sample is significant for a specific type of manufacturer and size.
- **Audiovisual (25 companies):** This is the only non-manufacturing sector in the study. The majority of participants are media companies that produce content for commercials, TV, movies, and corporate clients. Some participants are also multimedia or specialise in a specific field, such as animation. Nearly all participants are located in São Paulo and Rio de Janeiro.
- **Other (58 companies):** This category does not represent a specific sector, but is part of the "Brazil" data set, which combines all data sets described above. It is composed of a wide variety of companies including retail, industrial equipment manufacturers, consultants, public bodies, and companies from the food industry.

The colors used in FIGURE 2 for each sector are used throughout all the infographics in this section. Each color represents one sector: Black for machinery and equipment; beige for medical/dental/hospital; green for personal hygiene, perfume and cosmetics; blue for furniture; yellow for food product packaging; red for footwear; purple for textile and clothing; light blue for wall and floor tiles; and pink for audiovisual.

FIGURE 2: SAMPLES FROM PARTICIPATING SECTORS
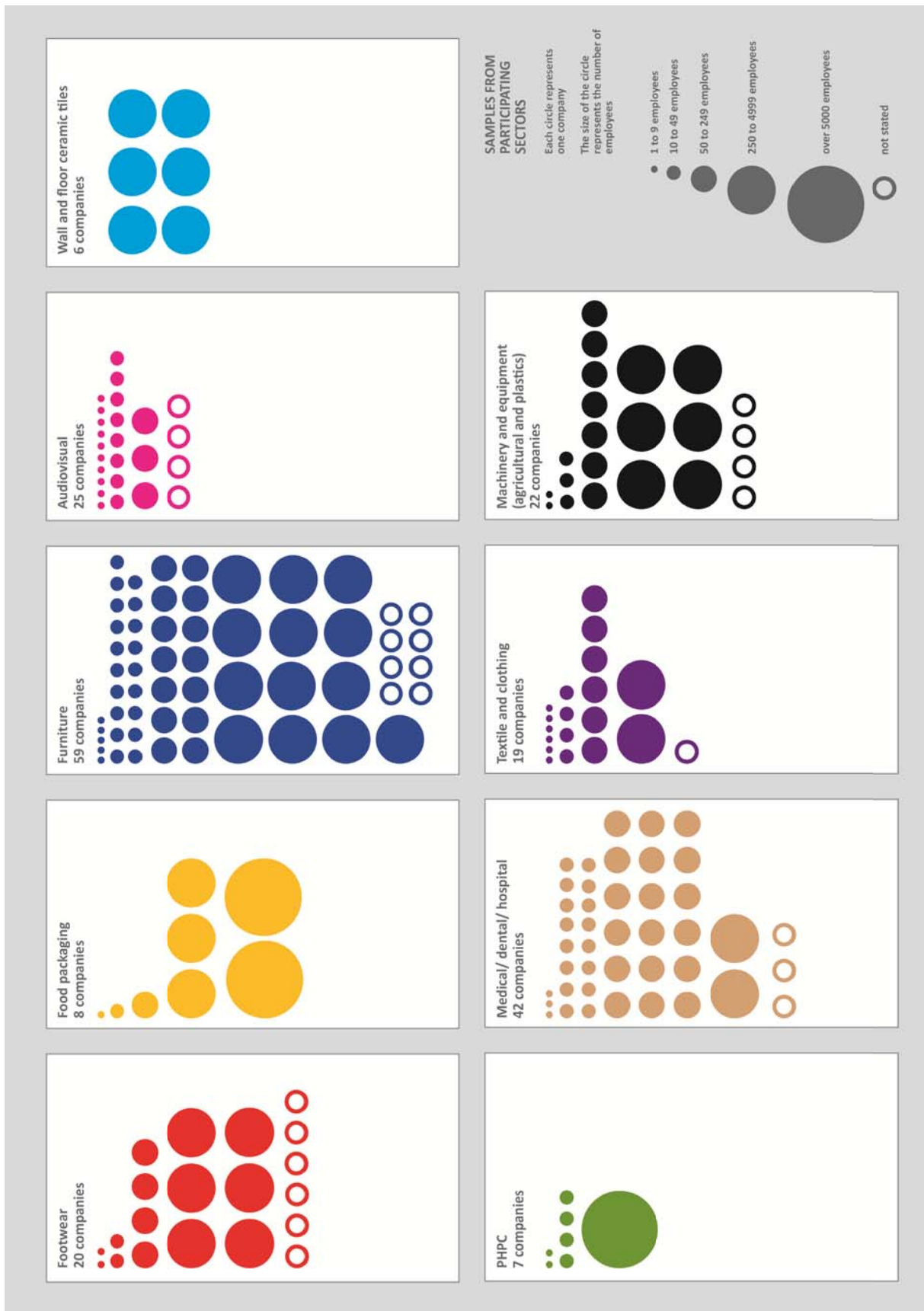
SOURCE: The authors, based on data collection and questionnaire, 2013

3.1.2 DISTRIBUTION

The infographic in FIGURE 3 is a map showing the geographical distribution of the companies that participated in the study. Each point represents one company and each color represents one sector, all of which are described in the key in the lower left corner of the figure. The bar chart on the right illustrates the distribution of sectors by state in Brazil.

From a quick analysis of the map, the concentration of companies located in the South of the country can be clearly seen. With regard to the states, only 11 of a total of 26 are represented in the studies, 5 of which are poorly represented: Goiás, Espírito Santo, Distrito Federal, Pernambuco and Rondônia states. The state of São Paulo is the one with the greatest number of companies in the study, with practically double the number of companies from Rio Grande do Sul, for example. Additionally, it is the only state that includes participant companies across all sectors covered in the study. The region surrounding the BR-050 federal highway can also clearly be seen on the map, since there is a large concentration of manufacturing plants along its route. On the other hand, the other states have specific concentrations from one sector or another.

Significant groupings can be observed on the map, such as the group of companies from the medical/dental/hospital sector, which are concentrated in the states of São Paulo and Paraná; audiovisual companies in São Paulo and Rio de Janeiro; the furniture industry is concentrated in Rio Grande do Sul and Paraná; the footwear industry is concentrated in Rio Grande do Sul and Minas Gerais; and textile manufacturers are concentrated in Paraná.

FIGURE 3: GEOGRAPHICAL DISTRIBUTION OF PARTICIPATING COMPANIES
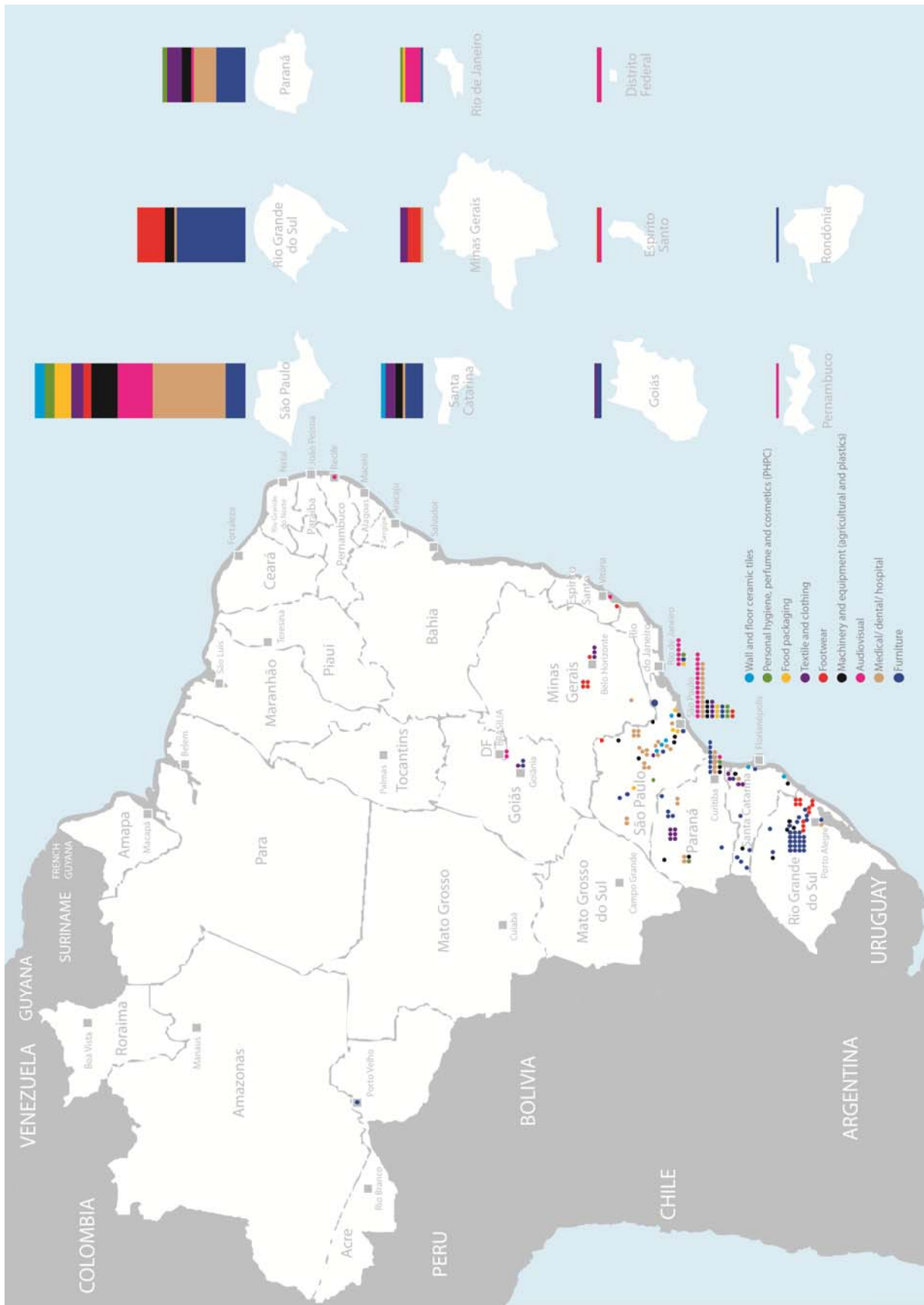
SOURCE: The authors, based on data collection/questionnaire, 2013

3.1.3 THE DESIGN MANAGEMENT STAIRCASE

The basis for this study is the Design Management Staircase (KOOTSTRA, 2009), originally developed by the Design Management Europe (DME) program to evaluate companies' design management capabilities. The evaluation tool ranks an organization's design management profile along four levels:

- **DM1:** Organisations at this level use design on an ad-hoc basis, with limited targets and guidelines. There is little knowledge available with which to handle design activities. Design activities tend to be unpredictable and yield highly inconsistent results, due to the lack of clearly defined procedures.
- **DM2:** These organisations use design only to meet direct business needs e.g. style changes or product improvement projects. Design is used as a finishing touch. Instead of being used to create added value through new products or services, it is primarily used as a marketing tool that adds value through styling, packaging, marketing communication, or visual identity. There is little or no collaboration between departments; and minimal co-ordination of design activities.
- **DM3:** These organisations entrust a dedicated employee or department with formal responsibility for the management of the design process. This person or department will act as an interface and point of contact for designers and other departments as well as manage-ment. In order to accommodate shortening product cycles, design is used proactively and becomes a permanent feature of product development.
- **DM4:** Organisations aspiring to establish themselves as market leaders through design innovation eventually begin to espouse design management as part of their culture. These organisations are highly design-driven and stand out because they have a differentiation strategy that revolves around design. Senior management as well as whole departments are closely engaged with design, and design is part of the organisation's main business processes. Design is in effect a way of life within these organisations.

The infographic in FIGURE 4 shows where each of the participant companies falls on the Design Management Staircase, which is based on a process maturity model under which a company's capability for managing design improves along with its experience. The staircase has levels, or "steps", ranging from "no design management" up to the highest step, "design management as part of the organisation's culture", as described above. In terms of these levels, the best company, that is, the one most capable of managing design, would be on the highest step of the Staircase, DM4.

For many companies, level DM3 is an excellent position, since it is a level at which design is integrated into the company's day-to-day operations. To be at the highest level, DM4, a cultural and strategic change is needed within the company, which may not be suitable for all companies, mainly for those whose main strategy is not design, and is not intended to be design. Companies working in sectors where design is used extensively, such as Furniture or Fashion, for example, or companies that intend to use design as a strategy, should aspire to reach the highest step, DM4.

FIGURE 4: DISTRIBUTION OF THE SAMPLE ALONG THE DESIGN MANAGEMENT STAIRCASE
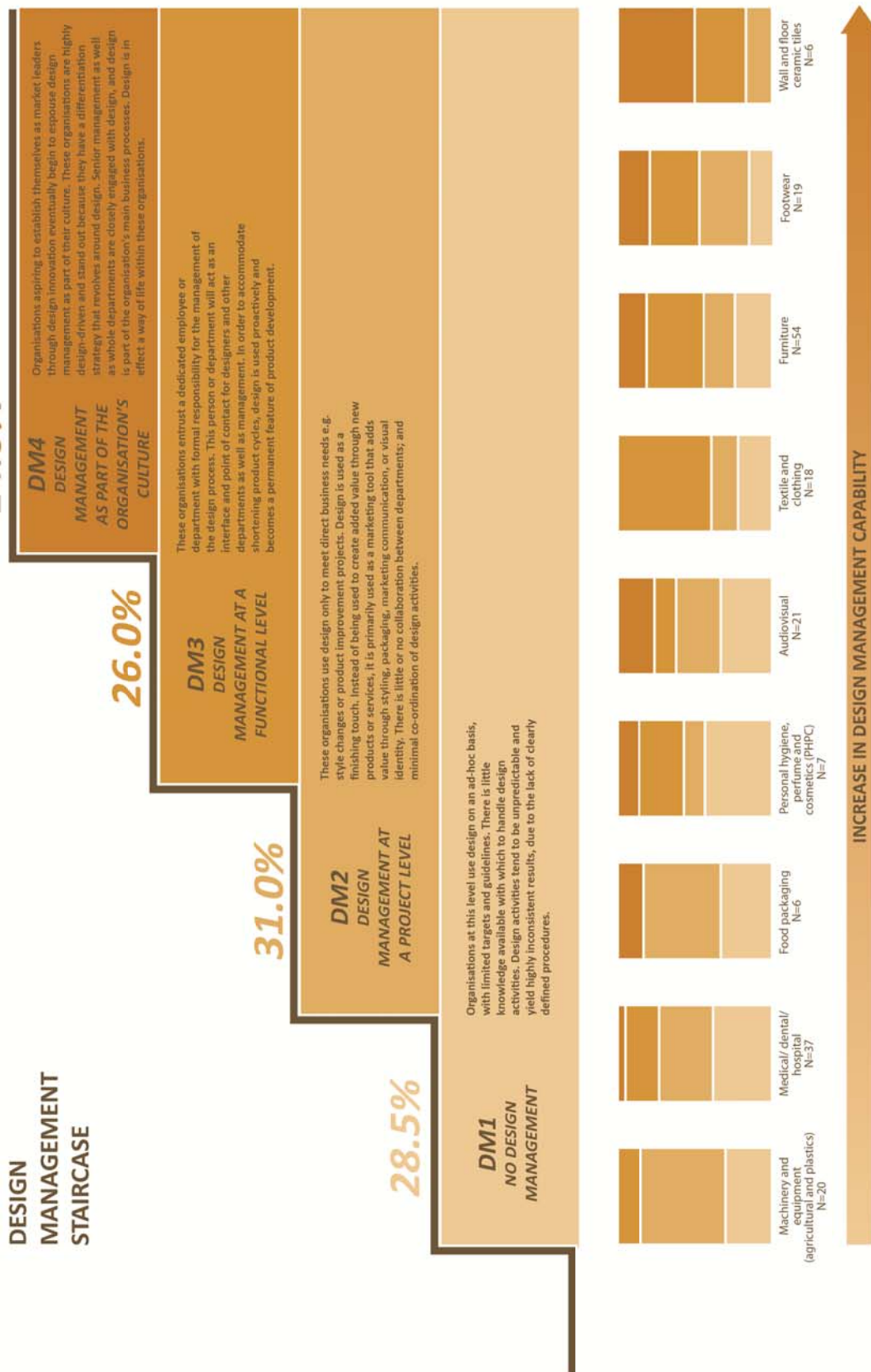
SOURCE: The authors, based on data collection/questionnaire, 2013

FIGURE 4 shows the distribution for the sample "Brazil" (which combines a total of 266 participating companies, including those who do not fit in the other sectors defined for the study) as a percentage on each step. A practically even distribution can be observed at the first three levels – 28.5% at level DM1, 31% at level DM2, and 26% at level DM3 – while the remainder, 14.5% of companies, are at level DM4. While these numbers are positive, there are some factors that should be taken into consideration when analyzing the graphic.

One important point is that the study was published under the title "Design and Innovation Study", so it is likely that only companies involved in design, or that have been recently involved with the design sector, would have been willing to answer. Of the 1,279 companies invited to participate in the study, only 350 accessed the questionnaire and, of these, only 266 filled it out. In addition, during the analysis of the 266 companies, we noticed that all of them had been in contact with design activities at least once. Within this context, the distribution tends to place companies at the higher levels of the Staircase.

In order to evaluate the Brazilian sample in more detail, it was compared to a sample from European countries. In 2008 and 2009, a similar study was conducted in Europe by the ADMIRE program in partnership with the European Commission through the PRO-INNO program, with the objective of evaluating the design management capability of European companies. The European sample was composed mainly of design consultancies, but it also included 206 manufacturing companies. This sample is similar to the Brazilian one, and the conditions for the study were also similar. The distribution of the sample from Brazil is compared below to the sample from Europe along the four levels of the Staircase.

TABLE 2: COMPARED DISTRIBUTION OF THE BRAZILIAN AND EUROPEAN SAMPLES

Levels of the Design Management Staircase	Brazilian manufacturing companies (n=204)	European manufacturing companies (n=206)
DM1	28.9%	22.3%
DM2	30.9%	27.7%
DM3	27.9%	37.9%
DM4	12.3%	12.1%

SOURCE: The authors, based on data collection/questionnaire, 2014

The table above shows a greater concentration of European companies at level DM3 compared to the Brazilian sample which, in turn, shows a greater concentration at the first two levels. However, the same number of companies is at the highest level, DM4, for both samples.

Upon analysing this comparison table between the samples from Brazil and Europe, it can be concluded that, in Brazil, design is not being used in an integrated manner within businesses to the same extent as European companies. On the other hand, for both results, there is an equal number of companies at the highest level, and these companies are the ones that use design as a vital component of their competitiveness strategy.

Along the bottom of FIGURE 4 are bar charts showing the distribution along the Design Management Staircase for each sector. The bar charts are ordered by sector from the lowest performance on the left to the highest performance on the right.

The wall and floor ceramic tile sector's performance ranks the highest, with 50% of its companies operating at level DM4 of the staircase. Although the sample size is small, with only six participating companies, the group is indicative of the sector's characteristics. The large porportion of companies at levels DM4 and DM3 shows the high level of design management capability in a very competitive sector, where design is a crucial part of product differentiation. In addition, the size of companies in the sector requires them to have advanced, effective design processes in place in order to integrate design into their operations and stay up-to-date with the industry's ever-changing consumer behavior and fashion trends. Another contributing factor that explains the high design management capability of this sector is their experience in design. On average, each company in this sector has 41 years of design experience. The Design Management Staircase model is based on process maturity and would explain the relationship between design experience and design capability, i.e. the more design experience, the greater the capability of making good use of this experience.

At the other end of the scale, the two lowest scoring sectors are machinery and equipment, and medical/ dental/ hospital. These sectors are not expected to use design as the main strategy for competitiveness (DM4) but should at least have design as a functional part of the organisation's operations (DM3), especially given the technical nature of the products and the important user interface required for the medical products. One possible reason for this is that these sectors have little experience in design, with an average of 12 years. On the other hand, other sectors with a similar average amount of experience are able to achieve better results from design, such as for example the personal hygiene, perfume and cosmetics sector, which has on average 9 years of experience; audiovisual and textile, each with 8 years; and furniture with 12 years of experience in design. However, the comparison may be considered unfair, since each sector has different design demands and abilities to manage it.

3.1.4 CONTRIBUTING FACTORS FOR DESIGN MANAGEMENT PERFORMANCE

In order to determine at what level the companies are, the Design Management Staircase model is based on an evaluation which considers five important factors for design management success. They are: awareness of the benefits of design; planning for design; design resources; expertise and process.

In FIGURE 5, the linear scale of the design management levels is shown along the horizontal axis, from DM1 to DM4; the vertical axis shows the five factors listed above. Each company is represented by a square, while the large circle on each line represents the average for the whole sector. Each sector is identified by the color assigned to it in this report.

FIGURE 5: CONTRIBUTING FACTORS FOR DESIGN MANAGEMENT PERFORMANCE
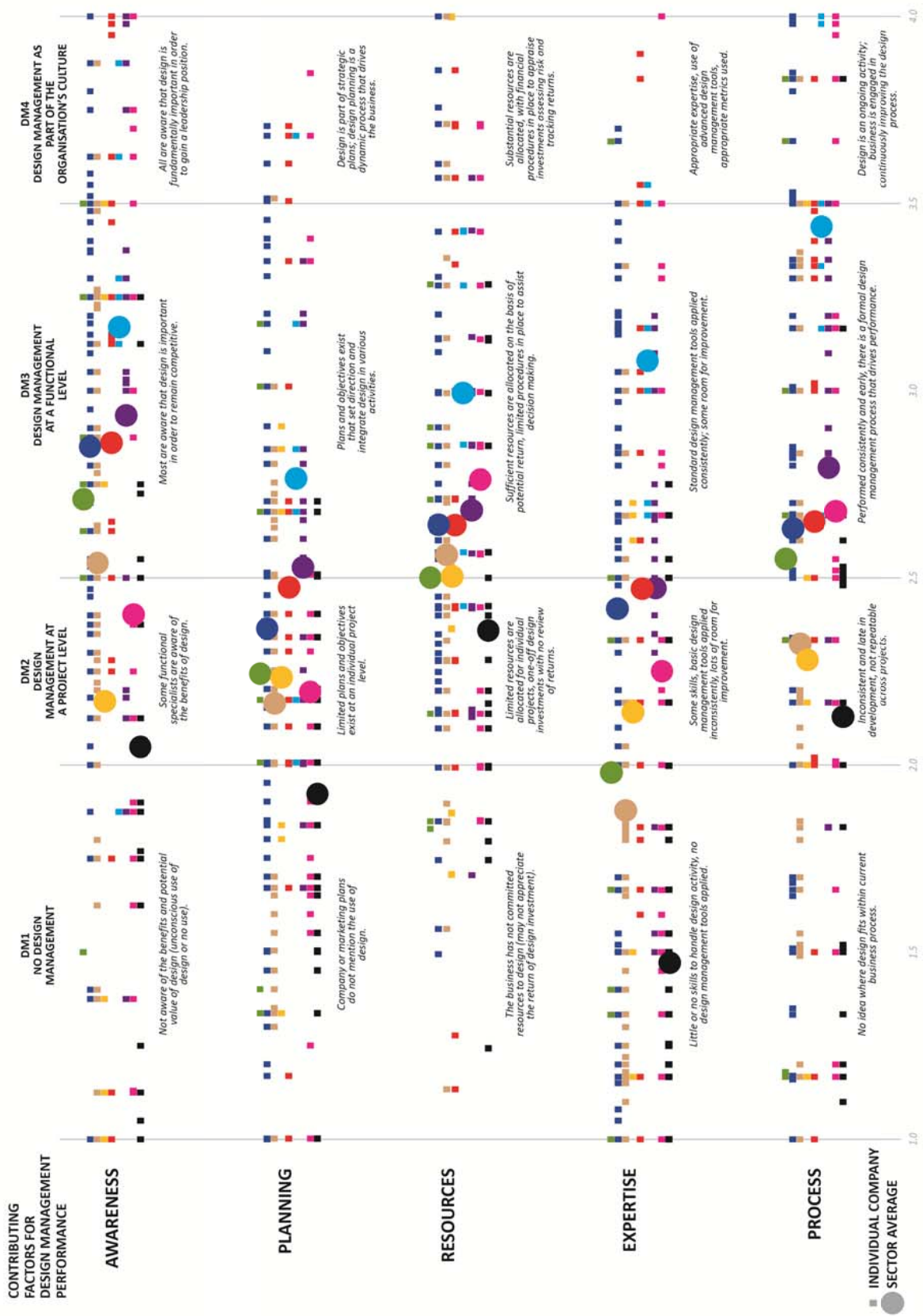
SOURCE: The author, based on data collection/questionnaire, 2014

The infographic in FIGURE 5 shows the high degree of variability in capability for design management among the different companies from each sector. For example, the furniture industry has companies (represented by the small squares) distributed along the scale for the Awareness and Process factors. This shows that the average, for this particular industry, is not extremely representative, but it does, however, help compare it with other sectors. Nonetheless, the graphic allows us to identify the concentrations and gaps along the levels for each factor.

For the Awareness factor, the companies are concentrated mostly at the highest levels of the scale, with very few at the lowest level, DM1. This provides evidence that companies in the sample are largely aware of the benefits that design can bring to their business.

The next factor, Planning, companies are concentrated mostly at level DM2, which is characterised by companies having limited plans and objectives for design. In addition, there is a low number of companies at the highest levels, with only 13 at the DM4 level.

The Resources factor is the strongest and most consistent, with a concentration of companies in the middle, at the DM2 and DM3 levels. The lowest level for this factor (DM1) has the lowest number of companies.

Expertise is the factor with lowest performance in the sample. This factor is a reflection of the Awareness factor and is concentrated at the lowest level of the scale. It is also the factor with the lowest concentration at level DM4.

Only the Process factor has a relatively similar distribution at all levels, which indicates a large variation in terms of design processes between the companies, even though they can be from the same sector.

The five factors determine a company's ultimate position on the Design Management Staircase. Therefore each sector's performance, in FIGURE 5, is directly related to its respective performance as illustrated in FIGURE 4. Comparing the sectors across the five factors, there may be a small distortion in the ranking. For example, the wall and floor tile sector consistently ranks at the top for each factor, and the machinery and equipment sector is frequently at the low end of the rankings. The least consistent sector is audiovisual, which falls into second place for Resources, and seventh for Awareness and Planning. This is not surprising, considering that audiovisual is the only sector that is not made up of manufacturing companies, in addition to the fact that they usually work with short and medium-term projects.

3.1.5   ATTRIBUTES FOR NEW PRODUCT DEVELOPMENT SUCCESS

New product development is an important component to be evaluated in design management and innovation. Because of this, the infographic in FIGURE 6 shows each sector's status regarding each success attribute for new product development.

FIGURE 6: ATTRIBUTES FOR NEW PRODUCT DEVELOPMENT SUCCESS

SOURCE: The authors, based on data collection/questionnaire, 2013

There are nine specific attributes for a company to be successful in product development (HESSELMAN, 2011). Unlike one-off design activities and the Design Management Staircase, these attributes represent the process that develops, manufactures, positions and sells new products in the market. In the infographic in FIGURE 6, each sector's average performance for the nine attributes is represented by radar charts wherein, the farther from the center, the greater the capability of that sector for that attribute. The overall average (for all attributes) is noted in the lower left corner of each radar chart.

The nine attributes are described below, as well as in FIGURE 6.

- **Strategy:** To what degree design is strategically used to make the company more competitive, more consumer-focused, and more innovative.
- **Multi-functional teams and fluent communication:** How design is integrated across a company's various departments.
- **Product/process leadership:** Are there people specifically responsible for overseeing the development of new products, and at what level of management do these people work?
- **Support and involvement by upper management:** Is design represented at the management level and considered a strategic aspect for the company.
- **Consumer involvement/focus:** To what extent consumers and users of the product/service are involved in the development and testing of new products.
- **Research and understanding of market needs:** The quality and variety of methods used to understand the market, its trends and competitors.
- **Financial and business analysis:** What procedures are used to help evaluate investments in design, assess risks, and monitor returns on investment?
- **Preliminary market assessment:** Are the market's needs clearly identified and considered at the start of the product development process.
- **Preliminary technical evaluation:** What procedures are used for analysing production and design requirements, in addition to monitoring costs at the initial stages of the process?

As in the infographic on design management factors in FIGURE 5, the performance for each attribute within each sector will show a large variation in capabilities. The averages shown in the radar charts allow us to compare and identify trends. In each sector, when comparing its design management staircase ranking against its new product development success attributes rankings, shows a small variation, as shown by TABLE 3 below. The two rankings are not directly related. Rather, they show two different but complementary abilities: the ability to develop new products/services and the ability to launch these new products/services on the market.

TABLE 3: COMPARISON OF RANKINGS

Sector	Design management staircase ranking	New product development success attributes ranking
Wall and floor ceramic tiles	1	1
Footwear	2	4
Furniture	3	3
Textile and clothing	4	2
Audiovisual	5	5
PHPC	6	8
Food packaging	7	6
Medical/ dental/ hospital	8	9
Machinery and Equipment	9	7

SOURCE: The authors, based on data collection/questionnaire, 2013

In TABLE 4 below, the attributes were ranked in accordance to the capability of all sectors, that is, the average from all sectors for each attribute. The first attribute is Product/Process Leadership for driving new products and development within the company. In smaller companies, this is usually a role played by the owner or CEO, who has decision-making authority and the power to control the progress of projects. In larger companies, this function generally falls to an employee who is dedicated exclusively to this activity or to a manager or senior-level employee.

Consumer Involvement/Focus is the attribute ranked the lowest. It is a weakness found in all sectors. This attribute relates to the end user's/consumer's involvement in new product development. It is a valuable and simple exercise for any product development process which aims to capture the opinion of end users and test out prototypes with them.

TABLE 4: RANKING OF NEW PRODUCT DEVELOPMENT SUCCESS ATTRIBUTES

Attribute	Ranking
PRODUCT / PROCESS LEADERSHIP	1
FINANCIAL AND BUSINESS ANALYSIS	2
PRELIMINARY MARKET ASSESSMENT	3
SUPPORT AND INVOLVEMENT BY UPPER MANAGEMENT	4
MULTI-FUNCTIONAL TEAMS AND FLUENT COMMUNICATION	5
PRELIMINARY TECHNICAL EVALUATION	6
STRATEGY	7
RESEARCH AND UNDERSTANDING OF MARKET NEEDS	8
CONSUMER INVOLVEMENT/FOCUS	9

SOURCE: The authors, based on data collection/questionnaire, 2013

3.1.6 REVENUE FROM INNOVATION

Innovation is a difficult activity to measure, since it can appear in many different ways, such as in products, new technologies, services, and even brands. One innovation indicator used in this study is the percentage of annual revenue from products/services new to the market and less than three years old. This metric is obtained through the following questions, which were carefully constructed to arrive at a specific measure.

With regard to design and innovation, please answer the questions below:

A: How many products and/or services does your company currently offer, excluding small variations on the same product?

B: How many of these products/services were launched onto the market in the past three years?

C: How many of these products and services were new to the market when they were launched? For example: the launch of a completely new, significantly better product, before others launched their competing products?

D: What percentage of annual revenue did these "new products" generate in 2012?

Analysing and cross-referencing the answers to the above questions is very important – specifically for question C – because if a participant launched a large number of new products on the market (question B), but these products were not considerably new (question C), then the value given by the respondent in question D would be zero, irrespective of the percentage given. This rule is used to ensure that the measurement comes from products that are actually new to the market and not old products that have been superficially made-up, or even feature slight changes that are not substantially new.

FIGURE 7 shows each sector's performance for this innovation metric and is illustrated in a circle diagram. Each sector is represented by two vertically aligned circles. The area of the larger circle indicates the average annual revenue for the companies in each sector, while the area of the smaller circle indicates the revenue from new to market products less than three years old for the same year. The circle areas are proportionate to values in reals, and median values for each sector were used (rather than averages). The sectors are ordered from the lowest revenue generated from new products (in reals), on the left, to the highest, on the right. The food packaging sector lacked enough data to make a concise diagram. However, with the little data that was obtained being represented only by lines, with no fill.

Below is the infographic in FIGURE 7, followed by the sector-specific analysis.

FIGURE 7: REVENUE FROM INNOVATION

REVENUE FROM INNOVATION

What is the percentage of annual sales resulting from new to market products?

Annual turnover R$

Sales from new to market products R$

* EU 35%
** EU 20%

Audiovisual — 25%
PHPC — 15%
Medical/ dental/ hospital — 7.5%**
Textile and clothing — 40%
Machinery and equipment (agricultural and plastics) — 7.5%*
Footwear — 25%
Furniture — 30%
Food packaging — Lacked enough data
Wall and floor ceramic tiles — 13%
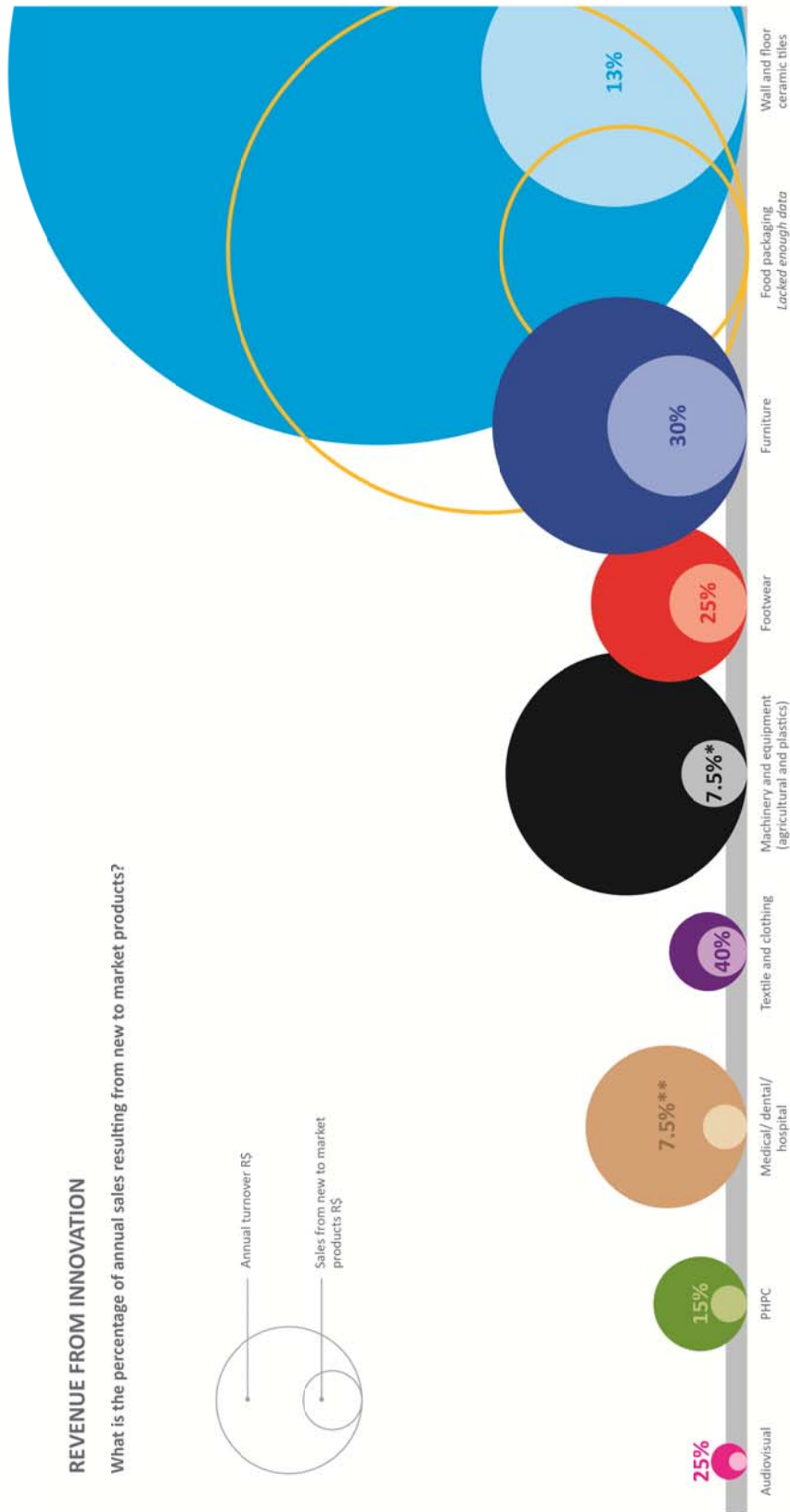
SOURCE: The authors, based on data collection/questionnaire, 2013

The wall and floor ceramic tile sector once again proved its ability to develop new products and make significant money from them. The large gains from new products in this sector explain the importance of good design management and effective new product development processes.

Audiovisual is the only creative sector in the diagram and made up only of small companies. Innovation for these companies does not come from new products, but rather from new services, such as animation, Common Gateway Interface (CGI) and multimedia platforms, among others.

Footwear (with 25% revenue from new products) and textile and clothing (40%) are the industries most likely to report a high level of revenue from new products, since they seek to be up-to-date in terms of trends and, therefore, they must deliver more assertive products to the market. However, upon analysis, it is arguable whether these sectors are truly innovative in an industrial context, even though they are companies with business strategies based on constantly maintaining a competitive advantage, seeking creativity and originality through the design processes.

The furniture industry is frequently considered the leader in design and the barometer for current design thinking and trends. Most of the companies in the furniture sample are located in Rio Grande do Sul, and offer products which are generally quite similar as well as offer customised services. While many of them may not be classified as providers of "state-of-the-art" design, they have shown themselves to be very receptive to new ideas and trends, offering a service which aims to meet clients' demands.

There are two sectors whose performance is significantly low: Medical/dental/hospital, and Machinery and equipment. The percentage of revenue from new products is 7.5%, while their European counterparts make around 20% and 35%, respectively. If these numbers were scaled up for the mediam figures given, that would mean that the medical/ dental/ hospital companies is losing a potential BRL 1,604,416.00 in revenue from new products each, and machinery and equipment makers are each losing BRL 6,300,000.00. If these numbers were scaled up to include all companies from both sectors that participated in the study, the equivalent would be BRL 200,000,000.00. It is no coincidence that these sectors lack strong capabilities for design management, product development, and innovation.

The values for the Personal hygiene, perfume and cosmetics sector must be treated with caution, since its sample only includes six small companies and a large one. The diagram in FIGURE 7 would be different if averages had been used. For this sector, it was not possible to draw reliable conclusions from this analysis based on the available data.

3.1.7   USE OF DESIGN

FIGURE 8 illustrates the use of different design resources per individual sector, with a series of icons. Each icon represents a different design resource, and the size of the icon represents how frequently it is utilised by companies in each sector. For example, all companies from the textile and clothing sector sample have an internal design team, compared with the medical/ dental/ hospital sector, in which only 31% of its companies have an internal design team. For some resources, an "X" is shown, which represents 0%. The icons are ordered by frequency of use. For example, the most used design resource by all sectors is the

internal design team, and it is positioned at the top. On the other hand, the least used design resource is the public subsidy for new product development, which is positioned at the bottom.

For many of the sectors the companies source their design capability largely from in-house design teams with little use of external consultants, such as the footwear, audiovisual, and textile and clothing sectors. This offers evidence for a characteristic of the fashion industry, where it is important to develop and control its own branding, design and style. The audiovisual sector is a little different, since it uses freelancers to a large extent as a design resource.

The use of freelance designers may be an indication of the companies' design teams' limited capability to deal with changing demands. It may also be indicative of a lack of planning when freelancers are hired to fulfill last-minute requests. The audiovisual sector makes great use of this resource, as does the personal hygiene, perfume and cosmetics sector. In the case of the audiovisual sector, this may be due to the nature of the projects within the sector. In the case of the personal hygiene, perfume and cosmetics sector, the high rate of its use of freelance designers may be explained by the characteristic seasonal demands in the market or the small size of the companies in the sample.

The food product packaging sector makes little use of the three design resources which are most commonly used by the other sectors: internal design department; external design consultants, and freelance designers. One possible explanation for this is that the companies work with clients who design their packaging themselves, giving the packaging manufacturer ready-to-go design work.

Other sectors, which make little use of the three most used resources, are medical/ dental/ hospital and machinery and equipment. The former is the only sector that uses external design consultancies more frequently. This is common practice in the medical/ dental/ hospital industry, which invests heavily in research and development, but only works with external designers at the end of the development process, to package its new technologies.

The wall and floor tile sector relies heavily on a wide range of design resources. The diversity of practices may indicate an ability to use and manage a broad range of resources. In a competitive market such as this one, it is necessary to have this ability in order to create advantages whenever possible. For example, the use of suppliers in the design process may be to maximize efficiency and technology gains.

The other design resources shown in FIGURE 8 are secondary resources, which are generally used to support the main design activities. This use of these resources is low for several reasons, but it indicates a lack of interest in looking for alternatives and original ideas which could aid new product development and design.

FIGURE 8: USE OF DESIGN BY THE DIFFERENT SECTORS

SOURCE: The authors, based on data collection/questionnaire, 2013

3.1.8   DESIGN DEPARTMENT SIZES AND THEIR SPECIALTIES

A company's internal design team is the most widely used design resource among the companies within this study. FIGURE 9 contains diagrams to illustrate the composition of the design teams in each sector. A house icon was used to represent the design department, and its size represents the average number of designers in that team. The icons inside the houses represent the different design disciplines represented, and their sizes indicate how frequently they are used.

On average, the food product packaging sector has the largest design teams as a proportion of the size of the companies, with about 6,000 employees. A design team in this sector is generally composed of graphic designers, architects or interior designers, and product designers, with a design manager to monitor project progress. The presence of an architect/interior designer in the sector is an unexpected factor, which would require a more detailed study to understand why.

The audiovisual sector is part of the creative industry and consists of small companies with large design teams. The average number of employees for these companies is 31, and the average number of members in their design teams makes up about a third of the total number. The teams in this sector are made up of graphic and multimedia designers, which is in line with the products they offer, which are, for example, movies, ads and websites.

Just as the wall and floor tile sector uses different types of design resources, its design teams also include a variety of disciplines. All main disciplines appear in the sample and this diversity demonstrates the knowledge that the sector has with regard to the benefits that each design discipline can bring. It is also evidence of its capability to apply design to different aspects of the company, not just to product development.

The smallest design teams (on average) are found in the personal hygiene, perfume and cosmetics sector, taking into account that one of the companies in this sector is several times larger than the others put together. The size of the other companies' design teams (with an average of 15 employees in total) is 1.5 designers, and all of these are graphic designers. The sector uses freelance designers widely as a way of dealing with variations in demand. For small manufacturing companies, it is a big commitment to employ a second designer.

There are no rules as to how many designers should be employed in a design team. The size of the team depends on several factors, such as the company's strategy, the complexity of its products, and its capability to manage its team and make effective use of the designers to add value.

FIGURE 9: DESIGN DEPARTMENT SIZES AND THEIR SPECIALTIES

SOURCE: The authors, based on data collection/questionnaire, 2013

3.2 DESIGN MANAGEMENT AND EXPORTS

This part of the study seeks to investigate whether there is a correlation between companies' design management capabilities and exports. CHART 1 shows the relationship between these factors by comparing the Brazilian and the European samples. Both samples represent manufacturing companies with a range of between 4 and 600 employees. The sample from Brazil includes 164 companies, and the European one includes 335.

The line chart shows the percentage of the sample for five different export volumes. Export is calculated as the average annual export as a percentage of turnover over the last three years. For each sample, each level of design management is represented by a different line color.

CHART 1: ANALYSIS OF EXPORT FREQUENCY DISTRIBUTED OVER
THE FOUR LEVELS OF DESIGN MANAGEMENT CAPABILITY

BRAZIL

Average values
DM1 = 9.8%
DM2 = 14.9%
DM3 = 8.2%
DM4 = 8.0%

EUROPE

Average values
DM1 = 28.2%
DM2 = 37.2%
DM3 = 41.3%
DM4 = 49.0%

DM4
Design management as part of the organisation's culture

DM3
Design management at a functional level

DM2
Design management at a project level

DM1
No design management

Percentage of the sample

Annual export rate as a percentage of turnover
(3 year average)
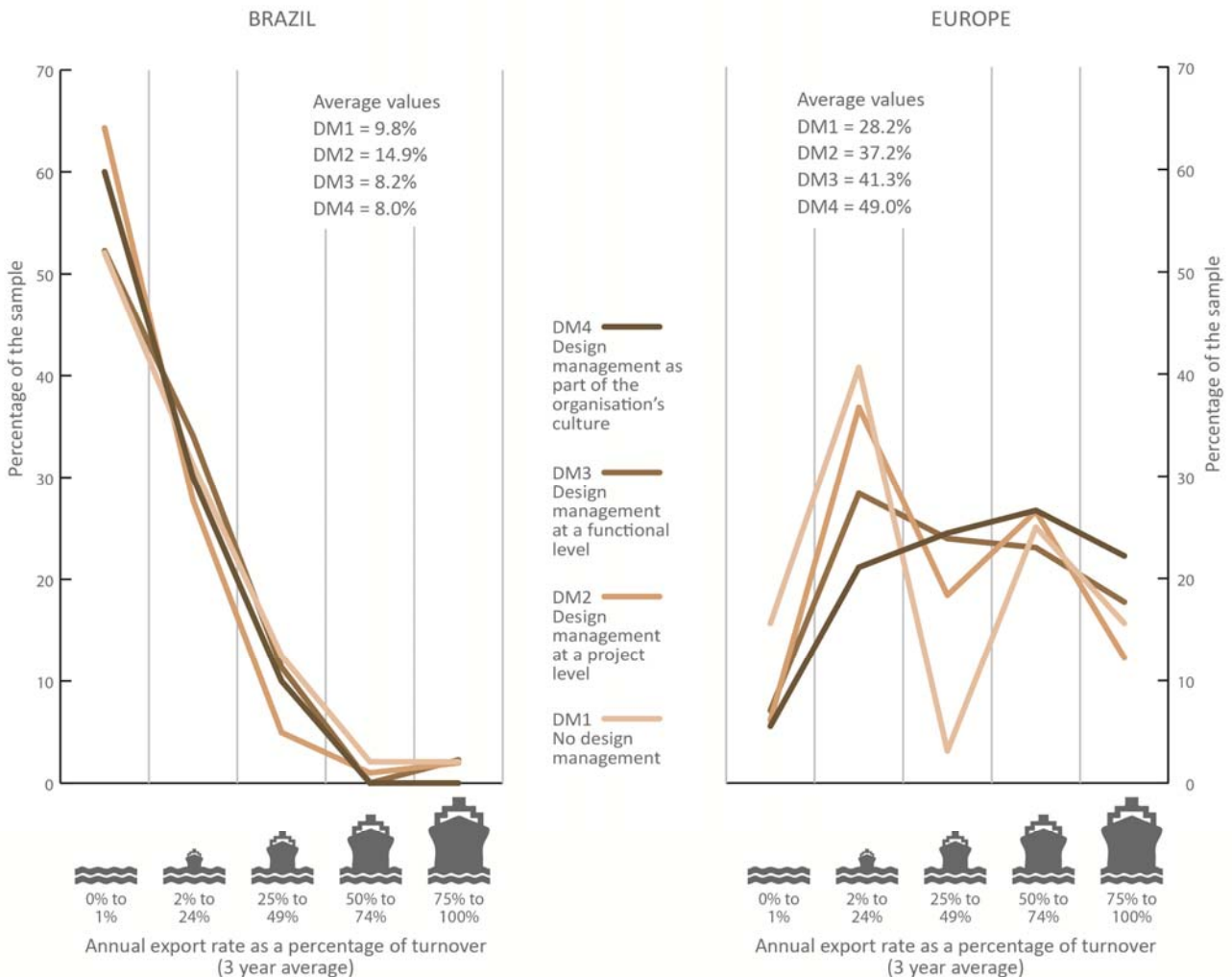
SOURCE: The authors, based on data collection/questionnaire, 2013

The line graphs show the frequency of the samples across five different export rates (measuring the average annual export rate over three years as a percentage of sales). Each of the four levels of management design in the samples is represented with different lines colours. On the left side graph the Brazilian sample drops rapidly in frequency as the export rate increases. The European sample on the graph on the right follows a "M" form with the exception of DM4 which follows a gradual increase in frequency as the export rate increases until the last rate when it drops slightly. A summary of average rates of export on the top of the graphs shows a linear increase in the rate of export as the level of design management increases for the European sample. Not so with the Brazilian sample.

To understand this better, we shall use CHART 2. This illustrates the perception of companies from the two samples are towards design's contribution to exports. It can be clearly observed that the European sample is well aware of design's benefits for exporting, while Brazil's shows the exact opposite.

CHART 2: PERCEPTION OF DESIGN'S CONTRIBUTION TO EXPORTS
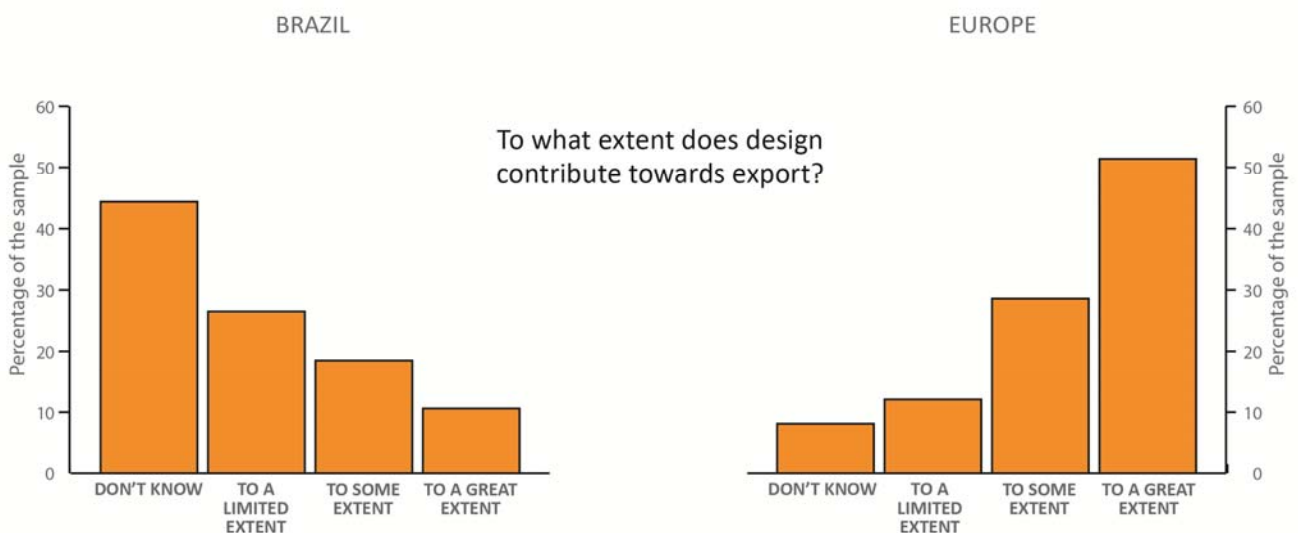
SOURCE: The authors, based on data collection/questionnaire, 2013

In another analysis, as shown in FIGURE 10, we can see that the sectors' average export reinforces the negative relationship between design and export in Brazil. The sectors least committed to design management, new product development, and making money from new products are among those that export the most. These are: Machinery and equipment, and medical/dental/hospital. The wall and floor tile sector, which showed the highest performance in the same metrics as before, is the second lowest in terms of exports.

Machinery and
equipment
(agricultural and plastics)
20.4%

Footwear
19.1%

Medical/ dental/
hospital
12.3%

Textile and
clothing
10.9%

Furniture
7.9%

Food
prackaging
7.6%

Audiovisual
6.2%

Wall and floor
ceramic tiles
5.9%

PHPC
3.3%
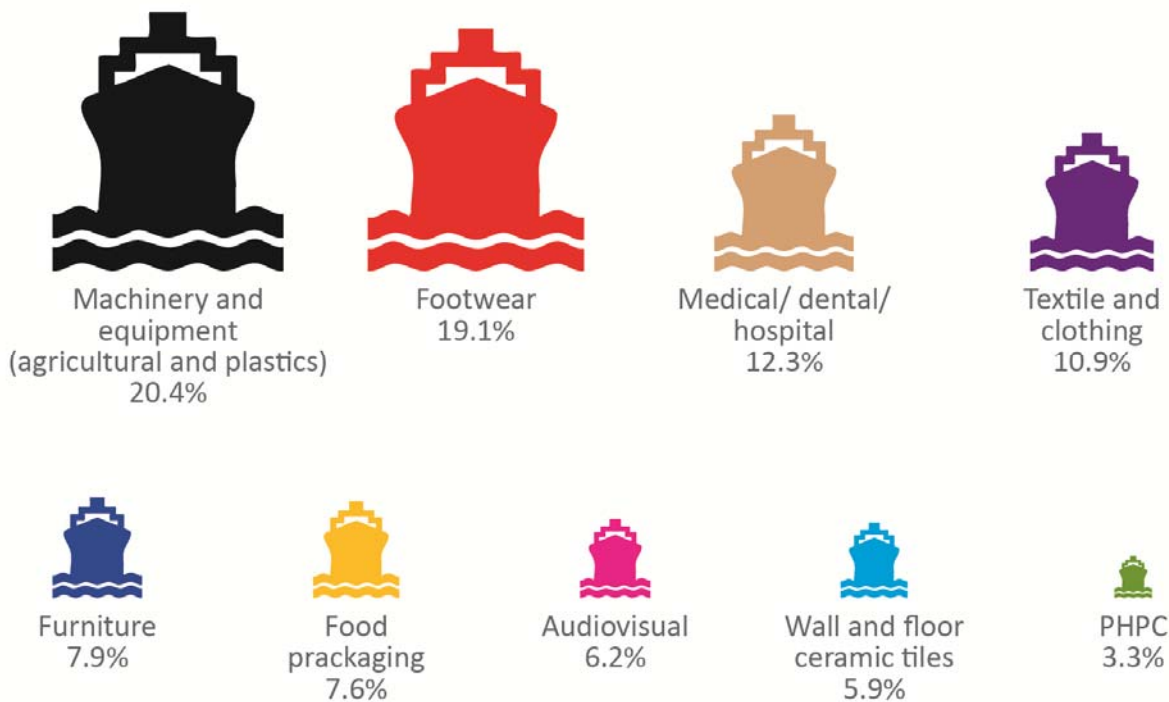
SOURCE: The authors, based on data collection/questionnaire, 2013

The explanation for this phenomenon is complex. When the European Union was formed in 1993 it created a free movement of trade between all the member states. With the trade barriers between the member states removed and an efficient infrastructure in place the conditions were made for companies to export more. There were of course new barriers to encounter including different languages, different currencies, national standards and different consumer buying habits. Companies who saw the potential in the wider European market adapted themselves to the new challenges presented to them.

This dynamic change in business culture in Europe can be seen in their appreciation for design to assist in exports. In order to export products to different countries there will be different demands on them, e.g. German product standards are different to Spanish product standards, trading standards in the UK are different to trading standards in Italy. Although the European Commission is working to homogenize many of these idiosyncrasies companies do encounter fiscal, cultural and trading differences. The most cost efficient way to accommodate these variables is during the design process, as changes made to a product after its launch can be very costly and possibly counterproductive.

Being able to meet the demands of different markets and still provide products and services to them indicates a strong capability for management and leadership within a company. Strong design management is often one of the many characteristics of good management practices within a company. In order to increase the potential for export, it is important to be good at managing design.

The conditions for a Brazilian company to export is very different than those for a European company. There are fewer accessible countries, due to the large distances and the significant topographical barriers. Commercial conditions vary from country to country and, in the absence of a common currency, national currency exchanges can vary a lot.

Brazil is the sixth largest economy in the world and sufficiently large enough for most of the companies who participated in this survey. The differences between Brazilian states can be as stark as the national differences in Europe e.g. different tax tariffs, different power supply voltages. To cater for all of these demands also requires significant skills.

The difference in attitude to design for export in Brazil could be linked to the low export rate of Brazilian companies. Because export from Brazilian companies is so low they do not identify such business opportunities with design but instead with selling, marketing, logistics, languages and administration. For the MOH and M&E sectors to have the highest exports rates of the sectors could be due to the specialised nature of their products and the business skills required in delivering them.

3.3   INTERNATIONAL DESIGN SCOREBOARD

To understand further the current state of design in Brazil, a methodology published in 2009 by the University of Cambridge (United Kingdom) was used: the International Design Scoreboard (IDS). The study began with the intention of collecting data from 20 nations, but there were only 12 with usable data. Even with its limitations, the exercise is valid for comparing the design sector's aspects and its impact on different countries. Although other comparative studies exist, the IDS has proved be more applicable and complete within the possibilities of data collection in Latin American countries. That is why it was selected for this review.

In this document, data on the original participant countries are shown as they were published in 2009; data collected recently on Brazil, Uruguay and Colombia are added in order to extend the study to Latin America, due to the lack of similar studies in the region. It is important to note that, when taking this position, the researchers recognise there are limitations in the data used and, therefore, sometimes the information cannot be compared because it was collected at different times. However, it is worth noting that this part of the disnostic review is presented as a reference and direction for future studies, and not necessarily as conclusive results. In any case, the results offer important information which may serve to guide the development of public policies on design.

When the IDS was first compiled and published in 2009, the researchers and their partners started with a list of 20 countries. What they discovered during the research project was how hard it is to find reliable and comparable data for all countries. In the end, it was only possible to include 12 countries, and countries with a significant design sector in the international scene did not participate, nor did emerging countries. Some of the countries that did not participate in the study are: Germany, France, Spain, India, Taiwan, China, Belgium and Brazil.

The problems encountered in 2008 to find data on the design sector in Brazil are still present today. Of the seven measures for design in Brazil, data on only five of them have been found or compiled. According to the methodology developed for the International Design Scoreboard a minimum of six

out of the seven metrics are required for a final ranking. Of the five metrics we have data on, it is still possible to provide some analysis and comparisons of Brazil's design capabilities. It has to be considered that the data from the original design scoreboard is on average ten years old. Recent additions to the scoreboard for Uruguay and Colombia are from 2012 data.

The IDS proposes a platform for a detailed analysis of each country's design system through a series of specific indicators. In the IDS study, seven indicators are used and each one uses two measurements: the absolute measurement (total size and/or value, number of people) and the relative measurement (per capita, percentage of GDP). Both measurements are important and, when combined, provide a complete overview for each country.

Not all indicators are simple to collect – some require specific strategies for their collection, and, in general, a lack of available data on design and the sector means that a greater systematisation of information is necessary.

The summary tables below presents the seven indicators that were used in the study, and their respective data source for each country: Brazil, Colombia and Uruguay. In Uruguay, the data was compiled between August and October 2013 by the team from the Cámara de Diseño de Uruguay (Uruguay Chamber of Design),[2] except for the data from the World Intellectual Property Organization (WIPO). In Brazil, the data was collected from December 2013 to February 2014, from several sources, as described in SUMMARY TABLE 1 below. Data for Colombia was gathered from December 2013 to January 2014, from various sources that are also described in the table below, with the assistance of Colombian researcher Claudia Marcela Sanz. The sources were existing references and interviews with several stakeholders, such as those from the Programa Nacional de Diseño.[3] TABLES 5 and 6 show the values and the countries' classification on the Scoreboard, both in absolute and relative terms.

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[2] The *Cámara de Diseño de Uruguay* (CDU) is a not-for-profit institution, which brings together businesses and institutions exclusively from the design industry. Its mission is to promote and strengthen development within the industry by fostering sustainable competitiveness and strategic positioning of Uruguayan products, culture and identity, thus contributing to the country's development. (CDU, s.d).

[3] The *Programa Nacional de Diseño Industrial* (PNDI) is an organization created in the early 2000s by the *Colombian Ministerio de Comercio, Industria y Turismo* (MinCIT) to stimulate and promote the insertion of design in the chain of production. It fosters the use of industrial design/product design as a driver for innovation in the manufacturing and service industries in Colombia, especially in micro, small and medium-sized companies by developing activities, projects, training, and information on the area (SARMIENTO, 2013).

SUMMARY TABLE 1: SOURCE OF INDICATORS USED IN THIS STUDY FOR LATIN AMERICAN COUNTRIES

INDICATORS	Data from Uruguay	Data from Brazil	Data from Colombia
Total public investment in design promotion and support	• Numbers from CDU, from different government bodies that support design. All values were converted to USD. • The GDP value was taken from an average of GDP values based on the *Informe de Cuentas Nacionales 2012* (Report on National Accounts), published by *Banco Central del Uruguay*. The value provided is consistent with other references available online.	• It was not possible to gather precise data on public investment at this stage of the study.	• Investment data was obtained directly from the Director of the PNDI – *Programa Colombiana de Diseño Industrial*. • The GDP value for 2012 was taken from the Legiscomex – *Información Estratégica de Comercio Exterior* (Strategic Information on Foreign Trade), from the category *Perfil económico y comercial de Colombia* (Colombian Economic and Commercial Profile). The value provided is consistent with other references available online.
Total number of design graduates	• Data from the CDU – *Cámara de Diseño de Uruguay*, obtained from a study on universities within the country. • The value for population was taken from the report *Uruguay en Cifras 2012* (Uruguay in Numbers 2012), published by the *Instituto Nacional de Estadística Del Uruguay* (Uruguayan National Institute of Statistics).	• Data was provided by *Centro Brasil Design*, obtained from the INEP – *Instituto Nacional de Estudos e Pesquisas Educacionais* (National Institute for Educational Studies and Research), in the document *Sinopse da Educação Superior 2012*. • Values for population were obtained from the official website of the OECD – Organization for Economic Cooperation and Development, for 2012.	• This number was obtained from a study conducted by the *Observatorio de Diseño Aplicado* (Applied Design Observatory) for 2013 as an initiative by the PNDI and the RAD – *Red Academica de Diseño* (Academic Design Network). • The value for population was taken from the accountant of the *Departamento Nacional de Estadistica* (National Statistics Department) from January 2014.
Number from WIPO for industrial design registrations	• The total number includes industrial design registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.	• The total number includes industrial design registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.	• The total number includes industrial design registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.
Total number of WIPO trademark registrations	• The total number includes trademark registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.	• The total number includes trademark registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.	• The total number includes trademark registrations for residents and non-residents for 2012, taken from WIPO's official website. • Value for population: see previous entry.
Total number of design companies	• Data taken from the *Plan de Refuerzo de La Competitividad* (Competitiveness Reinforcement Plan), from 2009. • Value for population: see previous entry.	• Data provided by *Centro Brasil Design*, obtained from an online questionnaire from November 2013 to January 2014. • Value for population: see previous entry.	• There is no agency in charge of collecting this information. The existing data is classified by the name of the company, and not by the CIIU (*Clasificación Industrial Internacional Uniforme* (Uniform International Industrial Classification), so all companies with the word "design" in their name are classified, which distorts the statistic.

Total revenue volume in the design sector	• Taken from the *Plan del Conglomerado – Informe Diseño* (Conglomerate Plan – Design Report (2013), published by IECON, and from the PACC report. • GDP data: see previous entry.	• It was not possible to collect this data because this type of information is not gathered for the sector in the country at this time. • Values for GDP were obtained from the official website of the OECD – Organization for Economic Cooperation and Development, for 2012.	• The number of design sector companies is not known, an additional study is required to collect this information.
Total jobs created in the design sector	• The number for persons employed by the design sector is an average of the estimated number given by the CDU (1 to 12 employees). This number was estimated from the number of design companies in the country (47), collected from the *Plan de Refuerzo de La Competitividad* (2009). • Value for population: see previous entry.	• Data provided by *Centro Brasil Design*, obtained from an online questionnaire from November 2013 to January 2014. • Value for population: see previous entry.	• The country dos not currently have this information. A specific study would be necessary for the number of jobs created by the design sector.

SOURCE: The authors, based on data collection/questionnaire, 2014.

TABLE 5: ABSOLUTE AND RELATIVE DATA FOR THE 15 COUNTRIES
ON THE INTERNATIONAL DESIGN SCOREBOARD

Absolute and relative data	PUBLIC INVESTMENT IN DESIGN		DESIGN GRADUATES		WIPO design registrations		WIPO trademark registrations		Number of design firms		Turnover of the design sector		Employment in design sector	
	US$m's	AS % OF GDP (x0.001)	Total number	per million pop.	Total number	per million pop.	Total number	per million pop.	Total number	per million pop.	Total t/o US$Bn	as % of GDP (x0.001)	Total number	per million pop.
BRAZIL	NA	NA	13,600	69	4,333	22	55,230	281	686	3	NA	NA	4,200	21
CANADA	NA	NA	3,308	102	2,178	69	22,878	701	12,411	380	2.37	2.130	44,000	1,402
COLOMBIA	0.257	0.00069	5,096	109	772	17	26,182	562	NA	NA	NA	NA	NA	NA
DENMARK	2.250	0.00760	450	82	1,166	217	7,694	1,416	2,860	534	0.7	2.400	2,846	531
FINLAND	2.200	0.00026	944	179	763	147	3,121	593	921	176	0.76	3.640	865	166
HONG KONG	2.560	0.01240	NA	NA	2,992	44	17,907	259	1,797	27	0.17	0.910	5,659	84
ICELAND	NA	NA	54	188	22	77	4,357	14,683	82	283	0.03	3.220	90	311
JAPAN	NA	NA	28,000	219	31,503	247	104,440	817	2,349	18	1.26	0.280	11,113	87
KOREA	68.800	0.06004	36,397	766	27,235	573	69,359	1,436	2,500	52	6.78	6.590	8,384	175
NORWAY	19.810	0.01018	167	37	683	151	8,088	1,739	927	203	0.15	12.950	1,483	325
SINGAPORE	26.120	0.16449	767	185	1,473	353	4,002	17,615	3,657	889	0.47	4.700	5,049	1,254
SWEDEN	5.590	0.01679	540	60	1,635	183	11,753	1,295	8,459	948	1.12	3.520	4,238	475
UK	11.890	0.00653	13,270	218	9,192	155	32,044	529	12,450	207	8.29	3.310	61,680	1,014
URUGUAY	0.211	0.00900	250	76	111	33	10,545	3,172	470	143	0.02	0.406	1,100	335
USA	0.000	0	38,000	131	15,451	54	154,812	518	30,485	106	19.51	1.620	141,390	469

SOURCE: The authors, based on data collection/questionnaire, 2013

TABLE 6: CLASSIFICATION OF THE 15 COUNTRIES ON THE
INTERNATIONAL DESIGN SCOREBOARD

Rank	PUBLIC INVESTMENT IN DESIGN		DESIGN GRADUATES		WIPO design registrations		WIPO trademark registrations		Number of design firms		Turnover of the design sector		Employment in design sector	
	US$m's	AS % OF GDP (x0.001)	Total number	per million pop.	Total number	per million pop.	Total number	per million pop.	Total number	per million pop.	Total t/o US$Bn	as % of GDP (x0.001)	Total number	per million pop.
BRAZIL	NA	NA	4	12	5	14	4	14	12	14	NA	NA	9	14
CANADA	NA	NA	7	9	7	10	7	9	3	4	3	8	3	1
COLOMBIA	9	9	6	8	11	15	6	11	NA	NA	NA	NA	NA	NA
DENMARK	7	7	11	10	10	4	12	6	6	3	7	7	10	4
FINLAND	8	10	8	6	12	8	15	10	11	8	6	3	13	11
HONG KONG	6	4	NA	NA	6	12	8	15	9	12	9	10	6	13
ICELAND	NA	NA	14	4	15	9	13	2	14	5	11	6	14	9
JAPAN	NA	NA	3	2	1	3	2	8	8	13	4	12	4	12
KOREA	1	2	2	1	2	1	3	5	7	11	NA	NA	5	10
NORWAY	3	5	13	14	13	7	11	4	10	7	10	1	11	8
SINGAPORE	2	1	9	5	9	2	14	1	5	2	8	2	7	2
SWEDEN	5	3	10	13	8	5	9	7	4	1	5	4	8	5
UK	4	8	5	3	4	6	5	12	2	6	2	5	2	3
URUGUAY	10	6	12	11	14	13	10	3	13	9	12	11	12	7
USA	11	11	1	7	3	11	1	13	1	10	1	9	1	6

SOURCE: The authors, based on data collection/questionnaire, 2013

3.3.1 ANALYSIS OF BRAZIL'S PERFORMANCE IN THE INTERNATIONAL DESIGN SCOREBOARD INDICATORS

3.3.1.1 DESIGN GRADUATES

For this indicator, the following domains were included: graphic design/communication, interior design, industrial design/product design, digital/web/multimedia design, and fashion design. This metric provides an indication of the scale of the design talent available for industry to choose from. In 2012, there were 13,600 graduates in design from Brazilian universities. This number is large and significant. However, in relative terms, compared to other countries, it is a low figure when considering Brazil's population. In relative numbers, we have 69 graduates per million inhabitants, which places Brazil in 12th place among 14 participant countries. Brazil only exceeds the Scandinavian countries Sweden and Norway.

3.3.1.2 INDUSTRIAL DESIGN REGISTRATION (WIPO)

Companies that submit a design (or industrial design) for registration with the World Intellectual Property Organization (WIPO) demonstrate an intent to export the product. In 2012, 4,333 applications were filed by Brazilian companies. This number places Brazil between the 13th (applications by residents) and 10th (applications by non-residents) places in the world in WIPO's ranking, and in fifth place in the IDS ranking. When the relative number is calculated, the result is 22 registrations per million inhabitants, so Brazil falls to 14th place in the IDS ranking, just ahead of Colombia (17 registrations per million inhabitants). Almost half of WIPO industrial design applications from Brazil were filed by non-residents. This low relative value may be due to several reasons. For example, the USA has a low score due to the size of its market, since the majority of American companies don't need to export to achieve commercial success. There is a similar reason for Canada, where companies have the American market next door and only need to protect their intellectual

property in this market for the majority of their exports. These are examples of each country having its own set of circumstances, making it difficult to draw conclusions from isolated statistics.

3.3.1.3 TRADEMARK REGISTRATIONS (WIPO)

The absolute value of 55,230 for Brazil puts the country in 11th place in the world according to WIPO and 4th according to the IDS. This is an impressive number, which is only exceeded by Japan, South Korea and the USA. Three-quarters of the applications in Brazil are filed by residents. In relative terms, the value for Brazil is 281 registrations per million inhabitants. Just as with other indicators, the relative value brings Brazil down on the scoreboard and its classification falls to 14th place, only ahead of Hong Kong.

3.3.1.4 NUMBER OF DESIGN COMPANIES

For this indicator, the following domains were included: graphic design/communication, interior design, industrial design/product design, digital/web/multimedia design, and fashion design. The review carried out in this project shows that external design companies are the second most popular design resource for industry (44%), and internal design teams showed themselves to be the main resource (61%). Considering the users of external design companies, 30% use this resource as their only source for design projects. On the other hand, 61% of users of design consultants in Brazil also have their own internal design department. The role of design companies within a national design system is of vital importance to help the industry to develop new products, brands and services, whether they have their own internal design teams or not.

The IDS indicator "number of design companies" shows the lowest performance for Brazil, for both relative and absolute values. With only 686 design companies identified in this research project, the number equates to only 3 design companies per million inhabitants. As a reference, the small country of Norway has 35% more design companies than Brazil does (based on 2003 data). The country showing the second lowest performance in terms of relative value is Japan, with 18 design companies per million inhabitants. It is very difficult to obtain precise numbers for this metric in any country. In some cases, the official records available include service companies in a general category called "creative industry". Even if the Brazil measure is inaccurate by as much as a factor of '2' it would still make Brazil the bottom of the relative rankings by a long way. This indicator shows a situation to be considered when it comes to developing public policies for the sector.

3.3.1.5 EMPLOYMENT IN THE DESIGN SECTOR

This is an indicator of the number of people employed by design companies in Brazil, including all employees and directors – not only people working as designers or in the design process. The same difficulties faced when measuring the number of design companies apply to this indicator. However, with a low number of design companies in Brazil, it is inevitable that its workforce would also be small, especially since this sector is dominated by companies with fewer than ten employees. According to a recent survey, the workforce in the Brazilian design sector accounts for approximately 4,200 people, which equates to 9th place on the IDS in absolute values. In relative terms, the result is 21 people

employed by the design sector for every one million inhabitants in Brazil. Within this context, the country's classification for relative values for this indicator falls to 14th place.

When calculating the average number of employees per design company, Brazil has the highest value among all countries on the IDS scorecard, which can be observed in TABLE 7 below. Although Brazil has few design companies (as stated in the study), they are, on average, larger than in other countries.

TABLE 7: AVERAGE SIZE OF DESIGN COMPANIES ACCORDING TO IDS DATA

Country	Average number of employees in design companies
BRAZIL	6.1
UK	5.0
JAPAN	4.7
USA	4.6
CANADA	3.5
SOUTH KOREA	3.4
HONG KONG	3.1
URUGUAY	2.3
NORWAY	1.6
SINGAPORE	1.4
ICELAND	1.1
DENMARK	1.0
FINLAND	0.9
SWEDEN	0.5
COLOMBIA	Data not obtained

SOURCE: The authors, based on data collection/questionnaire, 2014

To summarise, the absolute design capability indicators in Brazil are often higher in comparison with other countries. However, this can be misleading because when the numbers are placed within the national context according to the size of the population, Brazil's design resources are classified at the lowest end of the table for all indicators. It should also be considered that there is a lack of data on the indicators for public investment in design and the contribution of the design sector towards GDP.

3.3.2 COUNTRIES' PERFORMANCE IN COMPETITIVENESS AND DESIGN CAPABILITY

Another factor to be considered is that this study showed the industry is concentrated in six Brazilian states, representing 53% of the country's population. If the relative calculations only took this population into account, there would be a considerable improvement in the rankings. However, in general, the results show that the Brazilian design capability is insufficient for a country of its size and that this limits its ability to be competitive in design. To further explore this theory, the relative values for this IDS study and their corresponding score on the Global Competitiveness Index (GCI) were plotted in CHART 3. Values were normalised on a scale from 0 to 4, and an average value was calculated for each country. The higher the normalized score the greater the design capability. Although there is not enough data for Brazil and Colombia, the data that was available was extrapolated for the purposes of this study. The GCI scores for the original IDS countries were

referenced from the World Economic Forum report 2006-2007 as the majority of the data collected then dated from that period. For the Latin American countries (Brazil, Uruguay and Colombia), the GCI score was obtained from a 2012-2013 report. The higher the GCI score the more competitive the country, according to criteria set by the World Economic Forum.

CHART 3: COUNTRIES' COMPETITIVENESS AND DESIGN CAPABILITY PERFORMANCE ACCORDING TO THE INTERNATIONAL DESIGN SCOREBOARD AND THE GLOBAL COMPETITIVENESS INDEX
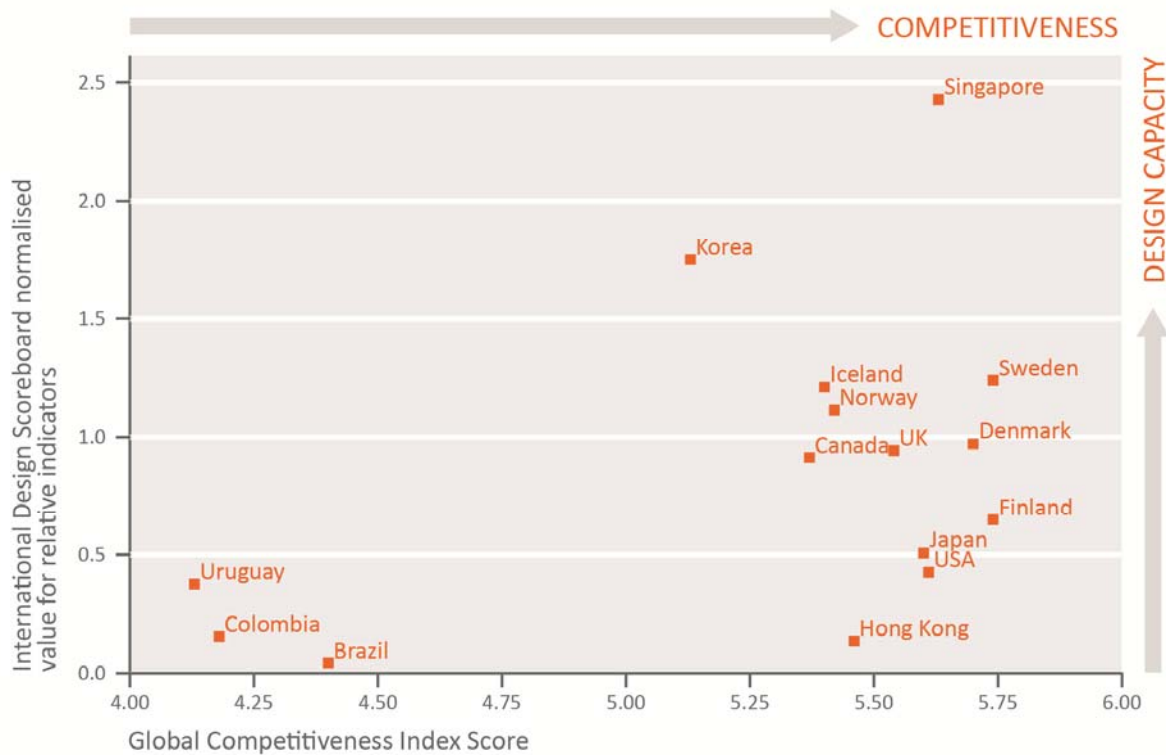
SOURCE: The authors.

From CHART 3, we can observe two distinct groups of countries: the first group, made up of Latin American countries, may be described as having the lowest performance in competitiveness and design capability. The second group may be described as having the highest performance in competitiveness and design capability. There are two residual countries: South Korea and Singapore. With the exception of Hong Kong, all countries with a high GCI score also have high IDS scores.

With limited data, it is not possible to categorically state that design capability has an impact on national competitiveness. However, from this chart it is evident that there is a positive relationship between the two factors.

4. THE BRAZILIAN DESIGN SECTOR AND BUSINESS ENVIRONMENT-AFFECTING VARIABLES

When analyzing data from the 2000s, the Brazilian design sector shows a high level of growth. This can be seen from a market standpoint in terms of knowledge production, technology, and education. This study shows such development in the past few years, as well as the sector's large potential for growth.

In the same way as it points out positive points, weaknesses are also highlighted, generated in large part by the low number of formal jobs and lack of organization in the design sector.

The six topics discussed below illustrate the Brazilian design sector through the variables that have an impact on the business environment: market, technology, talent, investment and lines of financing, knowledge production, and political/institutional environment.

4.1 MARKET

The Brazilian market is huge. It involves a host of variables that may be analyzed from macro and microeconomic standpoints and which have been studied by different industry sectors and fields of knowledge. However, prominent, designed is hardly ever mentioned as a market factor even by high-ranking Brazilian entities dedicated to generating knowledge. The few studies conducted in Brazil addressing design in this light usually lack statistical validity. They also fail to provide historical series that can be analyzed. Hence, it is impossible to hold a comprehensive, fruitful discussion about the standing of design in the industry.

Considering the aforementioned limitations, the purpose of this chapter is to take discussions about the Brazilian design market further. To do that, this section focuses on four main topics: the Brazilian industrial landscape and its relationship with design; design absorption and investments in the market; insertion of Brazilian design in the foreign market, and business models.

4.1.1 BRAZILIAN INDUSTRIAL LANDSCAPE AND ITS RELATIONSHIP WITH DESIGN

The evaluation of the Brazilian potential for competitiveness, based on economic, social and economic factors in the national and international settings, is a very important factor for design, as well as its relationship and contribution to the competitiveness of the Brazilian industry.

With that in mind, this topic has two central objectives. The first is to analyze the Brazilian industrial development over the past few years by looking at a few national economic performance constraints and some relationships with the international context. The second is analyzes the behavior of design as an integral link between the industry and the market.

4.1.1.1 BRAZILIAN INDUSTRIAL DEVELOPMENT IN THE PAST FEW YEARS

There are several phenomena that may be analyzed when talking about an economy's industrial development. Many of these are important for directing design activities, in both the microeconomic and macroeconomic contexts.

Along these lines, below are listed a few topics related to Brazilian industrial development over the past few years and which inform reflections on the role of design in the Brazilian and international markets. The approach taken focuses on the following issues: Brazilian potential for production; Brazilian processing industry; relationship between manufactured product exports and manufacturing output; growing domestic market; local chains of production.

BRAZILIAN PRODUCTION POTENTIAL

There is a heated discussion around whether Brazil has the potential to grow more, or whether the economy's current performance reflects growth at the maximum use of the country's resources. Indeed, the Brazilian economy's performance has slowed down in the past few years. In the five years leading up to the crisis, from 2004 to 2008, the Brazilian GDP grew at an average rate of 4.8%. By comparison, this rate is higher than the worldwide average growth (4.6%) and that of advanced countries (2.4%). Emerging countries grew 7.6% over this period, on average.

In the five years following the crisis, from 2009 to 2013, the country's average growth fell to 2.6% (CNI estimate). While higher than the growth rate of advanced economies (0.9% on average), this performance is less than half of what was recorded in emerging countries (5.3%). It is worth noting that, in that same period, worldwide growth was 2.9% (IMF estimate).

This decrease in growth gives a clear sign that, in the past few years, the country has not only grown less than it could have (or should have), but also that some downward trend in production potential must be underway.[4]

BRAZILIAN PROCESSING INDUSTRY

Since 2004, the Brazilian economy has experienced a new cycle in which the processing industry kept losing its share in the GDP, down to 13.3% in 2012. This percentage is similar to the one obtained in 1955, before the Juscelino Kubitschek Target Plan (first significant industrialization cycle). In addition, between 2009 and 2011, the processing industry made investments worth a mere 2.2% of the GDP, a percentage which is much lower than the 6.8% made in the 1970s. Within this context, there is a consensus that over-appreciated currency exchange rates and high production costs have been robbing the Brazilian economy of its competitiveness.[5]

If the current situation where exchange rates are over-appreciated and Brazilian production costs remain high is not reversed, in a few years the country's processing industry will regress to levels close to 10% of the GDP, when Brazil was a rural country and primary product exporter. As such, a planning

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[4] SOUZA JÚNIOR (2013) apud CNI (2013b)
[5] FIESP (2013)

process must be taken up that places the processing industry and fixed investments in the forefront. To make the Brazilian economy developed in 15 to 20 years, it is necessary to reverse the current situation, foster the manufacturing industry, and increase its rate of investment. Only then will the economy be able to grow at higher rates and allow the country to increase its per capita income.[6]

RELATIONSHIP BETWEEN MANUFACTURED PRODUCT EXPORTS AND INDUSTRIAL PRODUCTION

Based on data from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*, IBGE) and the Foreign Trade Office, it is possible to calculate the relationship between exports and industrial production for the historical data series of 2000-2010, for each Brazilian state. In general terms, it can be observed that:[7]

- The share of manufactured product exports in the country's industrial production changed slightly over the period, hovering around 20%.
- The majority of states show greater external competitiveness in sectors which consume more natural resources and labor. At the same time, a loss of competitiveness can be seen in exports from the more technology-intensive sectors.

In summary, over the historical data series under analysis, we find the exports by more technology-intensive industries losing their competitiveness and an increase in exports by more natural resource-intensive sectors.

GROWING DOMESTIC MARKET

Over the past decade, Brazil has grown via income distribution and an increase in the quality of life of its citizens, which created a domestic consumer market which was essential to face the international financial crisis in 2007-2008.

There are signs of expansion in sectors focused mostly on the domestic market, whose dynamic has proved able to counterbalance the situation of dwindling investments by sectors focused more on the international market. The consolidation of the consumer market, resulting from the combination of increased income and reduced social inequities, has been attracting investment to the country, which heralds growth above the world average over the next few years.[8]

GLOBAL CHAINS OF PRODUCTION

The distribution of industrial production on an international scale has undergone changes over the past few years as production stages were split up between different countries and regions. Unlike Asian countries and Mexico, the place of Brazil and other South American countries in the global value chain is generally restricted to the initial stages of the chains.

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[6] FIESP (2013)
[7] NONNENBERG; BERNER (2013)
[8] CRUZ et al. (2012)

Effective participation in value chains demands a certain level of specialization, and Brazil must seek strategies to integrate itself into the global value chains and to specialize in the steps which add the most value and technological content.[9]

4.1.1.2 DESIGN AS AN INTEGRAL LINK BETWEEN THE INDUSTRY AND THE MARKET

Taking the recent Brazilian industrial development presented in the previous topic as a reference, it can be seen that our economy needs strategies to boost the share of more technology-intensive sectors in the country's exports. Another inference is the need to furtherinnovation processes that meet the growing domestic market demand.

Going beyond typically national circumstances related to the topic, the literature posits that design plays a fundamental role as an integral link between the industry and the market. In this light, it is necessary to place it as a potential factor for competitiveness in the strategic agenda of the national economy.

A country's rate of imports and exports gives evidence of the strength of its economy. Design helps increase the rate of exports as it develops products that offer levels of quality and performance which are perceived as being superior. Design also participates in macroeconomic issues, such as a nation's level of innovation, consumption and well-being. Therefore, it can be said that there is a correlation between a sector's positive commercial balance and its high level of investment in design.[10]

Design plays an important role in the secondary phase of innovation, as well as in the conception phase of radical innovations and product improvement quality policies, thereby increasing a country's competitive capability. An economy's competitiveness is measured by its ability to innovate and conduct research. Therefore, patents or protected trade names fall under product design and packaging operations. In this sense, the economic success of many countries is owed to their political R&D investment efforts to support sectors wherein an opportunity exists to develop a competitive advantage through design.[11]

The World Economic Forum, in its publication "The Global Competitiveness Report 2001-02", also proves the use of design as a tool for maximizing international competitiveness. The comparison of between the Use of Design index and the general index of the report reveals a strong correlation between Use of Design and Competitiveness. An indicator of design success is the extent to which the brands become internationally known. The most competitive countries in the report have developed brands for products which have become well-known names over time.[12]

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[9] CNI (2013a)
[10] MOZOTA; KLÖPSCH; COSTA (2011)
[11] MOZOTA; KLÖPSCH; COSTA (2011)
[12] SCHWAB; PORTER; SACHS (2001)

4.1.1.3 DESIGN AS A COMPETITIVENESS FACTOR

In the range of factors identified as principal and fundamental for the development and strengthening of organizations that wish to be competitive in their markets, design is identified as one of the most important, decisive and determining strategies for corporate commercial and economic success.

Increasingly, design has shown itself to be essential in the business realm as a result of the increase in global competitiveness, which turns it into a strong advantage, not for the simple addition of esthetics, but rather for its ability to develop and implement complex projects. There is an even larger advantage when a company incorporates design into its strategy from the start of product conception all the way up to manufacturing, including all phases of development.

The mechanism to integrate design in all processes leading to product materialization and execution until products are finished is very advantageous for companies and makes them even more competitive due to the simple fact that it allows for integrated interaction with other company departments, in all aspects that they are involved in.[13]

In addition, design arises not only as a differentiating factor for organizations but also as a determining factor for how a company communicates with the market in which it operates, especially regarding aspects such as identity, quality and satisfaction, which are fundamental conditions for holding onto and capturing a market; differentiating one's products and services; and reducing costs involved in production and environmental conservation.

Among the series of contributions that design can bring to companies and their respective products in order for them to become more competitive in the market, some advantages are summarized below, in SUMMARY TABLE 2:

SUMMARY TABLE 2: CONTRIBUTION OF DESIGN TO COMPANIES' COMPETITIVENESS

Objective	*Contribution to Design*
Product Design	
• Differentiation	• Utility and value
• Satisfaction	• Relationship with marketing
• Upgrading	• Innovation and differentiation
• Manufacture and assembly	• Streamlining of production
• Expression	• Communication and value of the image
Communication of the Product	
• Clarity and coherence	• Identification and distinction
• Standing out from the competition	• Integral, coherent image
• Sufficient information	• Resource impact and savings
Corporate Image	
• Clear	• Optimizes the company's values
• Different from the competition	• Distinguishes itself from its competitors
• Quality, service, effectiveness	• Identifies and incorporates
• Remembered by the public	• Improves means of communication

SOURCE: TEIXEIRA (2005) in GOMES (2009)

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[13] GOMES (2009)

Manufacturers can also benefit from design in the following aspects: lower production costs, higher quality of their printed material, integration between their plants, easier circulation in their facilities, comfortable uniforms, and others.

Design is also a driver of corporate performance and offers contributions in terms of time, space and knowledge. These advantages can be seen in SUMMARY TABLE 3.

SUMMARY TABLE 3: CONTRIBUTION OF DESIGN TO ORGANIZATIONS
IN TERMS OF TIME, SPACE AND KNOWLEDGE

Regarding time	Regarding space	Regarding knowledge
DESIGN	DESIGN	DESIGN
Reduces the time to market - through better research - through communication skills (visual preview, prototypes)	Change relationships - internally, builds confidence in the team and concept sharing - externally, changes relationships with players outside the company (suppliers, society)	Is a continuous learning process
Develops multidisciplinary innovation	Simultaneously manage the flow of product information and consumer	Develop a core competency

SOURCE: MOZOTA; KLÖPSCH; COSTA (2011)

Know-how, and knowing how to be and become known are imperative for the industry. Within this context, design is the ability to use know-how and to generate value for the brand as an overall strategy for the brand's products, packages, and communications.[14]

4.1.2 DESIGN ABSORPTION AND INVESTMENTS IN THE MARKET

The multiple interpretations of what is understood by design make data collection complex with regard to the market's absorption of and financial investments in design. A lack of precision on this subject also makes the good use of potentially useful information difficult. In addition, the challenge of measuring companies' absorption of and investments in design is having a model that can be applied in a flexible way across all sectors and contexts.

Because of this complexity, Brazilian literature on this subject is scarce. It should also be noted that there are no statistically accurate mechanisms for measuring this. Only examples of methodologies tested by a few countries can be found.

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[14] MOZOTA; KLÖPSCH; COSTA (2011)

In Brazil, the most comprehensive study on the subject is entitled **"Design's Impact on Company Performance"** ("*Impacto do Design no Desempenho das Empresas*", by *Associação dos Designers de Produto* and *Ministério do Desenvolvimento, Indústria e Comércio Exterior* (MDIC), published in 2006. It is not an extensive study on the whole economy, but rather a survey focused on evaluating the situation from the point of view of manufacturing companies that need to use product design.

The sample for the study contained 453 companies, with 244 respondents; the following sectors were investigated: Furniture, housewares, automotive, sporting goods, electronics, household appliances, fashion, machine tools, medical/hospital equipment, and construction materials. The study is quantitative with regard to the tabulation of results, and qualitative in terms of the opinions in the answers.

The study results are available at: http://adp.org.br/wp-content/uploads/2013/03/pesquisa_consolidada_adp_design_setores_produtivos.pdf. Some inferences from the study demonstrate that:

- 89% of respondents say that they use product design, 69% of whom have been using product design for more than five years.
- 56% of the companies' total investment in design is geared towards the design of the product itself; 17% of the investment is allocated to service and business facilities design; 14% is used in graphic design; 7% to the design of displays and point-of-sale materials; and 5% in packaging design.
- 83% of companies that invest in design as part of an innovation process show growth.
- Design is used within companies in the following way: 22% by the owner, partner or designers related to them; 20% by internal employees from a design department; 58% by categories such as freelance designers, external design companies, employees in the engineering/development departments.
- Only 52% of the companies hire designers in a professional way, as external consultants or in design departments.
- 61% of companies that contract out design show growth.
- 87% of companies see design as an investment.
- The importance of design for companies is evaluated by respondents in the following way: 58% as strategic (design as a key function of their product and market strategy); 28% as structural (design developed alongside marketing and engineering); 14% as basic (for the external appearance of the product once it has been developed by engineering).
- The main application of design is as follows: 24% in the launch of new products; 21% to reinforce their image; 16% to incorporate new technologies and materials; 14% to improve cost reduction processes; 13% to upgrade the design of existing products; 7% to adjust to international standards; 4% to nationalize imported products.
- 84% of interviewees increased their competitiveness by using product design; 62% of these increased their competitiveness a great deal and 22% increased it a little.
- 82% of respondents increased their market share by using product design; 58% of these increased their market share a great deal and 24% increased it a little.

- 81% of interviewees improved their company's image by using product design; 68% of these improved their image a great deal and 13% improved it a little.
- 21% of the companies that hire designers recover their design investments in two years, while 31% of companies recover them in five years.
- Even without a precise measurement of the return on investments in design, the following estimates can be observed on the subject by companies: 21% believe that the annual return on the amount invested in design was greater than 50%; 9% of companies feel that the return was 50%; 15% assess that the return was 20%; 11% suppose it was 10%; 44% don't know.

4.1.2.1 DESIGN IN THE CREATIVE ECONOMY

Currently, design operates at the core of a new concept of economy based on creativity for human and sustainable development: Creative Economy. In Brazil, as classified by the Ministry of Culture's Creative Economy Office, design is part of the functional creations sector.

Design has been affected by this paradigm shift. Initially subject to a model geared towards industrial production, design started to be adapted to a new financial accumulation model, primarily meant for the service industry, the dissemination of information, and the building of meanings. "Nowadays, a device is not purchased solely based on aspects related to its function or quality. Rather, its purchase is strongly related to the construction of immaterial content.[15]

In 2011, the core of the Brazilian creative industry was made up of 243,000 companies, in a chain of production totaling over 2 million companies. With 2,717 companies in the industry's creative domain, the design chain encompassed 117,000 companies. Among the activities with the largest number of establishments, furniture retail stands out in the aggregate of the design chain, while interior design leads among creative activities.[16]

That same year, the formal employment market in the Brazilian creative industry was made up of 810,000 people (1.7% of all Brazilian workers). Architecture & engineering employed the most people (230,000), followed by advertising and design (over 100,000 people each). Together, these three sectors concentrated half of Brazilian creative workers. The design industry employed the third largest number of creative people (103,000). Considering the entire design chain, the number reaches 207,000 employees.[17]

Among the ten creative occupations employing the most people in Brazil in 2011, four are related to advertising (business analyst, market research analyst, marketing manager, and advertising agent). Design and R&D also stand out, with graphic designers (17,806 workers), research and development managers (13,414), and customized footwear designers (13,068) from the fashion industry.

In 2011, compensation for creative employees (BRL 4,693 per month) was almost four times higher than the national average (BRL 1,733 per month). "In general, creative occupations demand high levels

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[15] CARA (2010)
[16] FIRJAN (2012)
[17] FIRJAN (2012)

of training and contribute to the creation of products with high added value".[18] As a reflection of its employees' high level of technical skills, research & development was the field paying the highest average salary (BRL 8,885). Design personnel earned an average salary of BRL 2,363.

With regard to the Creative Economy's employability, in 2011 the design industry employed 12.7% of Brazilian creative people. In the South, the number of designers in the creative business was the largest in the country: Santa Catarina (20.4%), Rio Grande do Sul (17.2%) and Paraná (15.2%) states.

4.1.3   INSERTION OF BRAZILIAN DESIGN INTO THE FOREIGN MARKET

Design helps increase exports rates as it develops products that offer levels of quality and performance which are perceived as being superior. In order to drive development in this field, Brazil has been undertaking incentive and promotion initiatives to take design beyond national borders.

Today, Brazil is among the top ten iF Product Design Award winners, one of the largest European awards in the business and committed to evaluating design quality, finishing, selection of materials, degree of innovation, environmental suitability, functionality, ergonomics, perceived use, safety, brand value, and overall design.

This placement in the world ranking is very significant since, in contrast to other industries, design does not grant a seal or certification (along the lines of ISO) which would hold the company or product up as a good example of design, or a stamp for a product featuring good design. It is believed that, due to the lack of an official certification recognized internationally, the Brazilian industry has been preparing itself for the international market with more diligence and confidence by going after major, credible international awards that grant seals of excellence.

Recently, a few institutes and initiatives have been fostering the insertion of Brazilian design in the foreign market through actions geared towards design consultancies or Brazilian companies, with a focus on their production.

Design & Excellence Brazil Program

The Design & Excellence Brazil program operated between 2004 and 2012 with the objective of promoting Brazilian design abroad through participation in internationally renowned awards programs. This operation was an initiative by the Ministry of Development, Industry and Foreign Trade (MDIC), within the scope of the Brazilian Design Program (PBD) carried out by the Brazilian Trade and Investment Promotion Agency (Apex-Brasil), the Brazilian Service of Support to Micro and Small Businesses (SEBRAE), and the Brazilian Agency for Industrial Development (ABDI). The program was coordinated by the Brazil Design Center.

Because of Design & Excellence Brazil, it was possible to stimulate and support the participation of Brazilian products in important international design awards programs, especially in two awards sponsored by the iF (International Forum Design): the iF Product Design Award and the iF Concept

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[18] FIRJAN (2012)

Design Award. This was an important path towards promoting Brazil's image abroad, in addition to opening up new business possibilities in international markets.[19]

While the program was in operation, Design & Excellence Brazil received a total of 3,408 submissions in national pre-selection phases, of which 1,679 products and projects were chosen by the program's selection committee to compete in the iF Product Design Award and granted technical, logistical, financial, and media support.

During that period, 992 Brazilian finalists were supported by the program. Of these, 179 received awards and the iF seal. Nine award winners received the iF Gold Design Award trophy. It is believed that this operation started a ripple effect by encouraging the spontaneous participation of Brazilian designers and companies in this and other international award programs.

The program showed the world the creativity and quality of Brazilian design, increased product visibility, and enhanced the country's image.[20]

Brasil Design

This is an Integrated Sector-Specific Project Promoting Brazilian Design Service Exports, carried out by the Brazilian Trade and Investment Promotion Agency (Apex-Brasil) and the Brazilian Association of Design Companies (Abedesign). Since 2006, the partnership's objective is to take Brazilian design to the international market. Additionally, it offers knowledge on the Brazilian market and culture that makes it possible to implement a strategy meant to add tropical features to design.[21]

Brasil Design is an important promotion tool that is helping create a culture of Brazilian design as it puts together a detailed view of the sector by selecting target markets and giving visibility to the national design's potential and ability to generate business. The project was created in 2012 with the following objectives:

A – Positioning and Image

- Promote the Brasil Design brand and the brands of Brazilian companies participating in the project in priority markets.
- Establish the capability of Brazilian design in the foreign market.

B – Market Consolidation

- Increase the number of companies participating in the project.
- Improve the quality of exported services.
- Increase the volume of design services exported.
- Help project-participant companies go international.
- Increase and validate the project's current priority markets.

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[19] GOUVEIA (2011)
[20] QUIRÓS (2006) apud CATÁLOGO... (2006)
[21] BRASIL; ABEDESIGN (2014)

In addition, the project includes the following actions:

- Participation in the Cannes Lions Festival, the largest international creativity event, through an institutional stand and subsidies for project submission and delegate registration.
- Company missions (missions have already been made to New York and London), in which participants have the opportunity to visit international design agencies and associations andgo on technical visits to important venues and museums related to design, in addition to the opportunity to do business with potential international clients.
- Implementation of "*Projeto Comprador*" ("Buyer Project"), in which potential international clients make direct contact with Brazilian design agencies, opening up the possibility of generating business.
- Implementation of "*Projeto Imagem*" ("Project Image"), in which opinion leaders visit Brazil and learn about Brazilian design agencies, thereby creating the possibility of disseminating Brazilian design in the international market.[22]

Interagência

"Interagência" is an innovative project which aims to help Brazilian companies go international and fosters exports of design services through partnerships with companies in target markets – in this case, Colombia and Peru. The project started in 2013 and includes a local accounts manager who supports companies in their business dealings.

One of the project's efforts is to carry out missions to the above-mentioned countries with the aim of holding business meetings between design agencies, visiting potential clients, and spotting business opportunities. The business meetings included 15 Brazilian companies and 29 Peruvian and Colombian companies. In total, 220 meetings have been held.

In the project's nine months in operation, USD 125,000 worth of design services have been exported. Five partnership agreements have been signed between Brazilian, Peruvian and Colombian agencies.[23]

Design Export

Run by the Brazilian Trade and Investment Promotion Agency (Apex-Brasil) and the Brazil Design Center, Design Export is a new program which helps Brazilian companies to develop export-oriented innovative products featuring unique design.

The objective of the program is to offer the national industry a simple, instructive, straightforward methodology which helps companies to include innovation in their new product development processes by using design as one of their tools. The program now includes 70 companies being served and 93 design offices trained to support them. Business leaders are aided by four consultants who monitor every project stage. They also have access to a website containing management and online support tools.

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[22] ABEDESIGN (2014)
[23] ABEDESIGN (2014)

In 2013, the Design Export program educated 100 Brazilian companies on the concepts of design and innovation. Of these, 63 have had their use of design examined in six different states: Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro and Minas Gerais. In 2014, the program will be expanded to the Northeast, specifically to the states of Pernambuco and Alagoas.

As the program expands in 2014, the target is to create 100 innovations to products and services by 2015. The initiative serves as a bridge between entrepreneurs and designers. Participating companies get help to find the design firms which best meet their needs and are granted BRL 18,000 to hire their services. The program also includes training for companies through lectures on the concepts of design and innovation.

The expansion of the program will enable the Brazilian Northeast to be served, especially the states of Pernambuco and Alagoas, where 21 companies will be included.

In addition to training and consulting, participating companies receive indirect benefits, such as dissemination of their models in the media, greater visibility, and the opportunity to participate in a select group of innovative companies.

Design Export – Large Companies

With the objective of boosting the competitiveness of Brazilian companies in the international market through design, Abedesign and Apex-Brasil have created the Design Export – Large Companies program. The idea is to help Brazilian companies classed as medium-large and large develop export-oriented innovative products featuring good design. Representative associations carrying out sector-specific export projects are also included in the project's target audience.

The initiative connects Brazilian design companies and agencies so that together they may pursue their own individual pre-defined results, in accordance with their strategic guidelines. Participating companies receive guidance, coaching, and support in order to identify opportunities for innovation.

The program has been implemented to make design's strategic role clear to Brazilian business leaders, since its potential is yet to be fully understood by manufacturers. They also need to be told that design is an approach capable of driving economies to become highly innovative. The program began in 2014 and will conclude in 2015.

Design Embala

The *Design Embala* project is an initiative by Apex-Brasil and the Brazilian Packaging Association (ABRE). Its objective is to promote packaging innovation and design as tools to increase exports through education, training, competitive intelligence, communication, and image. To do that, the project plans several actions geared towards companies participating in sector-specific, export-fostering projects carried out by Apex-Brasil in collaboration with sector-specific bodies. Actions include:

- Educating business leaders on the strategic importance of packaging and design.

- Training business leaders on packaging design, references on key aspects of their specific industry in the destination country, consumer culture, functionalities, demand, most common structures, and competition analysis, as well as development of a competitive packaging checklist.
- National and international training and education workshops.
- Issuance of Market Intelligence reports that offer periodic diagnoses on the development of the market in question in the destination country.
- Individual attention for business leaders through Clinics with packaging experts.
- Closer contact with packaging manufacturers.
- Appreciation and promotion through national and international awards.

In one year in operation, Design Embala developed a portfolio of actions benefiting a significant number of companies in the business of specialty coffees, *cachaça* (sugarcane brandy), wine, sweets, food, and beverages:

- 72 companies participated in educational activities.
- 49 participants in the four innovation workshops.
- 30 participants in the four packaging clinics.
- 15 packages in the running for the ABRE Brazilian Packaging Awards, and six winners.
- Two packages won WIPO's World Packaging Awards – World Star.
- One packaging solution specially developed for the sector served.
- A new diagnosis on design management in the packaging chain of production was published.
- One international workshop

4.1.4 BUSINESS MODELS

The diversification of business models in the Brazilian design market creates multiple activities capable of generating different goods and services that increase the flow of capital between the country's different economic sectors.

Brazil faces the constant challenge of increasing its competitiveness, which calls for the design industry's efforts in several different contexts. In order to respond to different market dynamics, Brazilian design has been diversifying the range of business models it offers.

The design market involves a complex chain composed of different stakeholders and has four basic characteristics: it is international; it is divided into two areas (internal and external); it has a "design contagion process"; and it is made up of a "set of entrepreneurs".[24]

1. On being international: There are no borders when it comes to creativity, which allows the design market to be international. Regardless of local characteristics, designers are able to think globally, which is of great value to businesses focusing on internationalization.

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[24] MOZOTA; KLÖPSCH; COSTA (2011)

2. On being divided into two areas – internal and external: People who are actively involved in the process, such as designers, their clients and design promotion centers (go-betweens), make up the internal area, while the external area is composed of design schools and awards, competitions, museums, journals, and other assets which can foster the value of design.
3. The "design contagion process": Design plays a significant role in society as it stimulates consumers' critical thinking by infusing good design and impacting people's quality of life.
4. Designers also work in the market in different ways and even operate as entrepreneurs. They direct or create institutes and work with design consultancies, retail shops and factories.
5. "Set of entrepreneurs": They are also entrepreneurs from an economic standpoint. They work in an uncertain environment and make decisions that have a significant impact on new production combinations and new markets.

Designers work under four main schemes: as freelancers; in their own consultancies; as employees in design agencies; and also in companies' design departments.

In the case of freelancers, many designers opt to work as such, instead of incorporating. Designers who choose to work under this scheme provide services without being able to issue an official invoice (known in Brazil as a "*nota fiscal*"). The document that Brazilian freelancers can use for tax purposes is called the "*Recibo de Pagamento a Autônomos* (RPA)" (Receipt of Payment to Self-Employed Individuals), which is subject to its own specific taxes.

For the second option, i.e. a designer running his or her own consultancy, the important point is that he or she is the individual responsible for the activities of a company, which is required to be registered with the Public Registry of Commercial Companies (Boards of Trade). Registration with the State requires such information as the company's address and its legal classification – sole proprietorship or company.[25]

SUMMARY TABLE 4 shows the advantages and disadvantages of working as a freelancer in the labor market.

SUMMARY TABLE 4: ADVANTAGES AND DISADVANTAGES OF WORK SCHEMES IN THE MARKET

Freelancer	*Individual entrepreneur*	*Company*
ADVANTAGES		
• Less bureaucracy to get set up. • Simplified tax scheme. • Lower operating costs.	• No need to be accountable to partners and third parties. • No need to have decisions approved by third parties. • No need to share profits. • No additional costs for client companies. • In some cases, tax rates are lower than for an individual. • Normally, personal assets are protected in the event of debt.	• Has its own personality. Partners' names are not linked to business or labor relationships. • Easy to create and maintain one or more brands over time. • Adds credibility to business relationships. • No additional costs for client companies. • Depending on the situation, tax rates are lower than for an individual. • Normally, personal assets are protected in the event of debt.

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[25] KUNDE (2009)

• The designer's name is directly linked to business and labor relationships. • Client companies must pay an additional 20% on the project value to the INSS (Social Security). • The individual's assets are not protected if a client takes legal action. • Freelancers do not yet convey the same level of reliability and security that companies do.	• The name of the businessperson is directly linked to the company. • Routine tasks for one single company may come to be seen as an employment relationship. • The bureaucracy to get set up is the same as for a company. • No way to share losses. • Greater bureaucracy and costs for setting up, operating, and shutting down the business.	• Annual reports must be forwarded to partners annually. • Decisions require approval or consensus by partners. • Greater bureaucracy and costs for setting up, operating, and shutting down the business.

SOURCE: KUNDE (2009)

The types of design contracts are also important factors in the industry's labor market. There are different types of contracts that adapt to companies' specific objectives and situations, depending on their different needs. The most commonly used types of design contracts can be seen in SUMMARY TABLE 5.

SUMMARY TABLE 5: MOST COMMONLY USED TYPES OF DESIGN CONTRACTS

Type of contract	*Description*
Payment for services after expenses are made	The project is assessed beforehand; service expenses are paid monthly or after they are made.
Payment for previously budgeted design services	The company establishes an annual budget with monthly disbursements for all planned design services. Projects are, as above, evaluated beforehand and paid according to expenses made. Advantages: continuity, priority over other clients, more satisfactory pricing.
Fixed schedule with defined performance	This scheme only makes sense if task and performance indicators can be precisely defined. Modifications to services or expenses require additional prior agreements.
Payment for design services based on licensing	The designer/firm shares the risk of the undertaking. Payment is received as a portion of the license per unit of product. During the development phase, they receive a basic fee to be deducted from their future license payment.
Consultant's fees based on total for services	The design partner becomes a consultant for all design matters within the company and receives a monthly or annually lump sum for a previously established consulting fee.

SOURCE: IEL; SUDENE; BAHIA DESIGN (1994)

4.1.4.1 DESIGN BUSINESS IN BRAZIL

Design business in Brazil may be evaluated based on different criteria, as mentioned above. When the objective is to analyze some of the industry's business information in the country, we find either a lack of official data or studies devoid of statistical validity, and are therefore rendered unable to make inferences about the actual situation of the design business in Brazil.

One of the official pieces of data related to the design business in the country is the number of formal design jobs, recorded in the Annual Report on Social Information (RAIS). This tool supplies data for the development of labor statistics and provides labor market information to government bodies.

However, the data related to design jobs, as recorded in the RAIS, do not reflect reality. Since the RAIS only reports formal jobs, designers working on an informal basis are not represented.

In addition, since the registry classifies companies by economic activity rather than employees, the CNAE 7410-2 code for interior design and decoration does not cover all designers working in different sectors of the Brazilian market.

Another factor that leads to a small number of formal design job records is inadequate recording under the Brazilian Classification of Occupations (CBO).[26] It is possible that the majority of Brazilian designers are being recorded as working in other occupations.

Even under these circumstances, when the official number of design jobs in Brazil is investigated through RAIS data using CNAE 7410-2, the following scenario is found for 2012: 3,101 design jobs in the entire country; concentration of jobs in the state of São Paulo(1,588); higher number of jobs in the states of Rio de Janeiro (284), Paraná (193), Minas Gerais (181) and Santa Catarina (142); lowest number of jobs in the states of Roraima (0), Sergipe (2) and Amapá (2).[27] When design job records are evaluated, as per the CBO, only 296 formally employed designers are listed in 2012.

> **METHODOLOGICAL NOTE**
>
> Design companies, or design offices, belong to the tertiary sector, since their main business is service-based. In order to determine the number and approximate distribution of these companies across the country, quantitative data were collected through an online form. This form was available in November and December 2013, and was directed at formal Brazilian design offices – this information was validated by the company's CNPJ (Corporate Taxpayer ID). This project obtained 686 responses, and also allowed us to calculate the number of jobs the companies create. The list of offices is available in APPENDIX I.

FIGURE 11 presents some information inherent to the design market and collected in 2013 through a study conducted among design consultancies, which showed that:

- The Brazilian labor market was composed of 686 formal design offices and 4,200 design jobs.
- Design companies' activities were broken out as follows: Graphic Design and Communication (38%); Digital Design/Multimedia (22%); Product Design (16%).
- Service Design (14%); Interior Design (7%) and Fashion Design (2%).

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[26] The CBO is the document that acknowledges, lists, and codifies the titles and describes the characteristics of occupations in the Brazilian labor market.
[27] BRAZIL: RAIS (2014)
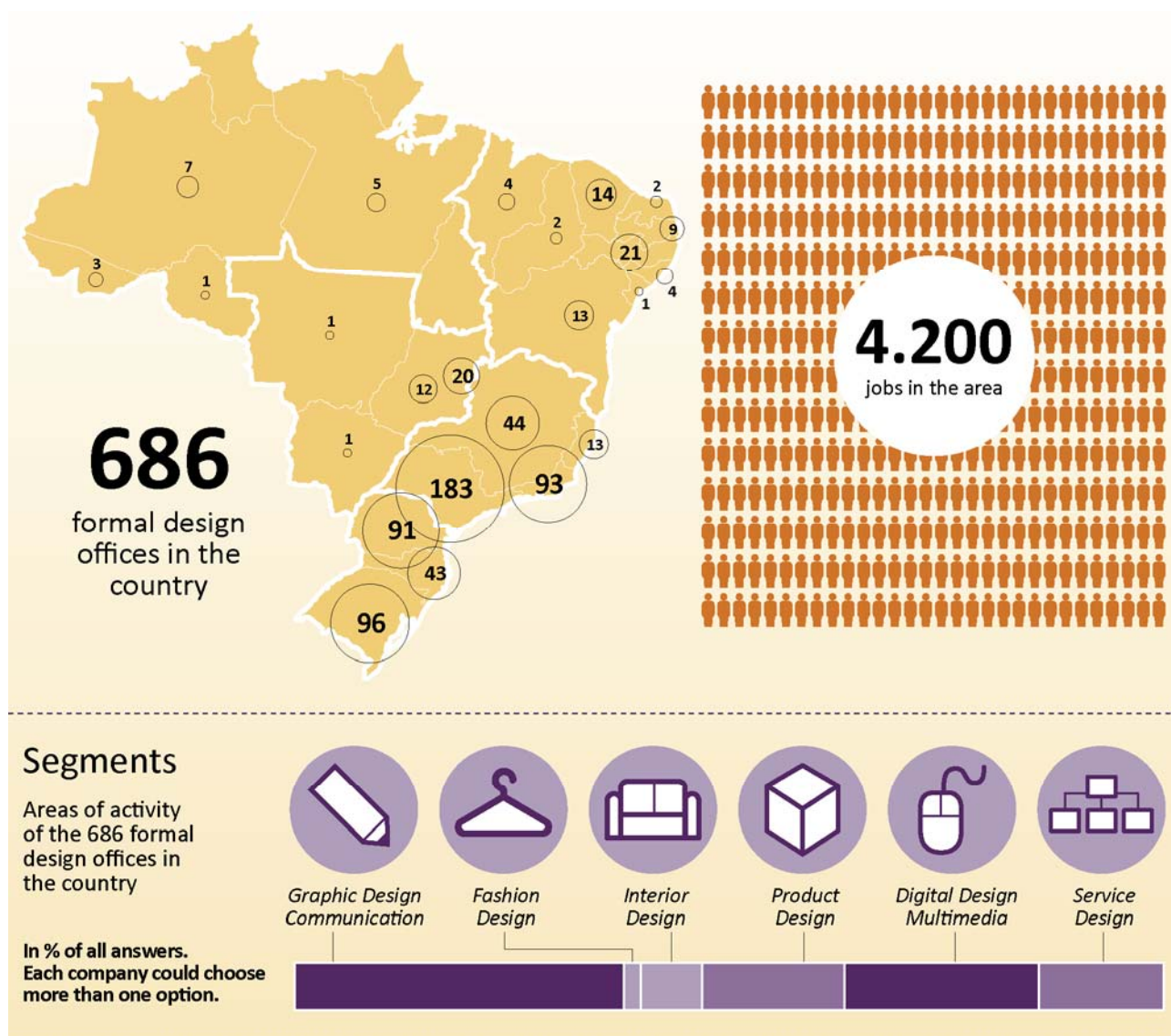
SOURCE: The authors, based on data collection/questionnaire, 2013

Design offices' activities were broken out into six areas: Graphic Design and Communication, Fashion Design, Interior Design, Product Design, Digital Design and Multimedia, and Service Design.[28]

From a market standpoint, it can be observed that 38% of offices work in the area of Graphic Design and Communication. Product Design represents 16% of the market, behind the areas of Digital Design and Multimedia, at 22%.

The number of Fashion Designers is small when formal design companies are considered possibly due to where they practice their profession, that is, in types of companies other than those dedicated to Fashion Design. In addition, another factor to be considered is informal employment in the industry, which was not measured in this study.

[28] MOULTRIE; LIVESEY (2009)

FIGURE 12 shows the sectors with the highest concentration of design companies in the country.

FIGURE 12: DOMAINS WITH THE HIGHEST CONCENTRATION OF DESIGN COMPANIES IN THE COUNTRY
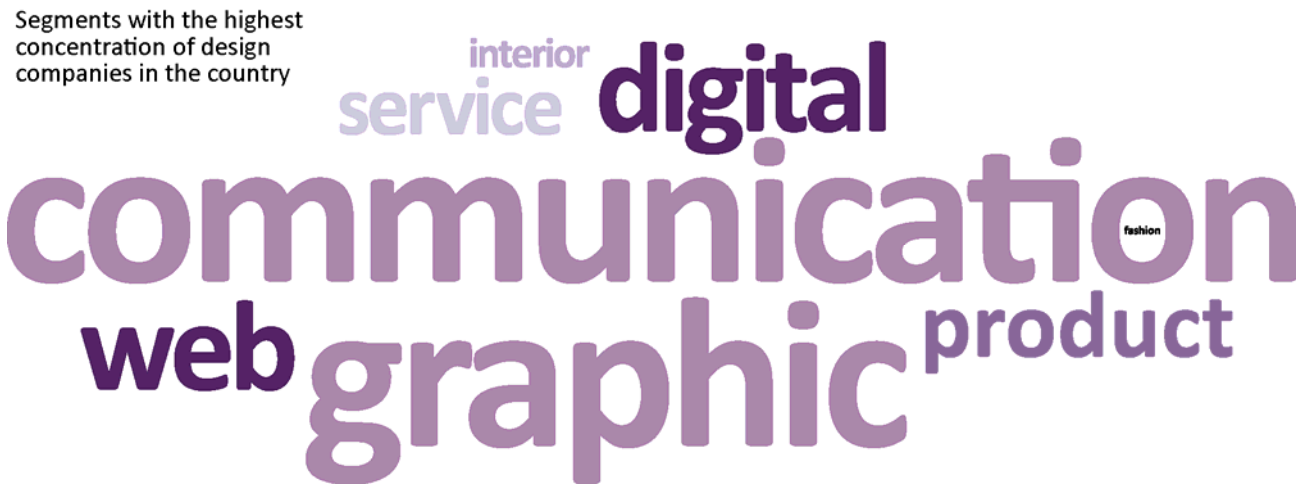
SOURCE: The authors, based on data collection/questionnaire, 2013

4.1.5 FINAL CONSIDERATIONS

In order to direct design activities in both the microeconomic and macroeconomic contexts, it is important to monitor the manufacturing scene. When industry data from the past few years are analyzed, it can be observed that:

- Since 2004, a new cycle of deindustrialization has been underway, with the processing industry losing its share in the GDP.
- For the 2000-2010 historical data series, exports by more technology-intensive sectors have declined, and exports by more natural resource-intensive sectors have gone up.
- There are prospects for expansion in sectors which are more focused on the domestic market, considering the consolidation of the consumer market resulting from the combination of higher income and reduced social inequities.
- Brazil must seek strategies to integrate itself into the global value chains and specialize in processes which add the most value and technological content.

Based on different references in the literature, design plays a fundamental role as an integral link between the industry and the market. Therefore, it is imperative to include it as a potential competitiveness factor in the national economy's strategic agenda.

The literature shows a correlation between a sector's positive trade balance and its high level of investment in design. In other words, design helps increase export rates as it develops products that offer a level of quality and performance which are perceived as being superior.

Design is also described as a driver of business performance that helps companies gain and maintain market share, set their products and services apart, reduce production costs, and contribute to environmental conservation, among many other benefits.

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Currently, design is part of the Creative Economy's functional creations sector. When 2011 data for the creative market are analyzed relative to design, the following can be seen:

- 2,717 companies in the creative domain of design and design chain, encompassing 117,000 companies.
- The third largest creative occupation in the country in terms of jobs (103,000 people); considering the entire design chain, the number reached 207,000 employees.
- Design is among the ten creative occupations employing the most people in Brazil.
- Average monthly salary of BRL 2,363.00.
- Industry employing 12.7% of Brazil's creative talent.

Brazil has been undertaking incentive and promotion initiatives to take design beyond national borders. Five programs make large contributions to that end. These are:

- Design & Excellence Brazil Program: operated between 2004 and 2012 with the objective of promoting Brazilian design abroad through participation in international design awards programs. Among its results, it should be highlighted that it helped to position Brazil among the top ten iF Product Design Award winners – one of the most important design awards in the world.
- Brasil Design Program: Integrated Sector-Specific Project Promoting Brazilian Design Service Exports, carried out by Apex-Brasil and Abedesign since 2006. The partnership's objective is to take Brazilian design to the international market, in addition to offering knowledge on the Brazilian market and culture that makes it possible to implement a strategy meant to add tropical features to design.
- Design Export Program: helps Brazilian companies to develop export-oriented innovative products featuring unique design. The program now includes 70 companies being served and 93 design offices trained to support them.
- Design Export for Large Companies Program: its objective is to increase the competitiveness of medium-large to large Brazilian companies in the international market through design.
- *Design Embala* Project: Its objective is to promote packaging innovation and design as tools to increase exports through education, training, competitive intelligence, communication, and image.
- Interagency Program: aims to help Brazilian companies go international and foster exports of design services through partnerships with companies in target markets – in this case, Colombia and Peru. In the project's nine months in operation, USD 125,000 worth of design services were exported.

The Brazilian design business involves a chain of different entrepreneurs that have been diversifying their business models in order to respond to the different market dynamics.

The most common types of design contracts include: payment for services after expenses are made, payment for previously budgeted design services, fixed schedule with defined performance, service fee based on licensing, and consultancy fees based on total services.[29]

The data related to design jobs, as recorded in the RAIS (the government's official registry tool), do not reflect reality. However, the official statistics show that when the CNAE 7410-2 (for interior and design decoration) is analyzed, the following can be seen for 2012: 3,101 design jobs in the entire country; concentration of jobs in the state of São Paulo (1,588); higher number of jobs in the states of Rio de Janeiro (284), Paraná (193), Minas Gerais (181) and Santa Catarina (142); lowest number of jobs in the states of Roraima (0), Sergipe (2) and Amapá (2). When design job records are evaluated, as per the CBO, only 296 formally employed designers are listed in 2012.

The circumstances that reflect the low official records for designers are the following:

- Designers working on an informal basis are not represented.
- CNAE 7410-2, for interior design and decoration, does not cover all designers working in different sectors of the national market.
- The majority of Brazilian designers are being recorded as working in other CBO-listed occupations.

In 2013, Brazilian design had the following characteristics:

- 686 formal offices.
- 4,200 jobs.
- Design companies' activities were broken out as follows: Graphic Design and Communication (38%); Digital Design/Multimedia (22%); Product Design (16%); Service Design (14%); Interior Design (7%); Fashion Design (2%).

The collection and processing of data on design absorption and financial investments by the Brazilian market are complex issues because of factors such as different takes on design, as they impair one's ability to make the most of potentially useful information; difficulty in creating a model that can be used in a flexible way across all sectors and contexts; lack of statistically accurate measuring mechanisms.

In Brazil, the most comprehensive study on design absorption and financial investment is entitled "Design's Impact on Company Performance" ("*Impacto do Design no Desempenho das Empresas*", by the *Associação dos Designers de Produto* and *Ministério do Desenvolvimento, Indústria e Comércio Exterior* (MDIC), published in 2006.

4.2   TECHNOLOGY

The introduction of different innovations in the market, the increase in *ad hoc* production, the dissemination of collaborative communities around ideas, and the increase in RD&I projects, among

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[29] IEL; SUDENE; BAHIA DESIGN (1994)

other factors, contribute to the scientific and technological revolution and the development of creative industries across the world.

As such, Brazilian design needs to stay in line with this context by investigating and implementing components to technologically develop products, and also identifying and placing the necessary tools for its activities in the market.

In response to this scenario, two relevant aspects for the progress of design are presented below: key design technologies – technologies considered critical for the current competitive success of design, and industrial property – one of the mechanisms to protect intellectual property assets and which enables the valuation of given pieces of work, especially when there is a potential economic return for its creator and society. In addition, it drives the different stakeholders in the market to keep their RD&I systems competitive.[30]

4.2.1   KEY DESIGN TECHNOLOGIES

We are living in a context of great technological development stemming from several factors, including consumers' search for higher quality products and services, shorter solution development and creation time, globalized markets, strict regulations, and demand for services with high added value.

This context drives different sectors and fields, including design, to invest in new technologies in order to respond to different global challenges, making it necessary to find and implement relevant technologies for their activities.

Below are some key design-related technologies grouped into four macro trends:

- Competitive manufacturing: Design-optimizing technologies capable of making organizations more competitive and allowing them to turn out higher-quality products.
- Information and Communication Technologies: Technologies that enable information and communication processes, thereby facilitating design activities.
- Innovations to Production Processes: Innovations to product manufacturing operations. Although they are technologies used by manufacturing departments, they need to be acknowledged by designers.
- New Materials: Some emerging materials design departments can incorporate to develop innovative solutions.

4.2.1.1 COMPETITIVE MANUFACTURING

Lately, changes have been observed in the way products are designed, manufactured and distributed. The entire supply chain has been reinventing itself, and the impact will be felt not only by manufacturers but also by individuals, families, communities, and even entire regions. Motivated by

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[30] JUNGMANN; BONETTI (2010)

the need to innovate faster than ever, different players have been dedicating efforts to new manufacturing models.[31]

Below are some design-optimizing technologies that can make organizations more competitive and allow them to turn out higher-quality products. It is important that designers understand these technologies well in order to make use of their full potential to develop innovative solutions in line with concepts that are relevant to this context, such as productivity, flexibility, reliability, and sustainability.

3D Digitizing

Reverse engineering is the process of obtaining the design of a piece in electronic format from the physical model. To expedite product launch, the pieces' 3D geometry is captured through the use of precise, flexible, trustworthy mechanisms.[32] This technique is often used to create new products, copy existing models, correct and improve models, and inspect and document products.[33]

Virtual prototyping

This technology permits a new form of virtual design that makes it possible to not only visualize the complete piece but also study its performance in real conditions, detect and correct errors, adjust the project, model the process of production, and reproduce the entire life cycle of the product, without fabricating any pieces. The result is a time-savvy development process that also saves on money and material.[34]

Rapid prototyping (3D Printing)

This is a technological process capable of fabricating physical models based on data sources generated by computer-assisted project systems (CAD). This technology enables the incorporation of materials, layer-by-layer, resulting in the final object.[35] The quick prototyping machines produce pieces made of plastic, wood, ceramic and metal.

We can observe the continual progress of electromechanical systems that create real objects from computerized models conceived of through CAD and CAM technologies. While the use of these technologies continues to spread, currently high-quality printers are expensive and only available to a select group of organizations. However, the tendency is that a series of "printing centers" will pop up to fill that gap. In this sense, some companies already allow their teams to send digital models for printing, which are then delivered physically.

Quick prototyping through 3D printing is essential for design, given how it assists in decision-making processes and in the management of innovative projects, thereby increasing the success rate of projects and reducing the risks of investing in innovation.

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[31] INSTITUTE FOR THE FUTURE (2011)
[32] OPTI (2000)
[33] SILVA et al. (2010)
[34] OPTI (2000)
[35] GORNI (2001)

4.2.1.2 INFORMATION AND COMMUNICATION TECHNOLOGIES – ICT

The incorporation of ICTs by any sector always encourages progress in different ways, and therefore contributes to competitiveness. Its implications in the field of design are fundamental and bring innumerable benefits, among which we can single out: improved communication between designer and client, faster project development processes, development of projects from a distance, advances in management models, and greater interaction between work teams. In the section that follows, we present some of the technologies that intervene in and mediate information and communication processes, thereby facilitating design activities.

Design software

Design methods that use participative software are becoming increasingly more popular, as they expedite the preliminary stages of a project by allowing the integration of design and production through the use of ICT at all levels of an organization. At the same time, the development of sector-specific CAD/CAM/CAE software is expanding to an extent that enables the creation of modular, adaptable design methodologies which expedite the conception phases according to to the specific needs of each target sector.[36]

There is a wide range of design software constantly entering the market, which makes conducting an exhaustive survey difficult. We can observe the dissemination of software containing new functions that perform ever more difficult tasks. However, many of these tools are imported and costly, and are therefore only used by a select group of Brazilian designers.

Augmented Reality

This is technology that keeps users in their physical environment and transports them to the virtual environment, allowing them to interact with the virtual world in a more organic way and without requiring training or adaptation. New multimodal interfaces are being developed to make it easier for users to manipulate an object in their own space by using their hands or more simple interaction mechanisms.

The use of optical sensors to track people or hands and augmented reality techniques can make real elements interact with the virtual environment and eliminate the inconveniences of technological apparatuses. In addition, it is possible to enrich a real scene captured on video, for instance, with interactive virtual elements in such a way as to make possible a series of innovative applications. For example, we can cite the real-time decoration of an empty apartment (real) with virtual furniture.[37]

Augmented reality is becoming a productivity tool for design, with a broad scope of application. The technology can help designers to understand space and form more effectively, allowing them to visualize and interact with their project in more intuitive ways. A multidisciplinary approach to

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[36] OPTI (2000)
[37] KIRNER; TORI (2006)

investigation and development conducted in partnership with potential users of this technology has a great chance of expanding its usage.[38]

Digital Communication

The use of ICT and all its associated tools is on the rise to make it easier and faster for organizations to put together any integrated communication processes. This process encourages them to choose technology options available in the environment or under development and whose use and application best suit a specific company and its respective stakeholders.[39]

Two main trends can be singled out in the networked digital society's communication: the incorporation of social media phenomena as a mode of communication, which requires a new strategic positioning from companies; and the incorporation of digital skills, which requires changes to people, the company culture, and the way of producing information.[40]

The use of digital communication technologies has been making it possible for designers to work outside conventional offices, creating non-territorial offices. The possibility of using a virtual office provides the opportunity to work in different environments, such as at home (home office), in hotels (hoteling), which are more often used for holding meetings in their reserved spaces, or in hired work stations (free address).[41] Given that virtual offices are based on their connectivity with conventional offices, we can foresee that quick, highly effective, efficient connections will be a determining factor for design business success.

4.2.1.3 INNOVATIONS TO PRODUCTION PROCESSES

The current socio-economic scenario should encourage the incorporation of technological innovations to production processes in the interests of making them more efficient and adept at producing solutions that can satisfy the needs of an increasingly globalized society in a sustainable way.[42]

To date, technology has been the main driver of advances in the industry in this context, which should remain thus in the future. Even though innovations to production processes may be manufacturing-oriented technology, designers need to acknowledge and interact with them by constantly testing and experimenting with their projects, and therefore finding new possibilities for their work and for meeting different consumer desires.

In the section that follows, we present some product manufacturing innovations that should be acknowledged by designers.

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[38] FERNANDES; SANCHES (2008)
[39] CORRÊA (2005)
[40] CORRÊA (2009)
[41] WEEGE; FIALHO (2013)
[42] OPTI (2010)

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Operative Intelligence

Sensor-equipped machines and tools and the development of digital imaging will allow the monitoring, diagnosis and total control of production. The anticipated progress in computer imaging and decision-making algorithms will make human intervention unnecessary by giving direct feedback to the production process.[43]

KBE and KBS systems (Knowledge-Based Engineering and Knowledge-Based Systems)

The disciplines of engineering and knowledge-based systems are using advanced software techniques to capture and reuse knowledge of products and processes in an integrated way, facilitating the different phases of specification, design and manufacturing. The development of such systems, although in its early stages, is a result of RD&I advances and will allow the increased efficiency of productive systems.[44]

New Open Control Architecture

Under the new production concepts, both machines and controls should be more flexible and adaptable to different manufacturing configurations. Their use will provide considerable benefits in terms of productivity, flexibility, reliability, and precision for machine manufacturers and consumers. The new open control architecture makes it possible to customize machines and improve their performance, allowing companies to implement their own specific programming systems.[45]

Rapid Tooling

This will be an alternative to respond to market needs, given that it is a tool necessary for creating mass production goods while allowing short product series to be made according to the final specifications before the definitive mold is fabricated. This trend applies especially to the production of prototypes, the pre-production of tools, the pre series of stamping, molds, mechanized parts, and validation processes.[46]

4.2.1.4 NEW MATERIALS

The development of new materials is one of highly impacting disciplines capable of improving the competitiveness of many economic activity sectors, from transport to energy to health, textiles, footwear, and packaging, among others. From a strategic standpoint, challenges point to a need for collaboration between researchers and companies to develop industrial applications using these materials, which requires multidisciplinary teams.[47] Designers are one of the key players in this process and must be able to acknowledge emerging materials and apply them in solutions that meet the

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[43] OPTI (2010)
[44] OPTI (2010)
[45] OPTI (2010)
[46] OPTI (2000)
[47] OPTI (2010)

market's different needs and satisfy the most varied consumer lifestyles. In the section that follows, we present some of the emerging materials the field of design may incorporate to develop solutions.

Nanomaterials

Beyond the ability to miniaturize devices, researchers have discovered a "fabulous new world" of materials sized between molecules and sub-micrometer level particles: nanomaterials. They have different properties to those of molecules and typical crystalline solids due to the effects of size and surface area that become especially evident for dimensions between 1-100 nm.[48]

Nanomaterials will incite an industrial revolution by presenting capabilities not found in materials currently used. Their applications are numerous, and they can be used to make nanotubes, biosensors, and nanocapsules, among others.

Composites

Materials that have at least two components or two phases whose physical and chemical properties are noticeably different. With the increase in automated processes, the cost of advanced composites is expected to go down and make it possible for them to be used a broad range of structural applications. Three-dimensional composites are one of the areas showing the most important potential for growth.[49]

Smart Materials

These are also called active materials or multifunctional materials, and have one or more properties that can be changed by external stimuli. External stimuli (physical or chemical) involve aspects such as: pressure, temperature, moisture, pH, electronic or magnetic fields.

Among the many smart materials, we can cite some examples: (i) photoactive materials – capable of emitting energy in the form of light; (ii) shape-memory materials – capable of returning to their original shape even after having been deformed as a result of temperature changes or a magnetic field; (iii) chromogenic materials – respond to external stimuli by changing their optical properties in a way that the material significantly changes its appearance.[50]

Multi-material Technologies

Multi-material technologies (co-injection, bi-injection, metal deposition, and others) are undergoing an expansion process in light of the benefits they offer. The widespread implementation of these technologies increases the possibilities offered to design and product processing, and allows for solutions that were hitherto unthinkable and difficult to copy.[51]

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[48] MARTINS; TRINDADE (2012)
[49] OPTI (2000)
[50] FECYT; OPTI (2011)
[51] OPTI (2000)

Recycled Components

Currently, the recyclables market is underdeveloped. Processes and new end products need to become beneficial in the medium term. To do that, the quality of retrieved materials should be such that it makes it possible to take advantage of market opportunities. The factors preventing this industry from developing include raw material prices, unpredictable quality, insufficient continuous production, unbalance between the quality of refuse, and the available demand for products made from recyclables.[52]

Surface and Heat Treating, Coatings

The surface treatment sector is advancing and plays a fundamental role in corrosion prevention and materials maintenance to increase the lasting power and lifespan. Heat treatments are a series of operations that aim to modify the properties of materials through actions that include heating and cooling them under controlled conditions.

We can also observe advances in coating that extend the lifespan of parts and wares, as well as helping to service highly specialized tools. The use of technologies is increasingly broader. However, there is limited production capability to take advantage of the huge potential market.

4.2.2   INDUSTRIAL PROPERTY

While there are informal means of protecting different industrial goods, such as the speed of innovation and the great complexity of design projects, a rise in actions related to the right to protect industrial property assets can be observed.

Industrial property applications filed by companies, universities, and governments help measure the degree of innovation of a given economy. Therefore, it is important that the issue be monitored by the design sector.

This topic deals specifically with industrial property as the main tool of interest to business activities.

Industrial Property may be protected via: trademark, patent, industrial design, geographical indication, and industrial secret & the repression of unfair competition, as per FIGURE 13.

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[52] OPTI (2000)
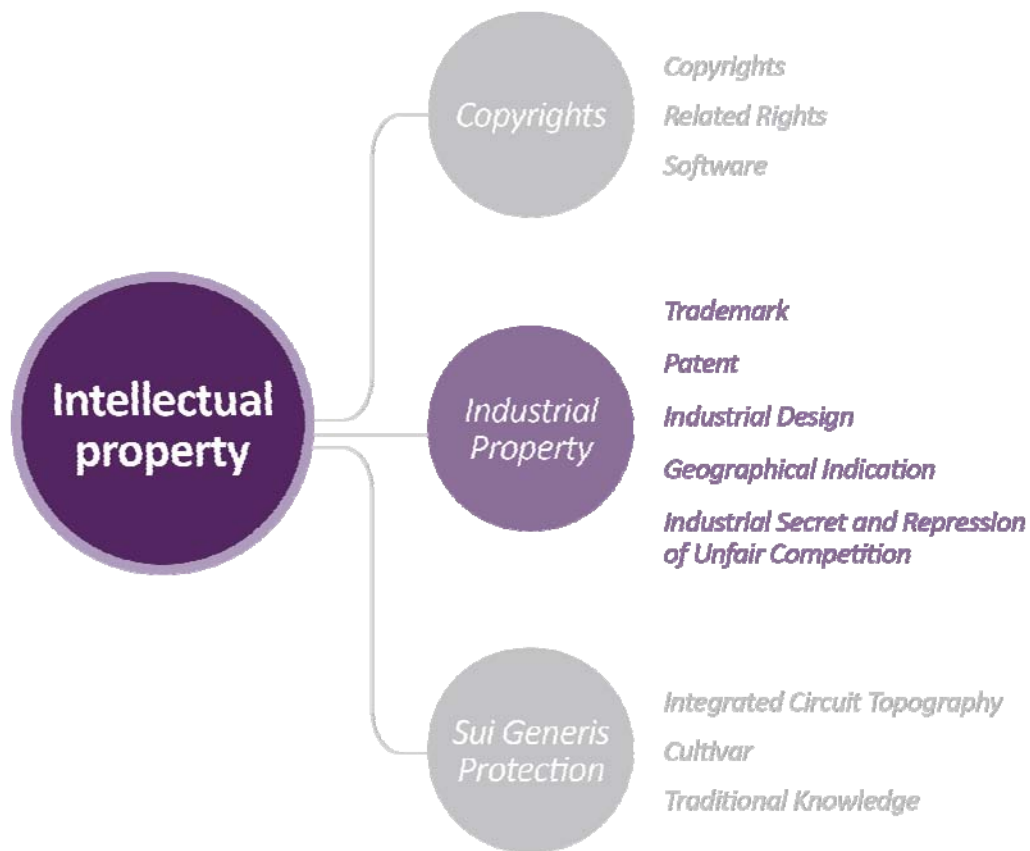
Source: JUNGMAN; BONETTI (2010)

Given that these are cutting-edge issues when it comes to the subject of technology, the National Institute of Industrial Property (INPI) makes data pertaining to the branches of industrial property rights protection available, with the exception of industrial secrets & repression of unfair competition, which is a recent addition. As such, the following points were analyzed: patents, industrial design, trademarks, and geographical indication.

Patents

A patent is a temporary property title on an invention or utility model, granted by the State to inventors or authors or other persons or entities that hold the rights pertaining to the creation. In return, the inventor undertakes to reveal in detail all the technical content of the material protected by the patent (INPI, 2013).

When analyzing the current Brazilian context regarding patents, it can be observed that:

- The country ranks 28th among nations applying for product patents in 2012[53].

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[53] CHADE (2013)

- The country filed 33,395 patent applications with the INPI in 2012, representing a 5% increase over 2011. However, only 3,130 registrations were granted.
- In 2012, Brazilian companies and researchers applied for 6,600 patents throughout the world, ten times less than those from France, twenty times less than those from Germany, and almost one-hundred times less than those from China. The volume of Brazilian applications in one year equals the amount filed by the Chinese in four days.[54]
- In 2012, the states depositing the highest number of patents were: São Paulo, at 3,287; Minas Gerais, at 730, and Paraná, at 684. The states depositing the least patents were: Amapá, 1, Acre, 2 and Roraima, 5.
- Among the 3,130 patent registrations granted in Brazil in 2012, 21% originated from Brazilian residents, while 79% came from non-residents.

TABLE 8 provides data regarding the five technology fields with the largest number of patents granted in Brazil between 2010 and 2012. By analyzing this table, it can be observed that:

- Patents granted to Brazilian residents in the last three years were largely concentrated in the technology field of "Other Special Machines", while those granted to non-residents were mostly in the area of "Fine Organic Chemistry".
- In the period between 2010 and 2012, 94% of patents granted within the five top technology fields were granted to non-residents.
- Mechanical Engineering and Chemistry are the sectors with the largest number of patents granted in Brazil between 2010 and 2012.

TABLE 8: TECHNOLOGY FIELDS GRANTED THE MOST PATENTS IN THE PAST THREE YEARS

Patents granted to residents						
Position	**Sector**	**Technology Field**	**2010**	**2011**	**2012**	**Total Last 3 Years**
1	Mechanical Engineering	Other Special Machines	60	87	63	210
2	Chemistry	Chemical Engineering	28	35	38	202
3	Mechanical Engineering	Handling	22	24	43	89
4	Mechanical Engineering	Mechanical Elements	44	23	18	85
5	Mechanical Engineering	Transport	25	26	33	84
Patents Granted to Non-Residents						
Position	**Sector**	**Technology Field**	**2010**	**2011**	**2012**	**Total Last 3 Years**
1	Chemistry	Fine Organic Chemistry	843	676	546	2065
2	Chemistry	Chemistry of Basic Materials	502	541	520	1563
3	Chemistry	Macromolecular and Polymer Chemistry	507	595	381	1483
4	Chemistry	Chemical Engineering	376	523	243	1142
5	Mechanical Engineering	Other Special Machines	364	380	250	994

Source: The authors, based on data from the INPI (2013)

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[54] CHADE (2013)

Industrial Design

Industrial Design registration protects the external ornamental form of an object or a series of lines and colors applied to a product, so long as these present a new and original result and may be manufactured (INPI, 2013).

Regarding this type of registration, FIGURE 14 shows that in the period from 2003 to 2012:

- The number of deposits increased by 35%. In 2003, 5,016 industrial designs were deposited, while in 2012 the numbers reached 6,772 deposits. However, there was a drop in deposits between 2011 and 2012.
- The number of patents granted decreased by 20%. In 2003, 5,451 industrial designs were granted, while in 2012 that number dropped to 4,334.

FIGURE 14: INDUSTRIAL DESIGNS DEPOSITED AND GRANTED – 2003-2012
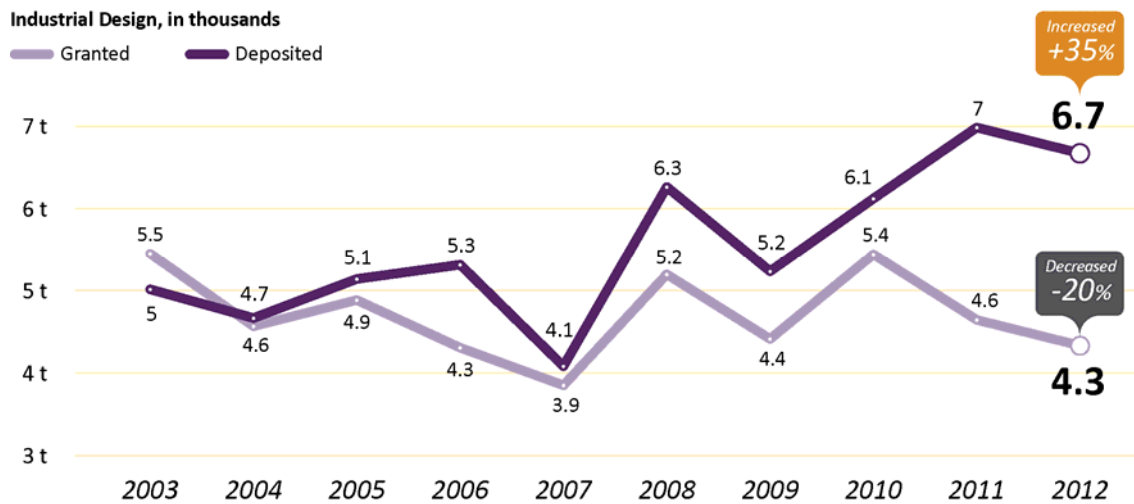
Source: The authors, based on data from the INPI (2013)

In SUMMARY TABLE 6 below is a list of the twenty main Industrial Design depositors according to 2013 INPI data:

SUMMARY TABLE 6: INPI'S 20 MAIN INDUSTRIAL DESIGN DEPOSITORS

1	Samsung Electronics Co, Ltd.	11	Ford Global Technologies, LLC.
2	Grendene S.A.	12	Kininklijke Philips Electronics N.V.
3	Honda Motor Co, Ltd.	13	Fiat Automóveis S.A.
4	Nike Internacional Ltd.	14	Paulo Ziober Junior
5	Volkswagen	15	Volvo
6	Duratex S.A.	16	Michelin
7	Koninklijke Philips N.V.	17	Cleber L Da Ré
8	Tramontina S/A Cutelaria	18	Extramold Jomo Indústria de Plásticos Ltda.
9	Microsoft Corporation	19	GO Participações Ltda.
10	Apple Inc.	20	Geraldo Fornasa

Source: INPI (2013)

Trademarks

According to Brazilian law, a trademark is any distinctive, visually perceivable sign that identifies and distinguishes products and services, while certifying their compliance with certain technical standards and specifications. A registered trademark guarantees its owner exclusive rights within the national territory and the owner's branch of economic activity. At the same time, how a trademark is seen by consumers may add value to products and services (INPI, 2013).

Regarding this type of registration, FIGURE 15 shows that for the Brazilian historical series between 2003 and 2012, inclusive:

- The number of trademark applications increased 57%. In 2003, 95,580 trademarks were filed, while in 2012 that number reached 150,107.
- The number of trademark registrations granted increased 423%. In 2003, 10,558 trademarks were registered, while in 2012 that number reached 55,306.

FIGURE 15: BRANDS DEPOSITED AND REGISTERED – 2003-2012
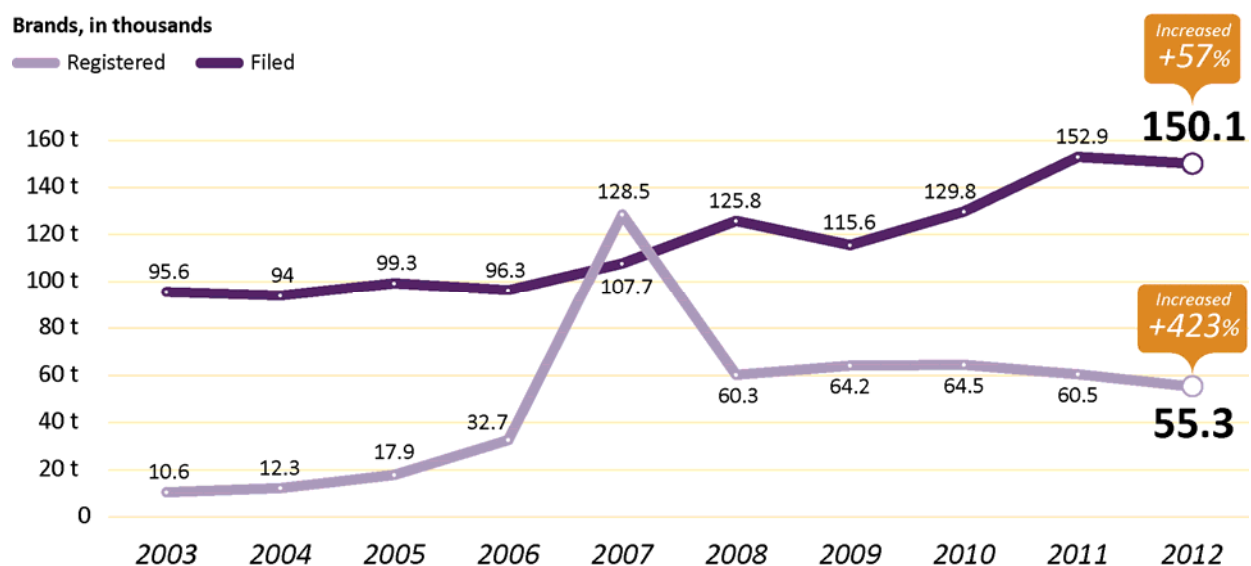
Source: The authors, based on data from the INPI (2013)

Geographical Indication

In Brazil, the registration of geographical indications takes into consideration the indication of origin and the appellation of origin. The indication of origin refers to the name of the place recognized for producing, extracting or manufacturing a given product or providing a given service. The appellation of origin refers to the name of the place which has come to designate products or services whose qualities or characteristics can be attributed to their geographical origin (INPI, 2013).

Regarding this type of registration, FIGURE 16 shows that for the Brazilian historical series between 2003 and 2012, inclusive:

- The number of applications filed increased. In 2003, there were no geographical indication applications filed, while in 2012 this number increased to ten.
- The number of registrations also increased. In 2003, only one geographical indication was registered, while 21 were registered in 2012.

FIGURE 16: GEOGRAPHICAL INDICATIONS DEPOSITED AND REGISTERED – 2003-2012
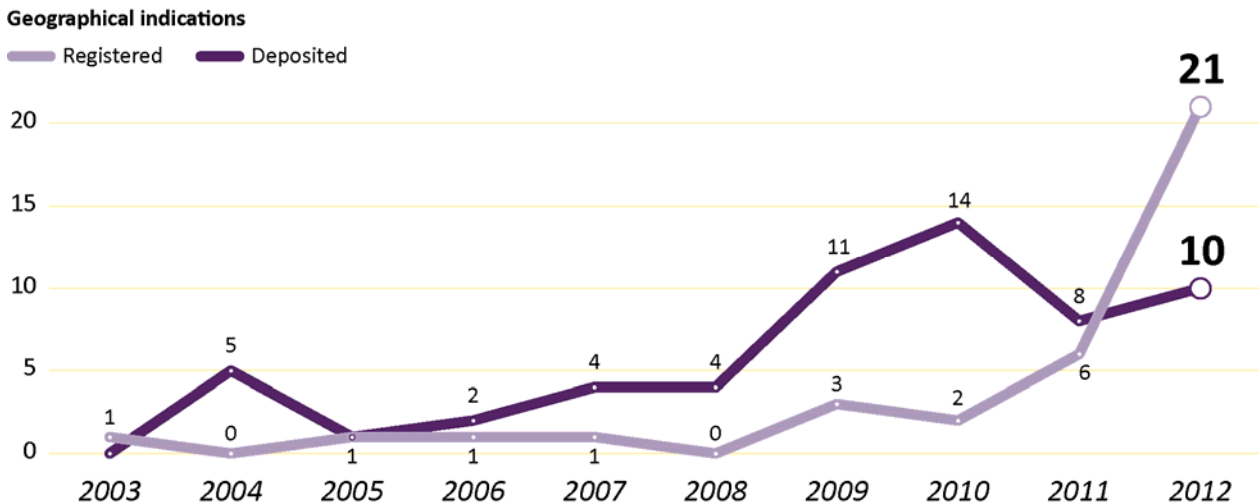
Source: The authors, based on data from the INPI (2013)

4.2.3 FINAL CONSIDERATIONS

To foresee opportunities and indicate trends, players involved in design activities need to mapp and monitor the sector's key technologies.

New technologies for the design sector are constantly becoming available in the market. However, many of these tools are imported and costly, and are therefore used only occasionally by a small group of Brazilian designers.

Among the key technologies that need to be acknowledged and incorporated by the design sector in the coming years, some may be singled out and organized into four main macro-trends:

Competitive Manufacturing – design-optimizing technologies that can make organizations more competitive and allow them to turn out higher-quality products. Some examples would be:

- 3D Digitizing
- Virtual Prototyping
- Rapid Prototyping (3D Printing)

Information and Communication Technologies – technologies that play a part in and mediate information and communication processes, thereby facilitating design activities. Among them, these can be singled out:

- Design Software
- Augmented Reality

- Digital Communication

Innovations to Production Processes – innovations to product manufacturing operations. While these technologies are used in manufacturing activities, designers must acknowledge them. Some of them include:

- Operative Intelligence
- KBE and KBS Systems (Knowledge-Based Engineering and Knowledge-Based Systems)
- New open control architecture
- Rapid Tooling

New Materials – some emerging materials design departments can incorporate to develop innovative solutions, in particular:

- Nanomaterials
- Composites
- Smart Materials
- Multimaterial technologies
- Recycled components
- Surface treatments, heat treatments, and coatings

Given that these issues are at the forefront when it comes to technology, data regarding the branches of industrial property rights protection must be observed attentively by designers.

Patents are vital because they grant their owner exclusive rights over the possible return on investments made to develop new products and industrial processes.[55] In the Brazilian context regarding this issue, we can emphasize:

- The country ranks 28th among countries that filed product patent applications in 2012.
- São Paulo was the state filing the highest number of patents Brazil, totaling 3,287 in 2012.
- Mechanical Engineering and Chemistry were the sectors granted the highest number of patents in Brazil in the period from 2010 to 2012.

Innovative companies prize their products' good image in the marketplace. Therefore, they invest time and money in the industrial design of their products to boost their appeal to consumers.[56] In the Brazilian context, when observing the historical data from 2003-2012, we can see that the number of industrial design applications increased by 35% and the number granted dropped by 20%.

For consumers, a brand represents distinctive factors of the company that has created the product or provided the service, such as reputation, quality control, investment in research and development, the product's design quality, and the qualification of the people providing the service. It means that consumers associate these attributes with the products and services identified by the brand.[57] In

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[55] JUNGMANN; BONETTI (2010)
[56] JUNGMANN; BONETTI (2010)
[57] JUNGMANN; BONETTI (2010)

Brazil, the historical data from 2003-2012 show that the number of trademark applications filed increased by 57% and the number of those registered increased by 423%.

Consumers perceive geographical indications as references of the origin and quality of products. This type of protection makes it possible to promote products and services on a global scale.[58] In Brazil, the historical data from 2003-2012 show that the number of geographical indication applications grew from zero in 2003 to ten in 2012, and the number of registrations grew 2,000%.

4.3 TALENT

The notion of talent is related to the ability to successfully practice a particular occupation or perform a particular activity. Increasingly, human talent has been sought out and, when found, become highly valued in the environment in which it is inserted. Retaining talent is a critical factor for the Creative Economy, one that may define a region's success or failure in terms of intellectual and innovative development.

Human capital is one of the most important factors allowing for solutions that meet the different global needs. Therefore, investigating the issue of talent is a strategic exercise for the Brazilian design agenda.

In the interests of analyzing how Brazilian design talent is configured, this chapter deals with three topics: designers, designer training; and design awards.

4.3.1 DESIGNERS

When considering designers' professional profile, it becomes clear this is a broad topic that requires us to analyze issues that go beyond the practice of the profession, that is, to discuss the global contexts in which designers are inserted.

As such, in this section, designers are seen as the product of a debate process that involves market and societal needs; the attributes validated by the practice of their profession (current professional profile); and desirable attributes to be incorporated into their profession (future professional profile).

4.3.1.1 MARKET AND SOCIETAL NEEDS

The current global context is characterized by an ever-changing society and market, the product of which is changes to in the production, association, cultural, and demographic characteristics, among others, of different groups.

These changes have repercussions on a wide range of contexts and require responses from several fields, including design. In light of the relevance of this issue, below we present some of the key social and market trends changing the way designers will be operating in the not-so-distant future.

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[58] JUNGMANN; BONETTI (2010)

Breadth and Depth: Multidisciplinary and Metadisciplinary Studies and Practices

In order to resolve problems in the global, competitive market of products and ideas, designers are expected to be able to take advantage of the experience and knowledge provided by a wide range of disciplines, including the Social and Human Sciences.

Communicational contexts are becoming more diversified. As such, designers need to experiment with metadisciplinary studies (depth), as well as build strong skills across a range of specific disciplines (multidisciplinarity). The market demands designers who are able to devise solutions that encompass a variety of aspects, from creation and innovation to business and management, among other variables. The multidisciplinary process must be manageable and implementable. Designers must be knowledgeable about the Social and Human Sciences so they can master the content they are invited to communicate. They must also learn how to work collaboratively with other theorists and practitioners.[59]

Expanded Scope: Scale and Complexity of Design Problems

Designers must tackle scale and complexity at the systemic level, even when there are individual components. They must also be capable of anticipating problems and solutions, instead of simply solving known problems.

Increasingly, design problems are embedded in highly complex social, technological and economic systems involving people whose behavioral patterns and cognitive, physical and cultural experiences differ. Designers' role is to manage that complexity and come up with clear messages that reveal to people the variety of relationships that constitute the information contexts, offering products and sustainable practices to clients.[60]

Focusing on well-being

Populations are living longer everywhere, and as such, the number of individuals with chronic illnesses is on the up, which makes health the main focus of their lives and daily activities. As people learn more about their health and new tools and treatments become available to manage it at an individual level, people have been taking a much more active role in the management of their own health.

To respond to this context, designers must rethink the economy of health in a much broader fashion. The idea is that they continue collaborating on specific solutions for the health industry but, above all, come up with innovations that can guarantee people's quality of life and well-being of people.[61]

Targeted Messages: a Restricted Definition of Audiences

Messages will change from mass communication to communication targeted at different audiences, requiring designers to understand people's differences and similarities and recognize the increasing

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[59] AIGA; ADOBE (2006)
[60] AIGA; ADOBE (2006)
[61] INSTITUTE FOR THE FUTURE (2007)

need for reconciling the strain between globalization and cultural identity. Likewise, solutions tend to be more focused and their reach reduced.

The most effective way of communicating has changed from general messages targeted at large audiences to messages targeted strictly at specific audiences. This is the result of the evolution of media resources and global dynamics. This trend demands a better understanding of a variety of cultures, dedication to ethnographic research, greater sensitivity towards cultural perspectives, and empathy.[62]

Rupture: An "Attention Economics"

Attention is a scarce resource in the information age, and the "attention economics" involves the design of communication, the design of information, the design of experience, and the design of services. The trend towards an "attention economics" stimulates discussion around such issues as concepts that guide "form" for clients; bringing in design business, and the problems design has to deal with in a market that values the short term.[63]

From Individuality to Connectivity

The network society excludes those who do not develop connectivity strategies. Some of the best ideas may come from unexpected contributors, including those that are far from the office walls and who "speak different languages."

To respond to global challenges, designers will need to turn to both internal and external innovation sources. Once open to the idea of working in a network, it is relatively easy to identify and become engaged with contexts of interest. To do that, designers must incorporate innovative social media in their work and develop digital skills to interact with others and benefit from the relationship and information gains they afford.[64] The market and society require people to work with the available resources in an integrated fashion to achieve greater effectiveness.

Responsible Results: Focusing on Sustainability

It is important for designers to recognize that the search for excellence involves focusing on human-centric design that takes into account that we live in an age of dwindling resources, where projects must make sure to use resources carefully and be simple and sensitive to human conditions.

Political, business, and community forces are joining together to tackle the challenges of working in a world whose resources are limited. Designers, as those who use creativity to propose solutions, must take a leading role in encouraging the responsible use of such resources. This involves both the traditional concept of sustainability, as well as an understanding of the appropriate technologies and resources to be used in proposals. Responsible results incorporate ethical issues, social needs, global requirements, and the unique contribution of "Design Thinking".[65]

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[62] AIGA; ADOBE (2006)
[63] AIGA; ADOBE (2006)
[64] INSTITUTE FOR THE FUTURE (2008)
[65] AIGA; ADOBE (2006)

"Design Thinking" belongs to a broader and more structured field of knowledge than that of post-modernity, the complex thought. It represents a specific cognitive style of thinking and acting, which offers ways and responses in the complex contexts experienced by private, public and third sector organizations in the 21st century. Therefore, thinking about design has evolved from a design of "how to do" (products, brands) to a design of "what to do" (strategy, management, business).[66]

Experience sharing: a model of co-creation

Designers need to change how they see clients/users to see them as co-creators (mass customizing). This trend focuses on user-centered issues through filters that identify the proper methods for understanding people (such as the current movement towards ethnographic research instead of focus groups). This also allows communication designers and product designers to work more closely together (the latter paying greater attention to business) and with the emerging Service Design sector as well.[67]

Design for Everyone

Normally, the idea people have of design is that of something cosmetic added to products when they are already finished. It is something that means little and serves to make products more expensive and elite-oriented. However, we can see that context changing as many people now understand that, when we speak of design, we must consider products, services, and environments meant to serve everyone irrespective of age, gender, capability, or cultural background.

Hence, the Design for Everyone trend emerges. Its focus is to make "things" that are not only directed at the average, that is, a hypothetical person. Design must, therefore, conceive solutions that are meant not only for right-handed people, adults, able-bodied individuals – who can see and move well. They must also take into consideration the elderly, children, and other specific audiences.[68]

4.3.1.2 CURRENT PROFESSIONAL PROFILE

Over time, different factors have been helping raise designers' professional profile. Career options have been branching out and leading to greater specialization as a result of constant social-cultural and economic changes, not to mention the dizzying pace of scientific and technological advancements. In such a dynamic setting, the context in which designers operate is progressing towards requiring them to adopt a system-wide approach.

According to the International Council of Societies of Industrial Design (ICSID), designers' practice entails "seeking and assessing structural, organizational, functional, expressive, and economic relationships" in their projects, with the task of:[69]

- Enhancing global sustainability and environmental protection (global ethics).
- Giving benefits and freedom to the entire human community.

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[66] COUTINHO (2011)
[67] AIGA; ADOBE (2006)
[68] BORGES (2013)
[69] ICSID (2012)

- Benefiting end-users, producers, and other social players (social ethics).
- Supporting cultural diversity despite the globalization (cultural ethics).
- Giving products, services, and systems those forms that are expressive of (semiotics) and coherent with (aesthetics) their proper complexity.

The duties described by the ICSID for designers can be applied to the various specialties in existence and as core attributes of the profession. Other authors[70] describe similar duties. To the, regardless of their specialty, designers must always consider environmental issues when carrying out their work, considering the pressing need to conserve natural resources and mitigate environmental impacts. Cultural diversity must also be included in the equation; otherwise, they risk having certain projects be shunned by the market. Designers must also enable social benefits, beyond meeting the needs and desires of users, suppliers, and other project stakeholders, in an effort to strike a balance between human and economic aspects. Finally, designers are also expected to create innovative products, services and systems featuring expressive, coherent forms, the product of research and systematized information. Designers are asked to coexist with multiple, never-ending demands imposed upon them by the outside world. From the most essential, basic usage situations to product-service systems, technology restrictions and means of production, environmental concerns, the economy, and several other project-related factors.

Based on such skills, some activities performed by designers may be laid out, regardless of their field of work:

- Study, organize, and systematize data and information.
- Use methodological procedures to perform their work.
- Develop projects, processes, systems and/or solutions.
- Seek processes, methods, and tools from other fields of knowledge, such as ergonomics, engineering, architecture, the arts, sustainability, and others, and apply them to the activity of project underway.
- Manage projects.
- Express ideas by means of designs, images, texts, models, prototypes etc.
- Reconcile the stakeholders' interests relative to the project being carried out.

From a more comprehensive outlook, the study "*Design – A Construção Contínua de Competências*"[71] contributes to the literature on the designer's professional profile by identifying and grouping a series of skills, based on several authors and institutions. These skills are listed in SUMMARY TABLES 7 and 8.

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[70] LÖBACH (2001); MANZINI, VEZZOLI (2002)
[71] GOMES (2009)

SUMMARY TABLE 7: BUSINESS AND PROFESSIONAL SKILLS

Ability to analyze and understand the business'/client's characteristics and operation, market strategies, and sales and profitability objectives.	Costa/ICSID
Ability to integrate the business'/client's reality in the global and specific market contexts.	APD/ICSID
System-wide view of company operations.	Costa/BEDA
Ability to establish market strategies in the context of projects developed.	BEDA
Ability to select market segments and develop a proper product/brand/business image.	Costa
Ability to interpret socioeconomic trends and consumer behavior.	IEFP/Costa/Munari
Ability to analyze conditioning factors and define the criteria to consider in the context of the business.	Potter
Ability to effectively communicate proposals, briefings, etc. to the business/client, orally and in writing.	ICSID/BEDA/APD
Ability to provide business/client with clear information regarding the style, functionality, security, and other aspects inherent to the specific nature of his/her work.	Costa
Ability to work/design while considering the international context	ICSID
Ability to visualize and visually communicate information.	ICSID/BEDA
Ability to meet deadlines and defined budgets.	BEDA
Ability to guide, fabricate, manufacture, or production of the design model.	BEDA
Ability to work in a team, coordinate and/or work in multidisciplinary teams.	ABD/ Potter/ Gondim/ APD/ICSID

SOURCE: GOMES (2009)

SUMMARY TABLE 8: DESIGN-SPECIFIC SKILLS

Mastery of the fundamentals of design (structure, form, color, space).	APD/ IEFP/ ICSID/ BEDA
Mastery of the visual language, namely the level of color, form, style, dimensions.	APD/BEDA/ICSID
Ability to draw freehand.	IEFP/ ICSID/BEDA
Ability to make detailed technical designs, scale models, prototypes, and models.	IEFP/ANECA/BEDA
Mastery of the proper presentation techniques and ability to use 2D and 3D representation techniques.	APD/IEFP/BEDA/ICSID
Mastery of display and demonstration techniques.	ICSID/BEDA
Basic knowledge of legal aspects of design, patents, brands, copyrights, and intellectual property.	ICSID/BEDA
Ability to solve design problems.	Potter/Munari/ICSID
Ability to do research and develop concepts, theories, and operating methods for industrial applications and other purposes.	APD/ICSID
Ability to set specifications and occasional regulations.	IEFP
Ability to plan and execute design projects.	Potter/APD/ICSID
Ability to propose technical, esthetic, and functional solutions for the spaces, products, or artifacts that he/she designs.	APD/IEFP/ADB
Ability to find alternative design solutions and evaluate them.	APD
Ability to design in an original way through forms that have meaning.	APD/Costa
Ability to decide on criteria for construction, material selection, and production systems.	APD/ ICSID
Ability to evaluate uses and functions.	BEDA
Ability to prepare standardization manuals.	APD/ABD
Ability to execute tasks and track/evaluate results.	IEFP/BEDA

SOURCE: GOMES (2009)

The literature also mentions skills relative to the human profile of the designer. Designers are expected to keep an open mind, be curious, be willing to communicate and get along with others, and be thorough and creative. They should also know how to creatively organize their knowledge and have a holistic view of the institution, which will enable them to easily understand the company's operations, strategies, and processes to help define and implement them. Designers must also have a free, independent spirit, while remaining able to work in groups and teams of designers or people dedicated to other fields. Finally, they must have the ability to get along with and motivate others.[72]

INTERVIEW WITH SPECIALIST 1

Are design graduates leaving university prepared for the workplace, with the multidisciplinary abilities that the current marketplace requires?

Dijon de Moraes: In my onion, this isn't really happening, as Brazilian students are leaving university with a good handle on computer programs, digital and technological media, but they are very deficient in other areas, including human, artistic and cultural areas, which would give them a better knowledge basis to propose innovation.

Innovation, in the design context, depends a lot on talent and on designers' ability to foresee future scenarios and new markets. This cannot be found through technological tools that are a functional means to an end, and for exactly this reason, they should not be considered more important than a solid education for professionals.

This reality, of education with an emphasis on media and technological tools (computers, programs software, multimedia, hypermedia etc.) has caused the impression that design is a discipline which is easy to exercise and which could even be called "improvisational".

It is important to recognize that the current result of that is projects that have big visual impact achieved through the use of digital presentations, but fragile content and keep repeating formulas and esthetic codes that do not set our design apart from the rest, and which identify technology as the directing force and project reference point.

Schools must review their curricula and add more socio-artistic-cultural courses, which are analytical and reflexive in nature, rather than other technical and objective ones.

Is there any specific skill that could still be implemented in Bachelor of Design degrees?

Dijon de Moraes: I would say so, nobody should design projects without first knowing their people's history and way of being. The scholar Andrea Branzi states that: "The simple fact of arranging stones into a wall is a cultural gesture." From that, we understand that a gesture of design also occurred, because the result of the wall project was a consequence of how people lived.

This ability to decode peoples and cultures can only be achieved through knowledge and culture, not computers. I usually ask my students to not look at existing products, but to go to contemporary art museums, craft markets, experimental music shows, theatre plays, and alternative films, because it is there that a fresh language resides, which can give rise to new products and new consumer experiences in the globalized world.

Dean of the University of the State of Minas Gerais (UEMG), PhD in Design from the Politécnico di Milano. Author of various books, such as "*Limites do Design*" (Limits of Design), "*Análise do Design Brasileiro*" (Analysis of Brazilian Design) and "*Metaprojeto*" (Metaproject). He is nationally and internationally renowned for the body of his work.

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[72] COSTA (2004)

Are design graduates leaving university prepared for the workplace, with the multidisciplinary abilities that the current marketplace requires?

Aguillar Selhorst: If schools were to give design students all the skills they need for the market, it would take ten years to train them! The basic concepts and elementary technical knowledge are worked on at school. I find that a lot of knowledge is passed on to students. However, that knowledge reaches students in a segmented fashion. I don't know if this is a defect of the structure of design programs or an incompatibility between generations. It seems to me that Generation "X" still does not know how to deal with the multi-tasking capabilities of Generation "Y". We are learning! On the whole, I usually take graduates into Megabox believing they are going to require a good deal of polishing – to get the bigger picture of projects and the needs of clients and consumers. But I also see a frustration on the part of most new designers, mainly with the routine activities of the design development process, and mainly a frustration with the need to deal with the business side of design.

Is there any specific skill that could still be implemented in Bachelor of Design degrees?

Aguillar Selhorst: Yes! I think schools should better introduce students to reality! And by this I mean that they need to develop an entrepreneurial profile (in the essence of the word). Many times, there is confusion between undertaking a project and chasing after your dreams. Undertaking a project means hard word, less passionate, more realistic evaluations of problems that a designer needs to solve. It is necessary to train their eyes to see whether an idea is feasible, instead of just looking at creative and technical aspects. By emphasizing only creative and technical aspects (from the point of view of the tools of design), we neglect the "business" outlook we need to evaluate the problems we are trying to solve. The effect of this is a gradual distancing from the essence of the "Design" discipline – which is above all a problem-solving discipline, whether those problems are technical, commercial, industrial, branding, usability-related etc. Over time, people get frustrated with the occupation and, most importantly, have the impression that they are going to graduate with the mission of immediately becoming design managers, directors, and stars. They don't understand that, thanks to the way their programs are structured, their path is gradual, and only those who understand the true role of a designer will be satisfied with their occupation. We live in a country where shortcuts are always more attractive than the journey itself. In design it is no different. We always laud those who manage to place their projects "quickly and creatively" under the spotlight of award events etc. And those projects that are successful from a business perspective and for companies are put in second place. We forget that it is basically those projects that sustain the activity of design and allow our activities to continue within the contexts of the Brazilian and global economies. In summary, design is business and we need to prepare our graduates for the world of business.

Designer, production director, and partner of Megabox Design since 2002. Master in Production Engineering and professor at the Pontifical Catholic University of Paraná since 2002.

4.3.1.3 PROFESSIONAL PROFILE OF THE FUTURE

Currently, offices, corporate departments, and other entities related to the field of design are searching for a new designer profile that combines traditional skills with broader, innovative abilities to solve a series of problems. Although there is a range of studies about the contemporary designer, there is a dearth of literature on the professional profile of the future.

The entities and authors that propose to investigate this question bring results that are not free from generalization, given that the profile of the designer is subject to a series of conditioning factors of a territorial, technological, economic, and socio-cultural nature, as well as to the uncertainties of the future. In addition, we could add that each designer sets their own path in accordance with their objectives, and in keeping with the nature of their work and their reality.

Notwithstanding, some results from prospective studies and the opinion of design experts are beginning to shape possible scenarios for the designer of the future. Without intending to be overly assertive regarding the profile of this professional, we present here three cases pertaining to this issue. We believe they provide different perspectives for us to think about the challenges faced by designers in the global economy and the context of social and technological transformation in which they operate.

CASE 1: DEFINING THE DESIGNER OF 2015

Since 2006, the Professional Association for Design (AIGA) and Adobe have joined forces to try and define the future profile of 2015's designers. Through interviews, focus groups, workshops, and research conducted along with educators and some of the top experts working in design, field observers and AIGA members sought to characterize future designers.[73]

The research project aimed to translate the participants' expectations regarding the essential capabilities that the designers of tomorrow will need, in various combinations. The results of the study are the capabilities listed below in order of importance:

- Ability to create and develop visual responses to the communication problems, including understanding the typography, esthetic, composition, and construction of meaningful images.
- Ability to solve communication problems, including the identification of a problem, research, analysis, generating a solution, prototyping, user tests, and evaluation of results.
- Broad understanding of issues related to the cognitive, social, cultural, technological, and economic contexts of a given project.
- Ability to understand audience contexts, recognizing the human, physical, cognitive, cultural, and social factors that orient decisions in design.
- Understanding of and ability to use tools and technology.
- Ability to be flexible, agile and dynamic in professional practices.
- Management and communication capabilities in order to act in a productive manner in large, interdisciplinary teams and a range of organizational structures.

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[73] AIGA; ADOBE (2006)

- Understanding the behavior of systems and aspects that contribute to products, strategies and sustainable practices.
- Ability to put forward verbal arguments for solutions related to a range of users/audiences; everyday issues; organizational business and operations.
- Ability to work in a global environment while keeping in mind the need to preserve local culture.
- Ability to collaborate in a productive manner to large, interdisciplinary teams.
- Understanding ethics in practice.
- Understanding contextualized items, including cause and effect; ability to set project evaluation criteria to be explained to the audience and context.

CASE 2: DESIGN-RELATED OCCUPATION PROFILES REQUIRED BY THE PARANÁ INDUSTRY – HORIZON FOR 2030

Published in the 10th Brazilian Conference on Design Research and Development, the material pertains to a section of the "Occupation Profiles for the Future of the State of Paraná Industry – Horizon for 2030" project. It was developed by researchers for the Federation of Industries of the State of Paraná and aimed to identify and analyze occupations that conduct activities within the design sector.

The project investigated data from a compendium containing 226 promising occupation profiles and 1,541 occupations in 12 domains deemed strategic for the Paraná manufacturing industry.

The study results show that, out of the 226 occupation profiles, 42 have at least one work activity related to design, totaling 18.6%. When considering the project's 1,541 work activities, it can be observed that 243 of these focus on design, equaling 15.8%. Among these activities, it can be noted that the majority are related to Management (50%), followed by Operating Technique (27%), Research (15%), and Market (8%).[74]

Out of the large number of design-related work activities found in the study, we mention the following:

- Planning and developing solutions for consumer needs in a way that expands how business is done.
- Managing projects and inserting design into production processes.
- Planning design initiatives to meet set objectives and minimize risks.
- Managing projects and inserting design in production processes.
- Including accessibility and safety aspects in projects.
- Designing functional, ergonomic spaces which facilitate workers' activities.
- Using design to simplify the interfaces of existing technological artifacts.

CASE 3: THE DESIGNER OF THE FUTURE THROUGH THE EYES OF JOHN MAEDA

"In the far past, designers were charged with designing solely for the physical environment. Buildings, parks, bridges, teapots, toothbrushes, wastebaskets.

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[74] VALENÇA et al. (2012)

In the recent past and present, designers began to shift towards designing for the virtual environment. Broadcast imagery, digital photographs, websites, information kiosks, clothing in Second Life. They designed for everything around themselves (the physical), and everything around their mind (the virtual). In the next chapter of the future, they will be designing the center of their very being – their own mind and their own body. They will design their arms to replace the many injuries from typing on their little BlackBerrys or from too much usage of the computer mouse; they will design their eyes so that they can easier see the little type on the tiny screens of their mobile; they will design their brains so that they can better handle a million tasks simultaneously instead of the three or four that they can process today.

They will have designed everything outside their body and outside their mind, to inside their body and inside their mind. In the end, they will have designed the essence of the meaning of design and life itself."[75]

4.3.2 DESIGNER TRAINING

One of present-day society's central issues is the professional or vocational education of individuals. This means strengthening the series of activities dedicated to the acquisition of knowledge, skills, attitudes, and behaviors required to perform the functions associated with an occupation or group of occupations in any branch of economic activity.

 The field of design has been increasing the offer of and improving the different training levels and models, while seeking solutions for the different current challenges. Different educational strategies are being implemented in this context. Among them, we can highlight the Secondary Vocational Education in Design and Tertiary Education in Design – both of which are the subject of analysis in the following section.

4.3.2.1 VOCATIONAL DESIGN EDUCATION

The main goal of vocational education is to provide programs that give direct access to the job market, for both students and workers seeking to enhance their qualifications.

In Brazil, design is offered in secondary trade education through vocational programs whose reference is the "National Catalogue of Technical Courses" (CNCT), developed by the Ministry of Education.

The Catalogue lists thirteen technology streams. One of these, Cultural Production and Design, combines program options related to the field of design. SUMMARY TABLE 9 presents part of the above stream, its programs and respective course loads.

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[75] MAEDA (2013)

SUMMARY TABLE 9: TECHNICAL DESIGN-RELATED PROGRAMS,
RESPECTIVE TECHNOLOGY STREAM AND COURSE LOADS

Technology Stream	Technical Program	Course load
	Visual Communication Designer	800 h
	Shoe Designer	800 h
	Packaging Designer	800 h
Cultural Production and Design	Interior Designer	800 h
	Jewelry Designer	800 h
	Furniture Designer	800 h
	Pattern-making Designer	800 h

SOURCE: The authors, based on data from BRAZIL: MEC (2013)

PROFILE OF VOCATIONAL TRAINING GRADUATES

When it comes to the profile of vocational design school graduates in Brazil, the reference document that guides discussion on the issue is also the CNCT. SUMMARY TABLE 10 shows the activities pertaining to the occupation profiles of vocational design school graduates.

METHODOLOGICAL NOTE

The Ministry of Education published a list of the top 40 vocational programs in terms of enrolments in 2009. Ranking 33rd, the Interior Design Technician is the only design program found in the aforementioned list, and accounts for 0.58% of enrolments in all vocational programs in Brazil.

SUMMARY TABLE 10: ACTIVITIES CARRIED OUT BY VOCATIONAL DESIGN SCHOOL GRADUATES

Technical Program	Job Description
Visual Communication Designer	• Executes visual programming in different genres and formats for advertising pieces such as books, portals, panels, folders, and newspapers. • Develops and employs creative and esthetic visual communication elements in graphic design. • Creates illustrations, applies typography, develops visual identity elements, applies and implements signs. • Analyzes, interprets and proposes the visual identity production of pieces. • Controls, organizes, and stores physical and digital graphic production material.
Shoe Designer	• Develops shoe designs. • Creates and makes 3D shoe models in conventional and electronic formats. • Applies ergonomic aspects to shoe design. • Researches and defines materials and accessories. • Develops models for production. • Monitors shoe production processes. • Applies sustainability concepts to shoe design.
Packaging Designer	• Develops standard drafts, perspectives and drawings for packaging. • Conducts volumetric studies and conventional and electronic models. • Develops visual programming for packaging. • Applies ergonomic aspects to the project. • Researches and defines materials and processes. • Develops technical documentation. • Monitors industrial and graphic production processes. • Applies sustainability concepts to packaging development.

Interior Designer	• Helps develop and execute interior design projects in residential and commercial spaces, display windows, and exhibitions. • Develops drafts, perspectives, and other drawings in accordance with technical standards. • Plans and organizes the space, identifying elements for the project conception. • Makes 2D and 3D representations of project elements by applying graphic representation methods.
Jewelry Designer	• Develops drafts and designs for jewelry, using jewelry market trends. • Conducts volumetric studies and makes 3D models. • Applies ergonomic aspects to the project. • Uses gold and silversmith and gemstone cutting techniques. • Develops standardized technical documentation. • Monitors jewelry production processes. • Applies sustainability concepts to jewelry-making.
Furniture Designer	• Develops standardized furniture designs, perspectives and other drawings. • Conducts volumetric studies and makes conventional and electronic scale models. • Applies ergonomic aspects to the project. • Researches and defines materials, tools and accessories. • Develops standardized technical documentation. • Monitors furniture production processes. • Applies sustainability concepts to furniture-making.
Pattern-making Designer	• Develops patterns by applying 2D and 3D techniques to enable clothing production. • Develops diagrams guided by the measurement table. • Transforms pattern bases into specific models, according to the technical design of the product. • Prepares the pattern for the cutting department, along with the appropriate instructions for prototype making and mass production. • Evaluates product fit and technical viability.

SOURCE: BRAZIL: MEC (2013)

4.3.2.2 HIGHER EDUCATION IN DESIGN

In Brazil, tertiary education includes:

- Undergraduate programs granting Bachelor and Associate Degrees;
- Graduate programs that train specialists (lato sensu) and Masters and Doctors (stricto sensu).

In Brazil, design-focused higher education currently offers different undergraduate graduate programs. The official information on the subject is analyzed in a panoramic fashion, as follows.

BACHELOR DEGREES IN DESIGN

Since the first design program was created in Brazil by the Higher School of Industrial Design (ESDI) in Rio de Janeiro in the 1960s, a series of transformations can be observed which have reconfigured different aspects of education in this field.

New programs have been created in an attempt to respond to the new market demands, as well as to cater to new areas of knowledge, scientific-technical progress, and emerging human needs.

In this context of change, it is possible to characterize the current scene of design programs from a variety of perspectives. Among them, we can single out some analyses regarding the following points

focused on the field of design: institutions offering bachelor degrees, number of degrees, selection processes, enrolments, higher education graduates, and profile of graduates.

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METHODOLOGICAL NOTE – STANDARDIZATION OF NOMENCLATURE

The analyses presented in this topic are based on data from the 2012 Tertiary Education Synopsis, conducted by the National Institute for Education Studies and Research (INEP). As such, Bachelor Degrees in Design include all those recognized by the Ministry of Education (MEC) as belonging to the Field of Design and Fashion Design, including: Interior Decoration, Fashion Design, Industrial Design, Design, Interior Design, Product Design, Fashion and Product Project Design. However, it is fundamental to consider that since 2009, MEC has been developing the National Curricular Reference Points for Bachelor Degrees, meant to unify the nomenclature for all Bachelor Degrees in Brazil, favoring those which are historically consolidated. In this specific case, all the industry's many specialties cease to exist and come together under the broader umbrella term of DESIGN. This said, there remain Bachelor Degrees in the area of Design which have not yet had their nomenclature adjusted.

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The general scenario in 2012 regarding Bachelor design Degrees in Brazil can be characterized in the following way:

- Of the 267 tertiary education institutions offering design programs, 79% are private and 21% are public.
- There are 538 programs, of which 422 are private and 116 are public, meaning 78% of the design programs are private.
- There is only one design distance education program, offered by a private institution since 2006.
- Tertiary education concentrated in Design programs (48%), which is to say, of the current 538 in-class programs, 311 grant this degree.

CHARTS 4 and 5 show the distribution of design-related Bachelor Degrees offered in Brazil and the distribution between public and private institutions, respectively.

CHART 4: DISTRIBUTION OF DESIGN-RELATED BACHELOR PROGRAMS AVAILABLE IN BRAZIL
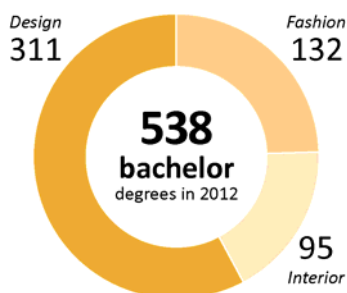
CHART 5: PUBLIC AND PRIVATE INSTITUTIONS

Source: The authors, based on data from Brazil: INEP (2012)
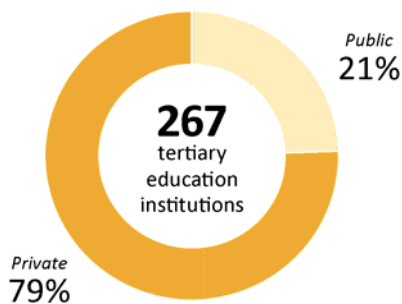
Source: The authors, based on data from Brazil: INEP (2012)

- There are 55,003 places offered by the various design programs, with approximately 100 places per program underway.
- There are 140,301 candidates applying for selection processes, i.e. an average of 2.6 candidates per place.
- The number of admissions totals 33,173 students in the various programs, which means 60% of places are filled.
- There are 79,458 students enrolled, of which 19% in public institutions and 81% in private schools.

CHART 6 shows the distribution of design-related Bachelor Degrees by number of enrolments.

CHART 6: DISTRIBUTION OF DESIGN-RELATED BACHELOR
DEGREES BY NUMBER OF ENROLMENTS – 2012
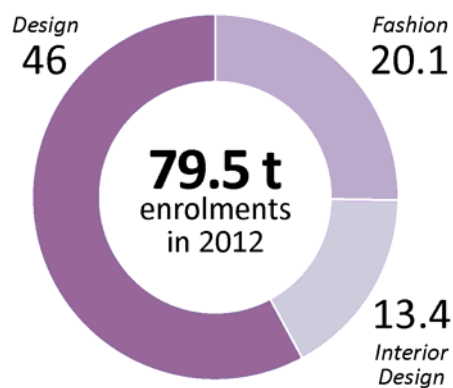
Source: The authors, based on data from Brazil: INEP (2012)

- In 2012, 13,616 design students graduated, 14% from public institutions and 86% from private institutions.
- Graduates are distributed as follows: 55% from Design programs, 27% from Fashion programs (Fashion Design and Fashion), and 19% from Interior Design programs (Interior Decoration and Interior Design).

CHART 7 presents this distribution.

CHART 7: BREAKDOWN OF DESIGN PROGRAM GRADUATES IN BRAZIL – 2012
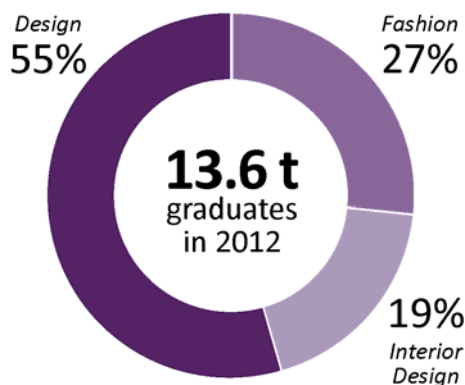
Source: The authors, based on data from Brazil: INEP (2012)

When the historical data from 2010-2012 is analyzed, it can be observed that the number of graduates from on-campus programs increased from 9,200 graduates in 2010 to 13,600 in 2012, corresponding to an increase of 53% in public education institutions and 46% in private education institutions. In total, the rise in the number of graduates corresponds to 47% in the period analyzed, as demonstrated by CHART 8. For comparative purposes, the chart also shows the increase of enrolments in on-campus design programs in Brazil for both public and private institutions over the same period, which amounted to 63%.

CHART 8: COMPARISON OF ENROLMENTS IN AND GRADUATION FROM ON-CAMPUS
UNDERGRADUATE DESIGN PROGRAMS IN BRAZIL – 2012
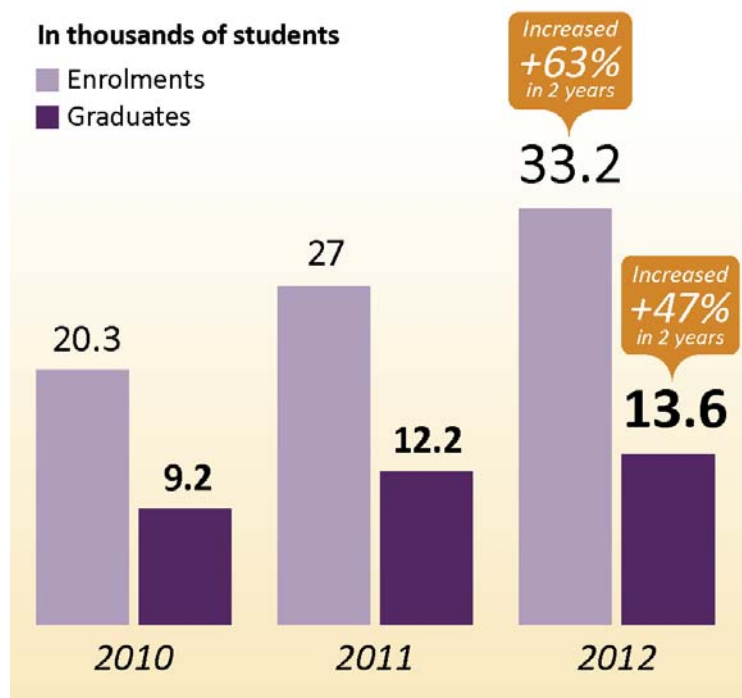
Source: The authors, based on data from Brazil: INEP (2012)

Profile of Graduates

The profile of Bachelor of Design graduates is also part of the document published in 2010 by MEC – "National Curricular Reference Points for Bachelor Degrees". According to the document, Bachelor of Design graduates should be involved in the "creation, development and execution of projects and systems that involve visual information". It describes how the activity requires knowledge and mastery of products and materials, as well as historical aspects, cultural traits, and the technological potential of production plants. Bachelor of Design graduates can develop new products, just as they can redesign existing products and adapt them to new situations or needs. A specific characteristic of their work is interdisciplinarity, which means interacting with experts from other areas who supply the complementary knowledge necessary to develop a new project. They coordinate and supervise teams, and abide by ethical, safety, and socio-environmental standards.

Some of the topics addressed in this education stream are: design; computer graphics; art history and the history of design; theories of design; project methods and techniques; means of representation; communication and information; ergonomics; materials and manufacturing processes; management; visual communication; semiotics; psychology; photography; illustration; interfaces; information and communication technology; ethics and the environment; relationships between science, technology and society.

According to the document, Bachelor of Design graduates can work in different public and private institutions; in graphic design firms or publishing houses; in various industry sectors; in design companies, or as freelancers.[76]

GRADUATE DESIGN DEGREES

Unlike other areas of knowledge, it took a long time before the first graduate design program was implemented in Brazil, which only occurred 32 years after the creation of the first undergraduate design program. In the meantime, designers resorted to other graduate degrees – in related areas – to fill that gap.[77]

After graduate design programs were set up in the country, we find them turning into an interdisciplinary space for discussions and reflections on the issues surrounding the area.
There is a series of other characterizations that can be made regarding the topic. In the sections that follow, some of these are explored in order to provide a panorama of *lato sensu* and *stricto sensu* design degrees in Brazil.

Lato Sensu Graduate Programs

Despite being accredited by the Ministry of Education, *lato sensu* design programs (graduate programs and MBAs) in Brazil are not permanent. Consequently, there are no official or definitive data on them. Additionally, said data remain valid for a short amount of time largely due to the dynamic nature of the programs on offer and their continuation.

In an estimation based on different information sources, it is observed that Brazil has 110 education institutions that offer *lato sensu* graduate design programs, and 274 specialization courses were in operation in 2013.

MAP 1 shows the geographic distribution of *lato sensu* graduate design programs by Brazilian state, which allows us to see that:

- Of the 27 members of the federation, 22 have at least one program.
- When classified by Design domain, the 274 specialization programs are distributed in the following manner: Fashion (23%); Interior Design (18%); Digital design (15%); Graphic Design (15%); Strategic Design (15%); Product Design (10%); General (4%).

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[76] BRAZIL: MEC (2010)
[77] DIAS (2004)

- Regarding the distribution of programs by Brazilian geographic region: 50% are in the Southeast; 35% are in the South; 8% are in the Northeast; 4% are in the Central West, and 3% in the North.
- São Paulo is the state with the most specialization programs in the field of design, totaling 77, followed by Paraná with 36.
- The states of Acre, Rondônia, Amapá, Roraima and Tocantins have no specialization programs in the field of design.

MAP 1: DISTRIBUTION OF *LATO SENSU* GRADUATE DESIGN PROGRAMS
BY MEMBER OF THE BRAZILIAN FEDERATION – 2013
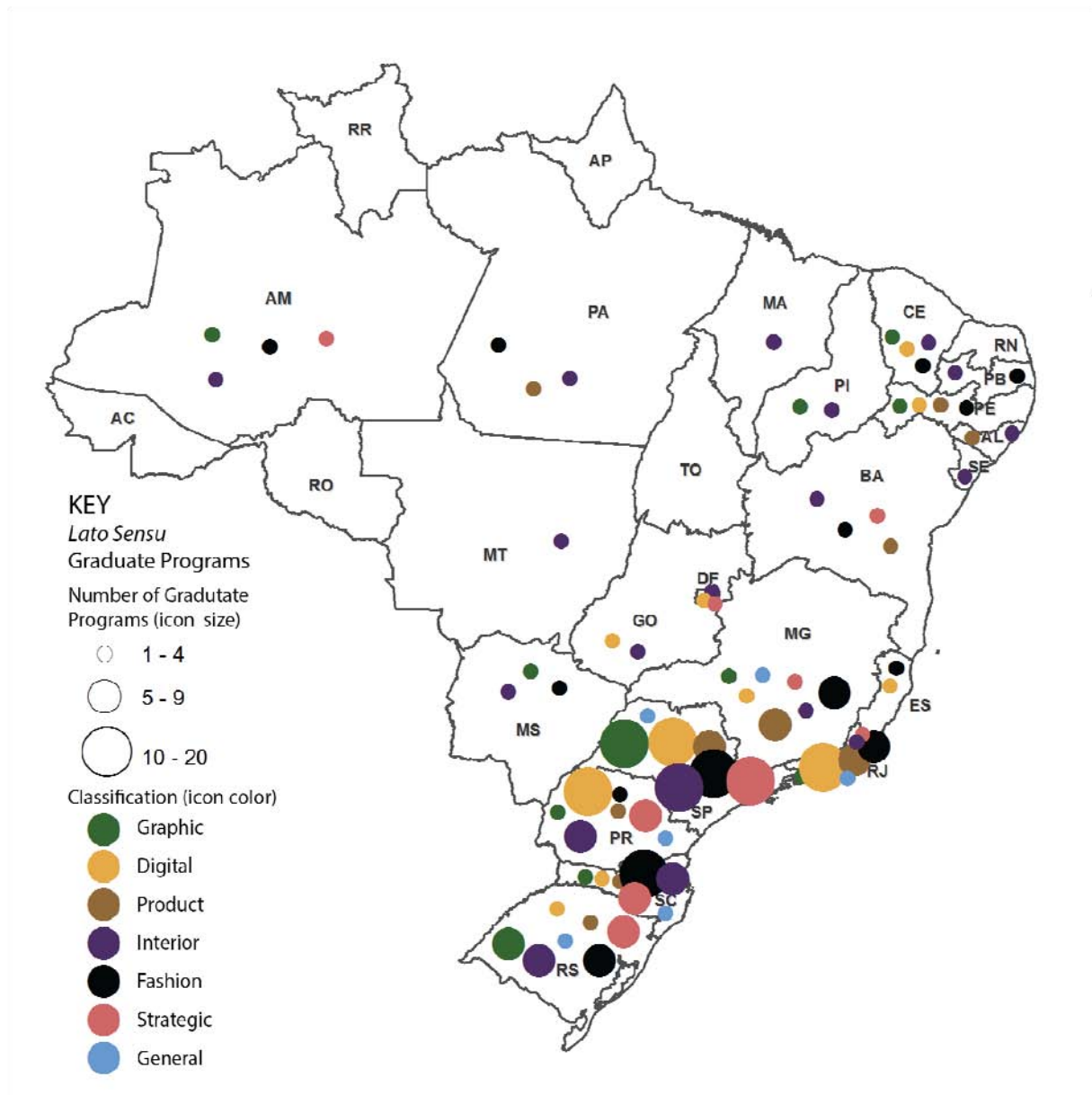
Note: the term "General" combines specializations in: Design, Design and Culture, Design and Advertising Creation, User-Focused Design, Art History – Art and Design, The Role of Design in Reading, Design, Technology and Creative Process, International Design Master, Experience Design, Creativity and the Market.

Source: The authors, based on data from a variety of sources in December 2013

Stricto Sensu Graduate Programs

Stricto sensu programs (Doctorate, Master's and Professional Master's) are regularly and periodically evaluated by the Brazilian Federal Agency for the Support and Evaluation of Graduate Education (CAPES), under MEC supervision, and these bodies provide qualitative data regarding these programs to the whole country. Based on said data, we can observe that in 2013, Brazil had 17 education institutions offering *stricto sensu* graduate degrees in the field of design and 27 *strict sensu* programs were in operation.[78]

MAP 2: DISTRIBUTION OF *STRICTO SENSU* GRADUATE DESIGN PROGRAMS
BY MEMBER OF THE BRAZILIAN FEDERATION – 2013
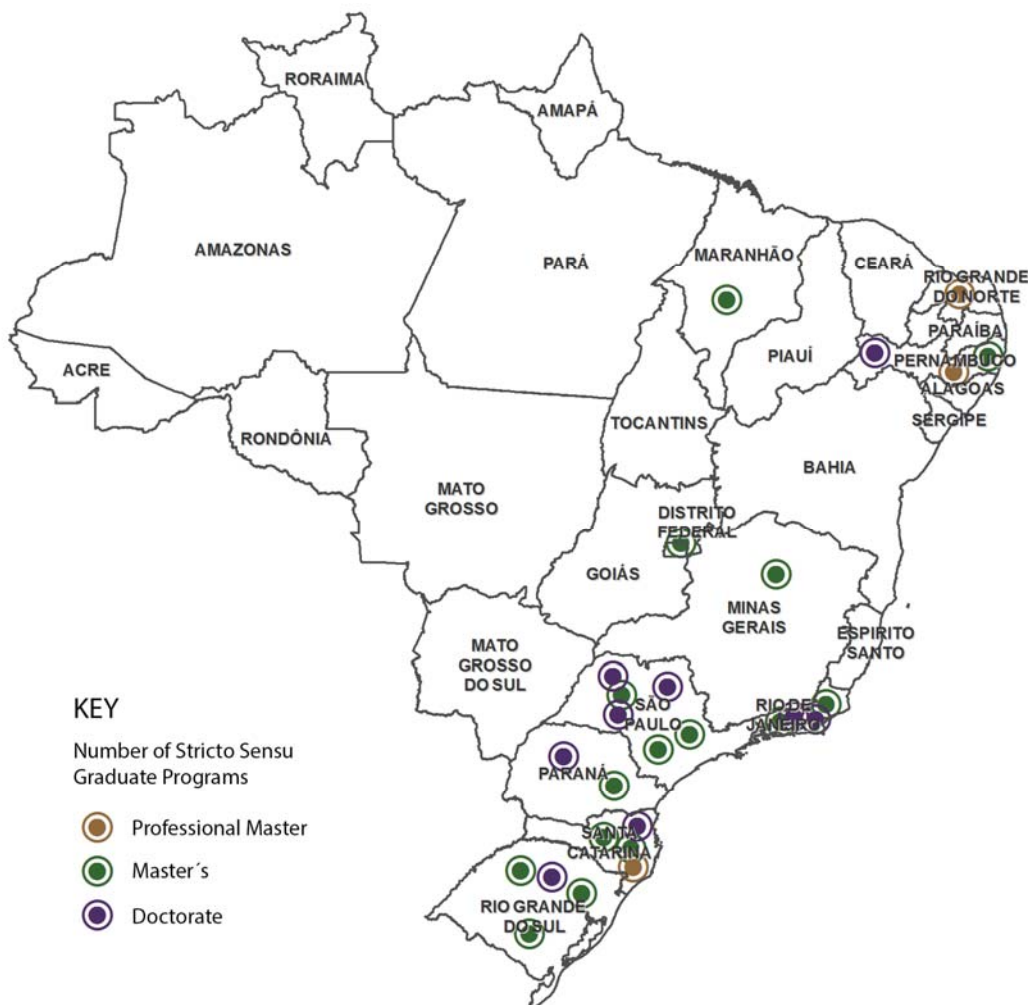
Source: The authors, based on data from Brazil: CAPES (2013)

MAP 2 shows the geographic distribution of *stricto sensu* graduate design degrees in Brazilian states, and we see that:

- Of the 27 members of the federation, only ten have *stricto sensu* graduate programs.

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[78] BRAZIL: CAPES (2013)

- *Stricto sensu* graduate design programs are distributed as follow in the country: 56% are Master's; 33% are doctorates; 11% are professional Master's.
- When the concentration of Brazilian geographical regions is analyzed, programs are distributed in the following manner: 41% in the Southeast, 37% in the South, 18% in the Northeast, and 4% in the Central West.
- The state with the largest number of programs is São Paulo, with three doctorates and three Master's.
- There are only three professional Master's programs in Brazil, located in Pernambuco, Rio Grande do Norte and Santa Catarina.

When analyzing the quality of *stricto sensu* programs in Brazil, CAPES attributes scores that range from 1 (lowest) to 7 (highest) on the basis of a triennial evaluation. The evaluation criteria include technical and academic production of graduate program faculty and students, as well as other aspects related to the available structure. Based on scores attributed by CAPES to Industrial Design programs in 2013, the following panorama can be observed:

- Of the nine design doctoral programs, seven hold a CAPES score of 4 and two hold a score of 5.
- The three professional Master's programs hold a score of 3.
- Of the fifteen design Master's programs: two hold a score of 5; five hold a score of 4, and eight hold a score of 3.

TABLE 9 lists the programs recommended and accredited by CAPES in 2012, the institution where the program is hosted, its level and score.

TABLE 9: LIST OF RECOMMENDED AND ACCREDITED PROGRAMS

STATE	UNIVERSITY	SCORE		
		M	D	F
SP	UNESP/BAU	5	5	-
DF	UNB	3	-	-
MA	UFMA	3	-	-
MG	UEMG	4	-	-
PE	UFPE	4	4	
PR	UFPR	4	4	-
RJ	UERJ	4	4	-
RJ	PUC-RIO	4	4	-
RN	UFRN	-	-	3
RS	UFRGS	4	4	
RS	UNISINOS	4	-	-
RS	UNIRITTER	3	-	-
SC	UDESC	3	-	-
SC	UNIVILLE	-	-	3
SP	UAM	4	4	-
SC	UFSC	4	4	-
PE	UFPE	-	-	3
SP	FAU/USP	6	6	-

Key: M – Academic Master's; D – Doctorate; F – Professional Master's

SOURCE: BRAZIL: CAPES (2013)

SUMMARY TABLE 11 presents a summary of *lato sensu* and *stricto sensu* graduate programs in Brazil, by state:

SUMMARY TABLE 11: GRADUATE DESIGN PROGRAMS IN BRAZIL – 2013

LATO SENSU Graduate Programs

	Fashion	Interior	Digital	Graphic	Services	Product	Others*	Total
São Paulo	19	11	11	17	11	6	2	77
Paraná	4	6	10	2	9	3	2	36
Rio de Janeiro	9	4	10	3	2	5	2	35
Santa Catarina	12	5	2	3	6	3	3	34
Rio Grande do Sul	5	5	1	7	5	2	1	26
Minas Gerais	5	2	2	2	4	5	1	21
Ceará	2	1	1	2				6
Amazonas	1	2		1	1			5
Mato Grosso do Sul	1	2		2				5
Bahia	1	1			1	1		4
Pernambuco	1		1	1		1		4
Distrito Federal		1	1		1			3
Espírito Santo	2		1					3
Goiás		1	2					3
Pará	1	1				1		3
Alagoas		1				1		2
Paraíba	1	1						2
Piauí		1		1				2
Maranhão		1						1
Mato Grosso		1						1
Sergipe		1						1
Total	64	48	42	41	40	28	11	274

110 education institutions

274 active lato sensu graduate programs

* Design, Design and Culture, Design and Advertising Creation, User-Focused Design, Art History – Art and Design, The Role of Design in Reading, Design, Technology and Creative Process, International Design Master, Experience Design, Creativity and the Market.

Methodological Note

To collect information on *lato sensu* programs, various sources were consulted (e.g. institutions' registration with MEC and graduate program guides published in Brazil). Due to the dynamic nature of these courses, this research considered valid data from November and December 2013.

On the other hand, the data from *stricto sensu* programs were obtained by searching the CAPES website, which is the body that evaluates this type of program in the country.

STRICTO SENSU Graduate programs

	Master's	Doctorate	Professional Master's	Total
São Paulo	3	3	–	6
Rio de Janeiro	2	2	–	4
Rio Grande do Sul	3	1		4
Santa Catarina	2	1	1	4
Pernambuco	1	1	1	3
Paraná	1	1	-	2
Distrito Federal	1	-	–	1
Maranhão	1	-	–	1
Minas Gerais	1	-	–	1
Rio Grande do Norte	-	–	1	1
Total	15	9	3	27

17 education institutions

27 stricto sensu graduate programs

SOURCE: The authors, based on a variety of research data

4.3.3 DESIGN AWARDS

In recent years, awards and competitions have shown themselves to be important tools to promote the culture of design in the consumer market and in the business and professional worlds. As well as generating visibility for designers, events of this nature encourage and reward initiatives that contribute to the development of design, in addition to proposing challenges, singling out products, and awarding prizes.

SUMMARY TABLE 12 presents a list of noteworthy design awards and competitions and how often they are held. Among them, 16 occur annually, 6 every two years, and 4 at indeterminate intervals. If the months when they are held are considered, there is a large volume of awards and competitions that occur between May and August. With regards to entrants, there is a balance between events directed at design students and professionals.

SUMMARY TABLE 12: MAIN BRAZILIAN DESIGN
AWARDS AND COMPETITIONS BY FREQUENCY

	Annual	Biennial	Variable
January	Jovens Designers (Young Designers) / Brasil Design Awards		
February	Concurso dos Novos (Competition of the New Ones)		
March	IDEA Brasil		
April		Prêmio IBGM de Design (IBGM Design Award)	
May	Prêmio Alcoa de Inovação em Alumínio (Alcoa Aluminium Innovation Award) / Prêmio House&Gift de Design (House&Gift Design Award)		ABD Novos Talentos (ABD New Talent)
June	Prêmio Abre da Embalagem Brasileira (Abre Award for brazilian packaging) / Talento Volkswagen Design (Volkswagen Design Talent) / Prêmio Tok&Stok Design Universitário (Tok&Stok University Award) / Prêmio Planeta Casa (Home Planet Prize)	AuDITIONS Brasil	Craft Design
July		Prêmio Objeto Brasileiro (Brazilian Object Award) / SEBRAE Minas Design	
August	Prêmio Museu da Casa Brasileira (Museum of the Brazilian House Award) / Prêmio Grandes Cases de Embalagem (Great Cases Packaging Award)	Prêmio Abilux Design de Luminárias (Abilux Prize for lighting design)	Moda Inclusiva (Inclusive Fashion)
September	Prêmio Francal Top de Estilismo (Francal Top Award for Styling)		
October	Concurso Cartaz Aberto (Open Poster Contest)		
November	Salão Design		
December			

SOURCE: The authors based on research data

In general, Brazilian design awards generally promote competition, stimulate creativity, and aspire to bring about a lively renewal. Entrants may be students at the beginning of their careers, people working in the market, and companies. International awards are less speculative, while maintaining all the other factors that encourage participation. When there is the possibility of a globalized competition, the degree of involvement, number of phases, and dedication are increased. International design awards currently offer a seal or stamp of approval, both for the product or service evaluated and for the company that commissioned it along with the designer or design firm that developed it. This seal translates into greater visibility in the media, recognition from informed consumers, absorption in the marketplace, and more competitiveness in a given sector.

Awards are intended to evaluate and reward existing works, raise the standards of design, foster a better, more extensive use of design, illustrate and define current practices, and single out social, economic and cultural indicators that may influence future design projects.[79]

The success of an award depends on its rules and the reputation of its organizers. Icograda has drawn up documents and offers guidance to organizers on developing regulations, rules of conduct and jury selection. The Council recommends its members to not compete or participate as jury members in awards that are not consistent with these recommended standards.

There are three determining factors that drive designers to enter competitions, namely: the search for credibility, the prospect of visibility, and the diversity showcased.[80]

Brazilian talent is being measured by the widespread participation of designers and companies in existing awards, both national and international. It is believed that putting their work out to be judged provides a great experience for designers, who must fulfill a series of requirements and rules in order to compete.

A barometer that illustrates Brazilian participation in international awards can be observed through an initiative by the Brazilian government, the Excellence Brazil Design Program. Some available numbers show the results already achieved, including Brazil's ranking among the ten countries winning the most European design awards upon being presented with the International Forum Product Design Award.[81]

SUMMARY TABLE 13 depicts the classification of countries presented with International Forum Product Design Awards – iF in 2008:

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[79] KLOTZEL (2009)
[80] BORGES (1996)
[81] GOUVEIA (2011)

SUMMARY TABLE 13: RANKING OF COUNTRIES PRESENTED WITH
IF PRODUCT DESIGN AWARDS IN 2008

Classification	Number of awards	Country
1st	336	Germany
2nd	84	Japan
3rd	76	Taiwan
4th	69	South Korea
5th	43	United States
6th	37	Netherlands
7th	**19**	**Brazil**
8th	16	Denmark
9th	16	France
10th	14	Switzerland
11th	13	United Kingdom
12th	13	Liechtenstein
13th	12	Finland
14th	12	Austria
15th	11	Sweden
16th	10	Belgium
17th	8	Italy
18th	7	China

SOURCE: GOUVEIA (2011)

We find that seeking visibility and recognition are important efforts designers should make to expand the reach of their work and consequently raise their value in the market.

4.3.4   FINAL CONSIDERATIONS

When we analyze designers' professional profile, we see that they have been branching out and becoming more specialized on account of the constant socio-cultural and economic transformations, as well as by virtue of rapid scientific-technological advances. In this dynamic setting, designers' work is progressing towards a systemic perspective. There is a series of social and market trends bound to change the way professionals operate in the field of design. Among them, we can emphasize:

- Depth and breadth: multidisciplinary and metadisciplinary studies and practices
- Expanded scope: scale and complexity of design problems.
- Focus on well-being.
- Targeted messages: a restricted definition of audiences.
- Rupture: an "attention economics".
- From individuality to connectivity.
- Responsible results: a focus on sustainability.
- Experience sharing: a co-creation model.
- Design for everyone.

There is no systematized statistical data regarding vocational design training in Brazil. The reference document for the issue is the "National Catalogue of Training Courses" (CNCT), developed by the Ministry of Education, which describes considerations on the seven technical courses related to the field.

Regarding tertiary education institutions that offer on-campus undergraduate design degrees, 2012 data indicates that 79% of these institutions are private, as are 78% of the programs. It can thus be inferred that the private sector has a strong presence in design education. On the other hand, the number of distance learning undergraduate degrees in design is negligible: in 2012, there was only one program on offer.

Still looking at 2012 data, we can see that undergraduate design education in Brazil is predominantly generalist, given that 50% of enrolments and 46% of graduates come from programs entitled "design".

In 2012, there was an average of 2.6 applicants competing for each place in first-year classes of undergraduate design programs, which indicates a low demand in relation to other fields of knowledge. In addition, only 24% of applicants get accepted into undergraduate design programs, and only 60% of available places are filled. It is the opinion of this author that such low rate of applicant admission merits further in-depth investigations in future studies.

On the other hand, there was an exponential increase in the number of Bachelor of Design degrees granted in 2010-2012, and the percentage of graduations from public (53%) and private (46%) institutions was similar. Overall, the number of graduates increased 47% during that period.

Regarding graduate degrees in Design, it can be observed that in 2013, 75% of *lato sensu* programs were concentrated in the Brazilian South and Southeast. In addition, in 2013 only 10 Brazilian states had institutions offering *stricto sensu* graduate design degrees. Once again, 78% of these programs were concentrated in the South and Southeast.

Finally, we looked at the different design awards and competitions in Brazil, most of them directed at both design students and professionals. It can be appreciated that designers' actively seeking to increase their visibility and recognition in the market is important to expand the reach of their work and raise their market value. Overall, Brazilian participation in awards and competitions is proving favorable.

It can be concluded that there is a significant offer of design programs in different regions, which allows a greater number of people to pursue a degree in this field. We can also see an increase in the interest in design programs, with annual increases in enrolments and graduates. However, it was not possible to gauge the quality level of the education and whether it is adequately responding to market needs. Nonetheless, it is believed that as in other fields, there are professionals that stand out for their design qualifications and awards.

4.4 INVESTMENTS AND FUNDING LINES

When it comes to innovation in Brazil, there are many available financial, technical, and management support mechanisms. Specifically for design, however, such opportunities remain embryonic. There is a

series of innovation-driving initiatives in which design is not included. Therefore, one can appreciate that there is an opportunity for existing initiatives to broaden their scope to include design. That is why the following section will include funding lines for innovation and design.

Regarding innovation and design, support mechanisms are essential to stimulate the development of new products and services, considering the level of risk that such activities pose to business leaders.

We can consider that, currently, development initiatives provide financial resources, which are transferred to the applicant company or professional by government or private entities acting in the public interest. There are still some products that are given technical and management support, in addition to funds.

This section aims to describe the current setting of financial, technical, and management support to innovation and design in Brazil. Financing methods are broken down as follows: financing and subsidies, venture capital, tax incentives, and scholarships.

4.4.1 LOANS AND GRANTS

Companies that aim to invest in innovation can obtain financial support from such institutions as FINEP (Studies and Projects Funding Agency), the CNPq (National Council for Science and Technology Development) and the BNDES (National Bank for Economic and Social Development), which are linked to the Ministry of Development, Industry and Foreign Trade (MDIC). They can also have access to free or subsidized consultancies and programs through private entities acting in the public interest, such as SEBRAE (Brazilian Service of Support to Micro and Small Businesses) or SENAI (National Service for Industrial Learning).

In the section that follows, we present the financing lines and programs that are made available through various Brazilian entities.

SUBSIDIES FOR BUSINESS INNOVATION

"Granting companies subsidies for innovation is a government policy tool widely used in developing countries, in accordance with the World Trade Organization regulations. Launched in Brazil in August 2006, this was the first time that an instrument of this type was made available in the country. The objective of the Subsidy Program is to promote a significant increase in innovation activities and a boost to the competitiveness of businesses and the national economy. This type of financial support consists of investing non-refundable public funds (those which do not need to be repaid) directly in companies, sharing with them the costs and risks inherent to such activities. The regulatory framework allowing subsidies to be granted was established by Law 10973 of December 2, 2004, regulated by Decree 5563 of October 11, 2005 (LAW OF INNOVATION), and Law 11196 of November 21, 2005, regulated by Degree 5798 of June 7, 2006 (LAW OF GOODS)." (BRAZIL: FINEP, 2014).

NATIONAL BANK FOR ECONOMIC AND SOCIAL DEVELOPMENT (BNDES)

The BNDES is a federal government-run bank linked to the MDIC. The bank finances investment projects for Brazilian companies from all sectors, as well as acquisition of equipment and exports of goods and services.

BNDES offers special conditions for micro, small and medium-sized businesses, and in its Corporate Planning 2009/2014 the bank elected "innovation, local and regional development, and socio-environmental development as the most important aspects of economic support in the current context, and which should be promoted and emphasized in all undertakings supported by the Bank".[82]

The BNDES' financing provisions can be divided into (temporary) Programs, Products, and Funds, which are directed at specific fields of activity. Each mechanism has their own specific rules tailored to their objectives. In the section that follows, we present a panorama of the available resources from this institution.

Innovation Support Programs

These programs are directed towards specific types of economic activity. They set their own financial conditions, but operate in conjunction with one or more of the bank's financing products. They have a transitory nature, limited funds earmarked, and a set timeframe.[83]

The section below describes some important programs for innovation and design. Some of them directly impact the field of design, while others, do so indirectly.

BNDES Company Revitalization Program (BNDES Revitalize)

Launched in 2011, the program includes a wide range of design-related expenses on its list of items eligible for financing. Including sectors such as footwear, furniture, textile and clothing, tile and jewelry, the program supports investments targeted at adding value to national products, the adoption of more efficient production methods, and strengthening company brand names. Among the items eligible for financing are investments in marketing, industrial design, brand name and logo creation, market studies, production of advertising materials and introduction of new products into the market, as well as product research, development and improvement, packaging, processes, services, modeling, and prototyping. Loans may be indirect non-automatic and indirect automatic, with the BNDES financing a maximum of 70% to 90% of the value of the financed items. Financing is capped at BRL150m per economic group and loans may be repaid in up to 8 years, including grace periods ranging from 1 to 36 months.

BNDES Prodesign

The program encourages investments in design, fashion, product development, brand differentiation and strengthening in textile and clothing industry supply chains, footwear, furniture, personal hygiene,

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[82] BRAZIL: BNDES (2013a)
[83] BRAZIL: BNDES (2013b)

perfume and cosmetics, housewares, toys, bathroom hardware, jewelry, watches, packaging, household appliances, and wall and floor tiles, including all the respective specialized types of services and trade associated with the aforementioned industry sectors. Loans may be indirect not automatic, indirect automatic, and mixed. The BNDES finances a maximum of 70% to 90% of the value of the items financed. Financing is capped atBRL3m over a five-year timeframe at the most, including grace periods ranging from 1 to 18 months.

BNDES Procult

This program finances investment projects and company business plans in all supply chains of the cultural industry. Among the resources financed, we can single out expenditures on research and development of new products and services, including design and registration of intellectual property rights. Loans may be direct, indirect non-automatic (through accredited financial institutions), or mixed. Investment-associated working capital loans are limited to 40% of the value of items financed. The maximum amount granted by the BNDES may be increased to up to 90%, to be repaid within five to ten years, including the grace period.

In addition to the aforementioned programs, there are others available for specific economic sectors, and which, in keeping with their major goal of developing said sectors, also include innovation. They are: BNDES Proplastic; BNDES P&G (Oil & Gas); BNDES Profarma (Industrial Health Complex); BNDES Prosoft (Software and IT); BNDES Proaeronáutica; BNDES Proengenharia, and PROTVD (Software, electronic components, broadcast equipment and infrastructure, reception and production of SBTVD-T content).

Innovation Support Products

These products are the BNDES' most basic, long-term credit mechanisms. They define the general rules for the financial conditions and operating procedures of loans. The main ones are:[84]

BNDES Automatic

Created to support implementation, expansion, renovation, and modernization projects for fixed assets, including Research, Development and Innovation (RD&I) projects.

BNDES Card

This product is based on the credit card concept and provides micro, small and medium-sized companies with applied research, development and innovation (RD&I) services for product and process development. In conjunction with the Brazilian Program of Design, the MDIC and the BNDES, since 2010 design service providers can register with the BNDES card Portal of Operations, which lists, integrates, and makes financial services available to those interested. RD&I services are among the items eligible for support, including:[85]

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[84] BRAZIL: BNDES (2013b)
[85] MESSIAS (2012)

- Technological extension.
- Packaging development.
- Product design, ergonomics and modeling.
- Prototyping.
- Highly complex technical response.
- Experiment project.
- Viability analysis and intellectual property registration application.
- Technicians specializing in energy efficiency and environmental impact.
- Acquisition of technology-related knowledge and technology transfers.
- Metrology, standardization, technical regulations, and compliance evaluation (inspections, tests, certification, and other authorization procedures).

BNDES Credit Limit

Revolving credit to support companies or economic groups that are already BNDES clients and whose credit risk is low.

BNDES Finem

The program finances company implementation, expansion and modernization projects. The minimum amount loaned by BNDES Finem – usually BRL 20m – may be reduced down to BRL 1m through the financing line dedicated to innovation investments, which is the following:

- BNDES Innovation: The objective of the BNDES Line of Innovation Support is to help Brazilian companies become more competitive by means of strategic investments in innovation, including initiatives towards product, process, or marketing innovation. Loans are granted for investments in building intangible capital and physical infrastructure – such as the implementation of research and development centers, for example.

Innovation Support Funds

Funds are resource sources governed by regulations or law and operate according to specific conditions and operating procedures. Below, we look at an innovation support fund.[86]

Non-refundable innovation support fund: Technological Fund – BNDES Funtec

Created to financially support innovation and technology development projects that are strategic for the country, consistent with the federal government's public programs and policies and the directives related to each line of work. Technological Fund – BNDES Funtec resources must be used in applied research, technology development, and innovation projects focused on energy, the environment, electronics, new materials, chemistry, electric vehicles. This program has been temporarily suspended.

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[86] BRAZIL: BNDES (2013b)

Other forms of support

In addition to the aforementioned examples, the BNDES operates another two support mechanisms, the Company Innovation Plan and the Variable Income, which are described below:

Plano Inova Empresa **(Company Innovation Plan)**

Along with FINEP and other public bodies, the BNDES participates in *Plano Inova Empresa*. Since 2001, the objective of the initiative is to develop projects that support innovation in sectors considered strategic by the federal government. Funds are made available upon calls for proposals selecting projects to receive grants already available through partner institutions. Among the plans in operation are *Inova Aerodefesa, Inova Agro, Inova Energia, Inova Petro, Inova Saúde, Paiss* and *Plano Inova Sustentabilidade*.

Renda Variável **(Variable Income)**

The BNDES is allowed to underwrite securities publicly or privately issued by publicly-traded companies, or securities privately issued by companies that may go public in the short-or medium term. Among the *Renda Variável* products we can highlight the BNDES Innovation Line, which focuses on helping companies become more competitive through innovation investments included in their business strategies. The program focuses on continuous or structured actions designed for product, process and/or marketing innovation, as well as initiatives to enhance skills and technical knowledge in the country. The minimum loan amount is BRL1m, and the bank may finance up to 90% of the total value of items eligible for financing.

SUPPORT TO INNOVATION
In the first semester of 2013, BNDES disbursed BRL88.3b for projects in various industries, 65% more compared to the same period in 2012. At present, a great demand for innovation funds is seen in the country, which shows the Brazilian economy has been investing more in science and technology, states the Brazilian Association for Industrial Development (ABDI). "The results from the last seven calls for proposal launched by FINEP in partnership with other public bodies, within the scope of the federal government's *Plano Inova Empresa*, point to an initial demand of BRL43b." Under the federal government's National Program of Support for Technology Incubators and Parks, in 2013 the MCTI and FINEP launched a BRL640m call for proposal to select technology parks in operation and under implementation, with the objective of increasing the Brazilian economy's productivity and competitiveness.
Also regarding support to innovation, in 2013 the MDIC paid special attention to and encouraged investments in startups. The Ministry signed a cooperation agreement with the non-profit organization *Anjos do Brasil*, which agreement "makes room for new public policies that stimulate the so-called "angel investments", directed at startups. (ANPEI, 2009; ABDI, 2013).

STUDIES AND PROJECTS FINANCING AGENCY (FINEP)

An important product, process, and service support agency in the country,[87] the mission of the Studies and Projects Financing Agency (FINEP) is to "promote the economic and social development of Brazil through public support to Science, Technology and Innovation in companies, universities, technology institutes, and other public or private institutions".[88] Linked to the MCTI, FINEP operates in partnership with companies, institutes, research centers, governmental bodies, investors, and third sector entities. FINEP is charged with financing the science, technology and innovation system by offering non-refundable resources (grants), loans, and venture capital (in this last case, the agency becomes a partner in the enterprise). In the section that follows, we present some of the support lines made available by FINEP.

Types of Financing for Companies (Loans)

Loans are granted to institutions that prove capable of repaying them and developing RD&I projects. Grace and amortization periods are calculated based on the project's execution timeframe, cash flow, and the company's repayment capability. Among these, we can highlight the following:[89]

FINEP Inova Brasil

Targeted at businesses of all sizes, the *FINEP Inova Brasil* program (Innovation Incentive Program for Brazilian Companies) finances research, development, and innovation projects carried out by national companies. Financial charges depend on project characteristics. Funds are provided for Pioneering Innovation, Ongoing Innovation, and Competitiveness projects. The program aims to support the Strategic Investment in Innovation for Brazilian Companies Plans, in conjunction with the *Plano Brasil Maior* (PBM).

Tecnova

Through funds, the program supports innovation to expedite the growth of a group of micro and small-sized businesses. The funds are transferred to the companies through state partners, and these partners carry out the operating activities inherent to the process (analysis and selection of proposals, contracting, disbursement of funds, physical and financial follow-up, account rendering etc.) The program supplies partners with funds in the amount of BRL190m meant to finance the companies' expenses and support projects that develop innovative products and processes. The first edition occurred in 2013 with the disbursement of funds in 2014, and more editions are expected to come.

Inovacred

This program finances product, process, and service innovation, development, and improvement, marketing innovation, and organizational innovation in an effort to increase companies'

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[87] ANPEI (2009)
[88] BRAZIL: FINEP (2013)
[89] BRAZIL: FINEP (2013)

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competitiveness both state-and nationwide. Funds are provided in a decentralized manner through financial agents, which operate in their respective states or regions. There is no deadline for financial agents interested in operating the Inovacred Program to seek accreditation. The amounts for the projects financed vary between BRL150,000 and BRL10m, according to the size of the company.

There are other lines of funding from FINEP that focus on supporting innovation in specific sectors. Each line has its own particular features, but generally they seek to meet innovation development needs. Among these lines of funding are: *Inova Saúde*, *Paiss* (processing of the sugarcane biomass), *Inova Aerodefesa*, *Inova Agro, Inova Energia* and *Inova Petro.*

Types of Financing for Companies (Grants)

Since 2006, public grants have been provided through FINEP (which shares the costs and risks inherent to the activities with the beneficiary company) to fund research, technology development, and innovation efforts by Brazilian companies.

The grants are awarded through calls for proposals, each setting their own specific amounts of money, timeframes and requirements. The calls for proposal are issued on a seasonal basis and posted to the FINEP website, where they can be searched.

Brazilian System of Technology (SIBRATEC)

SIBRATEC supports research and development of product and process innovation and is an instrument for bringing the scientific community and companies together. It was created in 2007 to increase companies' innovation and competitiveness rates in keeping with the Science, Technology and Innovation Action Plan. SiBRATEC is organized into networks through which companies can access services and specialized technology-related assistance, and carry out innovation projects in partnership with science and technology institutions. The networks award grants that vary in accordance with the projects.[90] SIBRATEC networks are composed of:

- *Innovation Centers:* They are development units belonging to technology research institutes or universities. The Networks of Innovation Centers seek to generate and transform scientific and technological knowledge into product and process innovation.
- *Technology Services:* The Technology Service Networks provide businesses with metrology, standardization, and compliance analysis services to help them meet technical requirements that allow access to markets. They also help Brazilian calibration, test, and analysis laboratories adapt and modernize their infrastructure.
- *Technological Extension:* Set up by state governments and primarily dedicated to serving the states' production sectors, the Networks of Technological Extension provide specialized technical assistance to innovation processes through arrangements with specialized institutions that help companies improve their products and production processes and reduce operating costs, besides providing training associated with technology consulting etc.

[90] BRAZIL: SIBRATEC (2013)

MINISTRY OF LABOR AND EMPLOYMENT (MTE)

The MTE, a federal government body, is charged with several duties. Regarding innovation financing, the MTE offers the *FAT – Proger* Employment and Income Creation Programs, comprising a series of lines of credit available for stakeholders to invest in the growth or modernization of their business or obtain resources to fund their activities. Among the lines of credit, we can highlight:[91]

FAT Pró-inovação

The program finances pre-investment studies and projects by Brazilian consulting engineering companies wishing to implement infrastructure works that improve the quality of end products, allow for the highest production efficiency, and introduce innovative products and processes. Up to 80% of the total project value may be financed. Loans are capped at BRL5m per company.

Proger Urbano – Investimento – Inovação

Financial support for investments in technological innovation projects carried out by micro and small-sized companies that create or maintain jobs and income. Up to 100% of the project value is eligible for financing. Loans are capped at BRL 600,000.

NATIONAL SERVICE FOR INDUSTRIAL LEARNING (SENAI)

An Industry System member, SENAI is seen as a benchmark of vocational training and renowned for the quality of its technology-related services that foster innovation within the Brazilian industry. SENAI's initiatives include the following call for funding proposals:

Edital Inovação

Every year, the country's manufacturers can apply for funding through *Edital SENAI SESI de Inovação*, a call for proposal dedicated to the support of technological and social innovation projects. In 2013, BRL30.5m were invested. For projects developed in partnership with SENAI, the value was BRL20m; for partnerships with SESI, the value was BRL7.5m. Another BRL3m were granted in scholarships through the National Council for Science and Technology Development (CNPq).[92]

BRAZILIAN SERVICE OF SUPPORT TO MICRO AND SMALL BUSINESSES (SEBRAE)

The Brazilian Service of Support to Micro and Small Businesses (SEBRAE) is a public-interest, non-profit private entity that provides training and foster the development of small businesses in Brazil.

SEBRAE operates offices in the 27 members of the Brazilian federation to support the competitiveness and sustainability of micro and small-sized companies. SEBRAE offers training and education in strategic areas for the sustainability of small businesses, such as planning, financial management, and innovation.

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[91] BRAZIL: MTE (2013)
[92] SENAI (2013)

Design is one of the strategic areas in which small businesses can innovate and set themselves apart in the market. SEBRAE helps entrepreneurs implement this strategy through technology solutions and programs, among which we can highlight:

Solutions:

Oficina Crescer com Design (Grow through Design Workshop)

Objective: provide information allowing individual micro-entrepreneurs to understand the competitive advantages that design affords.

Diagnóstico de Loja SEBRAE (SEBRAE Shop Diagnosis)

Objective: analyze the shop's customer services, layout, and business management (financial; sales, and marketing; people; processes) to facilitate the implementation of innovative strategies meant to make the company more competitive.

Gestão Visual de Loja (Retail Visual Management)

Objective: analyze the layout and design of the shop to improve the entrepreneur's understanding of how important interior design is for company management, and work out an action plan to increase sales. Topics addressed: display window concept, product display techniques, display window dressing, how to plan the look of the shop to make it a part of the company strategy.

Autodiagnóstico on line de design (Online design self-diagnosis)

Objective: make it possible for the entrepreneur to identify the level at which design is used by the company, and receive preliminary guidance on how to improve its use by said company. Sector: various.

Oficina Ser mais com design (Be more through design Workshop)

Objective: make it possible for the entrepreneur to understand the role of design when it comes to innovation and increasing the competitiveness of a small business by improving and creating processes, products, and services featuring competitive advantages.

Edição Eletrônica do Manual de Embalagem para o Artesanato (Electronic Edition of the Arts & Crafts Packaging Manual)

Objective: show Brazilian craftspeople the different ways of packaging that can be used to gain a competitive advantage, while adding safety and value to handmade pieces.

Programs:

Programa Sebraetec de Consultoria Tecnológica (SEBRAETEC Technology Consulting Program)

Operating across industries, the SEBRAETEC Program offers small businesses access to more than 1,400 suppliers – such as education, research, and extension institutions – of innovation and technology solutions all over Brazil. SEBRAE subsidizes 80% of consultancy fees for individual micro entrepreneurs, micro and small businesses, and farmers. Among its objectives and benefits, we can

highlight increased productivity, the responsible us of raw materials, lower production costs, improved production processes, lower operating costs, higher end-product quality, and the company's increased competitiveness in the market.

Programa Agentes Locais de Inovação (ALI) – Local Innovation Agents Program (ALI)

Carried out in partnership with the National Council for Science and Technology Development (CNPq), ALI operates across the country to educate entrepreneurs about the importance of innovation. All over the country, recent graduates (three years fresh from school, at the most) assist small-sized businesses. These businesses are evaluated using the so-called innovation radar, which points out the greatest challenge areas to be tackled for the business to innovate and evolve.

Calls for proposals

On SEBRAE's website, it is possible to keep track of grants awarded via calls for proposals, each setting their own amount of money, timeframe and specific requisites. The objectives and scope of these calls for proposals include accepting proposals meant to support various projects, such as business incubators, sponsorships, and technological innovation, among others.

SUMMARY TABLE 14 below summarizes the loans and grants available to support design and innovation according to the institutions and procedures described, categorized into credit lines, financing lines, financing programs, public calls for proposals for economic subsidies, funds, and venture capital.

INNOVATION & DESIGN

	Credit	Financing Line	Financing Program	Funds/Venture Capital	Subsidy
BNDES — National Bank for Economic and Social Development	**4** BNDES Limite de Crédito (BNDES Credit Limit) BNDES Automático PD&I (MPME) (BNDES Automatic RD&I - MPME) BNDES Automático PSI (Inovação) (BNDES Automatic PSI - Innovation) Cartão BNDES (BNDES Card) (Credit for applied research, development and innovation (RD&I) of products and processes in MPMEs). RESOURCES: RR\$1m per issuing bank	**2** REVITALIZA Investimento (REVITALIZE Investment) BNDES Inovação - Finem (BNDES Innovation - Finem)	**9** PROCULT PRODESIGN Support program for investments in design, fashion and brand strengthening. RESOURCES: from RR\$ 3m +7 other programs	**8** FUNTEC CRIATEC +6 other funds	
FINEP — Studies and Projects Funding Agency		**6** Inovacred +5 other lines	**2** Tecnova Inova Brasil	**1** Projeto INOVAR (INOVAR Project)	Calls for proposals*
SEBRAE — Brazilian Service of Support to Micro and Small Business			**1** SEBRAETEC Support to innovation and/or shared technology service projects through calls for proposals. RESOURCES: RR\$600,000	**1** Programa Capital de Risco (Venture Capital Program)	Calls for proposals*
SENAI — National Service for Industrial Learning					**1** Edital SENAI/SESI Inovação 2013 (2013 SENAI/SESI Innovation calls for proposals)
MTE — Ministry of Labor and Employment	**2** FAT – Pró-Inovação PROGER – Urbano Investimento Inovação (Urban Innovation Investment)				

SOURCE: The authors, based on research data

4.4.2 VENTURE CAPITAL FUNDS

Venture capital is a type of financing in which the investor shares in the technological and commercial risk of a project. The payment of the credit is linked to the financial results obtained by the company executing the R&D project.

Venture capital translates into temporary investment of funds, managed by banks or specialized entities, in emerging businesses with great growth potential. By buying stock or convertible

debentures, these funds acquire ownership interest in the emerging business. An investor's interest is explained by the possibility of obtaining a return on the invested capital above other alternatives available in the financial market, given the greater exposure to risk.[93]

Some institutions, such as FINEP and the BNDES, set up mixed funds in order to be able to raise private funds to finance project risks. These institutions' strategies, together with those of other private funds, are described in the section that follows.

PROGRAMA CRIATEC (BNDES)

The Criatec Program, currently in its 2nd edition, was created in 2007 with the objective of setting up an investment fund with participation from the BNDES to capitalize micro and small-sized innovative businesses. Criatec II prioritizes investments in the sectors of Information and Communication Technology (ICT), Agribusiness, Nanotechnology, Biotechnology, and New Materials.

PROJETO INOVAR (FINEP)

Launched in 2001, the venture capital program is meant to help the entrepreneurial capital industry cement itself and foster development of innovative national businesses. This partnership between FINEP and the Multilateral Investment Fund of the Inter-American Development Bank, FUMIN/BID is dedicated to providing seed money for investments, creating angel investor networks, providing strategic advice, and pitching innovative projects to potential investors. The Inovar Program seeks to attract institutional investors to the Brazilian industry and is includes the transfer of FINEP's accumulated knowledge to similar institutions and initiatives in Latin America. The project is carried out periodically, for an unspecified length of time.

PRIVATE FUNDS

Although they are still small in number, there are private venture capital funds that invest in technology-based companies. They are listed in SUMMARY TABLE 15:

SUMMARY TABLE 15: PRIVATE VENTURE CAPITAL FUNDS
INVESTING IN TECHNOLOGY-BASED COMPANIES

Private Venture Capital Funds	Interest Areas
Votorantim Ventures	Computer science, telecommunications, bioinformatics and biotechnology
CRP Companhia de Participações	IT, biotechnology, fine chemistry, precision mechanics, new materials.
Eccelera	IT, telecommunications, mobile solutions.
Stratus Investimentos	Small and medium emerging businesses, preferably already operational.
FIR Capital Partners	IT, biotechnology, education, health.
MVP (Mercatto Venture Partners)	IT and telecommunications.
Rio Bravo Investimentos	Infrastructure, services, IT, telecommunications, and life and environmental sciences.
FundoTec	Mutual Investment Fund in Emerging Technology-Based Companies
GP Tecnologia – GP Investimentos	Technology, energy, oil and gas.

SOURCE: The authors, based on data from ANPEI (2009)

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[93] ANPEI (2009)

4.4.3 TAX INCENTIVES

Tax incentives for R&D in all industry sectors were created by Law 11196/2005, also known as *Lei do Bem* (Law of Goods), which authorizes the federal government to grant tax incentives to companies conducting technology research and developing technological innovation. Activities can revolve around the creation of new products or manufacturing processes, or the addition of new functionalities or characteristics to existing products or processes, which lead to incremental improvements or quality and/or productivity gains, resulting in added market value.

In summary, the incentives set out in *Lei do Bem* are:

- Income Tax deductions of expenses resulting from R&D activities
- Deduction of expenses in scientific and technology research projects carried out by a Science and Technology Institute.
- Reduction of IPI when purchasing equipment, machines, devices, and instruments, as well as replacement accessories and tools that accompany these goods, intended for use in R&D.
- Creit from withholding income tax levied on amounts paid or remitted to beneficiaries residing or domiciled abroad as royalties or compensation for technical assistance and specialized services provided for in technology transfer contracts.
- Depreciation of machines, equipment, devices, and instruments used in R&D activities.
- Amortization for the acquisition of intangible assets linked exclusively to technology research and technological innovation development activities.
- Lower withholding income tax rate on payments made abroad involving the registration and maintenance of trademarks, patents, and cultivars.[94]

In addition to R&D tax incentives, there are others targeted at the cultural industry that include design, such as the case of *Lei Federal de Incentivo à Cultura* (a federal Law that encourages investments in cultural projects) – Law 8313 of December 23, 1991, better known as *Lei Rouanet*, which created the National Cultural Support Program (Pronac). The objective is to "stimulate the production and distribution of, and access to cultural goods; protect and conserve the historical and artistic heritage; and stimulate the dissemination of Brazilian culture and regional and ethno-cultural diversity, among others." There are two forms of support through Pronac: the National Cultural Fund (FNC), whose resources are employed in activities and initiatives directed by the Ministry of Culture (MinC), or Tax Incentives, through which it is possible to seek resources from people or companies that will be given tax breaks.[95]

4.4.4 SCHOLARSHIPS

In Brazil, different types of scholarships are offered to students interested in conducting scientific research, as well as experts interested in conducting research and development activities in companies and technology centers. Some types are described in the section that follows, by institution.

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[94] ANPEI (2009)
[95] BRAZIL: MINC (2007)

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY DEVELOPMENT (CNPq)

Among its many duties as a research-fostering agency linked to the Ministry of Science, Technology and Innovation (MCTI), this agency offers the following scholarships:

In-Company Researcher Program

Created in 1987 and carried out through calls for proposals, the Program for Training Human Resources in Strategic Areas (RHAE) serves micro, small, mid-sized and large enterprises whose headquarters and administration are located in Brazil. Conducted in collaboration with the MCTI and the CNPq, the various types of scholarships aim to train human resources to conduct applied research and technology development projects, in addition to supplying businesses with staff trained in R&D activities.[96] TABLE 10 shows the growth in the use of this program between 2007 and 2012.

TABLE 10: RHAE NUMBERS

Calls for Proposal	BRL (in millions)	Demand	Projects approved	Companies considered	Scholarships	Scholarships granted (divided by degree)
2007 (32/2007)	20	710	131	124	385	93 doctors, 112 masters, 96 bachelors and 84 undergraduates.
2008 (67/2008)	26	727	173	166	690	130 doctors, 182 masters, 155 bachelors and 223 undergraduates.
2009 (62/2009)	30	1,068	188	177	621	112 doctors, 166 masters, 180 bachelors, 152 undergraduates and 11 visiting experts.
2010 (75/2010)	40	1,125	211	209	694	117 doctors, 198 masters, 189 bachelors, 113 undergraduates, 23 visiting experts and 54 technical support staff.
2012 (17/2012)	60	1,558	265	247	932	125 doctors, 255 masters, 280 bachelors, 178 undergraduates, 28 visiting experts and 66 technical support staff.

Source: BRAZIL: CNPQ (2013c)

Scholarships

On its website, the CNPq lists the different scholarships in the country, abroad, and for companies,[97] dedicated to training human resources in the field of science and technology research. The scholarships are offered to high school students and undergraduate and graduate degree candidates interested in conducting scientific investigation and/or research and development in companies and technology centers. There are a total of 38 different scholarships, of which 15 are targeted specifically for in-company use.

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[96] BRAZIL: CNPQ (2013c)
[97] BRAZIL: CNPQ (2013b)

Calls for Proposals

The CNPq constantly selects requests for financial support through calls for proposals featuring a variety of timeframes, budgets and objectives. For instance, the Support for the Implementation and Training of Technology Innovation Centers accepts projects that aim to contribute significantly to the development of science, technology, and innovation in the country through the implementation and training of the Technology Innovation Centers (TICs). Other calls for proposals can be searched on the CNPq website.

Below we present a summary of financial assistance possibilities for students and researchers by institution and type described, categorized in calls for proposal, academic scholarships, and various aids.

SUMMARY TABLE 16: SCHOLARSHIPS AND SUPPORT FOR STUDIES AND RESEARCH

DEVLEOPMENT AND RESEARCH

	Calls for proposals	Scholarships	Aid
CNPq — National Council for Scientific and Technology Development	**2** RHAE – Pesquisador na Empresa (In-company Researcher) Apoio à Implantação e Capacitação de Núcleos de Inovação Tecnológica (Support for the Implementation and Training of Technology Innovation Centers)	**15** ITI – Iniciação Tecnológica e Industrial (Introduction to Technology and Industry) ITC – Iniciação Tecnológica em TIC's (Introduction to ICT Technology) IEX – Iniciação ao Extensionismo (Introduction to Extension Studies) PDI – Pós-Doutorado Empresarial (Business Post-Doctorate) DTI – Desenv. Tecnológico e Industrial (Technological and Industrial Development) DTC – Desenv. Tecnológico em TICs (ICT Technology Development) ADC – Apoio à Difusão de Conhecimento (Support for the Dissemination of Knowledge) SET – Fixação e Capacitação de RH (HR Definition and Training) ATP – Apoio Técnico em Extensão no País (Technical Support for Extension Studies in the Country) BEP – Estágio/Treinamento no País (In-Country Internship/Training) BSP – Estágio/Treinamento no Exterior (Internship/Training Abroad) BEV – Bolsa a Especialista Visitante (Visiting Expert Grant) EV – Especialista Visitante (Visiting Expert) EXP – Extensão no País (Advanced In-Country Training) SWI – Doutorado Sanduíche (Doctorate Exchange Program) +23 other scholarships	**5** ARC – Auxílio Promoção de Eventos Científicos, Tecnológicos e/ou de Inovação (Support for the Promotion of Science, Technology and/or Innovation Events) APV – Pesquisador Visitante (Visiting Researcher) AVG – Participação em Eventos Científicos (Participation in Scientific Events) APQ – Projeto Individual de Pesquisa (Individual Research Project) AED – Editoração (Publishing)
CAPES — Brazilian Federal Agency for the Support and Evaluation of Graduate Education	**20** Special programs* Auxílio Financeiro a Projeto Educacional ou de Pesquisa (AUXPE) (Financial Support for Educational or Research Project) Bolsas para estudantes de todos os níveis (país e exterior)* (Scholarships for students at all levels – in-country and abroad*)		**2** PAEP – Programa de Apoio a Eventos no País (Support Program for In-Country Events) AEX – Apoio a Eventos no Exterior (Support for Events Abroad)

SOURCE: The authors, based on research data

BRAZILIAN FEDERAL AGENCY FOR THE SUPPORT AND EVALUATION OF GRADUATE EDUCATION (CAPES – *COORDENAÇÃO DE APERFEIÇOAMENTO DE PESSOAL DE NÍVEL SUPERIOR*)

Linked to the Ministry of Education, CAPES is responsible for the expansion and consolidation of graduate studies (Master's and doctorates) in all states. In the interests of stimulating the education of human resources and complementing the efforts of undergraduate and graduate programs, CAPES grants scholarships for in-country and overseas study.[98] CAPES also grants university/company collaboration scholarships. We can highlight:

National Post-Doctorate Program (PNPD)

Supports science, technology, and innovation research aimed at the:

- Temporary assignment of young Doctors with relative experience in Research, Development and Innovation (RD&I) to projects focusing on strategic areas of research and development.
- Advancement of graduate studies and national research groups.
- Refresh training for high-level university faculty and research institution staff to teach in graduate programs, serve as advisors, and conductresearch.
- Expansion and consolidation of programs and initiatives by agencies participating in this program.
- Support for Production Development Policies (PDP) under Law 10973/04 – Law of Innovation, and Law 11487/2007, which regulates and grants tax incentives for the development of joint RD&I projects by science and technology institutions and businesses.
- Support for technology-based companies (EBTs) and sector-specific agencies supporting research, development, and innovation by companies.
- Development of initiatives by Technology Innovation Centers (TICs) from Science and Technology Institutes.

4.4.5   FINAL CONSIDERATIONS

The range of available resources and technical and management support mechanisms for innovation and design in Brazil is growing. However, design-specific options remain limited.

We find that innovation incentives are oftentimes useful for the field of design. Taking that into account, people interested in finding support mechanisms and financial resources targeted at design must carefully search generic innovation-stimulating strategies for offers that may serve them.

Financial resources for innovation and design in Brazil has been made available via the following mechanisms: loans and grants, tax incentives, venture capital, and scholarships.

In terms of financial support for innovation, we can single out the following entities: the BNDES, FINEP, the MTE, SENAI, the CNPq and CAPES. Beyond these, there are private funds from a variety of national companies.

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[98] BRASIL: CAPES (2013)

A specific example of the growing supply of resources for innovation in Brazil is the numbers reported by the BNDES, which in the first semester of 2013 disbursed BRL88.3b for projects in various sectors, a 65% increase compared to the same period in 2012. Regarding the financial incentives provided by the public sector and focused on design, the BNDES stands out in the country by offering a variety of lines, programs and products. The BNDES Card, for example, includes design services in its list of items eligible for funding, and benefiting both independent consultancies as well as micro, small and medium-sized enterprises that need such services.

Among the BNDES programs we can also single out Prodesign, Revitaliza and Procult, as those that prominently feature design in their scope. Design is also considered in the bank's special innovation-financing streams available for projects related to tests, prototyping, and other efforts related to the area.

We should also mention private and public-interest bodies that support innovation in Brazil. SEBRAE is an agency that supports micro and small-sized enterprises, by providing management and innovation training. SENAI provides advisory services on technical and technological matters, applied research, technological information, laboratory services, and design. In addition, SENAI annually releases *Inovação* calls for proposals aimed at supporting design-related projects.

There is a clear need to expand the current specific policies that support and finance the field of design, and to set policies which transversally include design in the agenda of other sectors and fields.

The cross-industry nature of design leads us to think there may be opportunities to include design in multiple financial and technical-management support strategies, and that requires those interested in obtaining said benefits to join forces and push for it.

Incidentally, we have found that design is seen mostly as a mere esthetic feature added to products. However, the work done by designers is much broader and more complex. This range needs to be better understood and then acknowledged by financial and technical-management support policies dedicated to design.

4.5   KNOWLEDGE PRODUCTION

In recent decades, in response to the visible scientific-technological progress, it has become necessary to organize and analyze diverse information regarding the production of knowledge generated by different disciplines. In the field of design, which is currently expanding in Brazil, that is no different. On account of social, economic, and political changes, an increase in the production of knowledge can be observed.

In this scenario, a series of support mechanisms have been created to drive the scientific-technological development of design and knowledge production in the area. Among them, there are incubators, laboratories, research groups linked to tertiary education institutions, and the Brazilian Conference on Design Research and Development (R&D), which are indicators of the level of scientific-technological production on the topic. In the following section, we will also address initiatives that promote design and the generation of design knowledge, such as the national events calendar, publications, publishing houses, and academic journals.

4.5.1 DESIGN INCUBATORS

Incubators are flexible, encouraging environments that facilitate the emergence and growth of new enterprises. They are controlled working environments whose particular characteristics aim to create a cooperative atmosphere for the training, support and development of companies and entrepreneurs.[99]

In recent decades, Brazilian incubators have matured and proceeded to enhance the quality of management processes and make them more professional. Official data shows there were 384 incubators operating in 2011.[100]

The current context reveals different types of incubators. Once a taxonomy has been established to analyze their specialties, we can see there are agencies dedicated to the field of design. The section below lists some of them.

Fucapi Design Incubator

Host institution: *Fundação Centro de Análise, Pesquisa e Inovação Tecnológica (Fucapi)* – Center for Analysis, Research and Technology Innovation Foundation

Location: Manaus (AM)

General Information: This project stimulates creativity and the development of design-focused companies through a technical support program that supplies technical and technological subsidies for the realization of ideas.

Website: https://portal.fucapi.br/incubadora/

Incubator for Design Enterprises and Business

Host institution: Design School of the State University of Minas Gerais (UEMG)

Location: Belo Horizonte (MG)

General information: Aims to support the implementation of design initiatives and companies whose products – processes or services – are innovative and focused on, among others, micro and small-sized businesses in the state of Minas Gerais.

Website: http://www.iedincubadora.blogspot.com.br/

Cultural Incubator

Host institution: The Genesis Institute of the Pontifical Catholic University of Rio de Janeiro (PUC-RJ)
Location: Rio de Janeiro (RJ)

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[99] ANPROTEC (2008)
[100] ANPROTEC (2012)

General information: In March 2002, the first Cultural Incubator in Latin America was inaugurated, with the aim of supporting the development of cultural and artistic initiatives. The incubator serves companies specializing in different fields, including design.

Website: http://www.genesis.puc-rio.br/main.asp

Design-Inn Company Incubator

Host institution: Fundação Parque de Alta Tecnologia São Carlos (ParqTec) – São Carlos High Technology Park Foundation

Location: São Carlos (SP)

General information: A result of support received from the National SEBRAE through a call for proposals to implement a network of design incubators in the country. Its main objectives are to host design companies and projects by offering the necessary mechanisms for them to be created and hold their ground; foster market development by helping micro and small-sized enterprises establish an entrepreneurial culture; add value to products through design.

Website:
http://www.parqtec.com.br/index.php?option=com_content&view=article&id=28&Itemid=30

Product Design Technology Incubator (Itdesign)

Host institution: Fundação de Ciência e Tecnologia – Cientec (Science and Technology Foundation – Cientec)

Location: Cachoeirinha (RS)

General information: Aims to be a facilitating agent for new entrepreneurs by training design professionals to create new products or improve existing ones, in an effort to expand design entrepreneurism.

Website: http://www.cientec.rs.gov.br/?model=conteudo&menu=140

Indesign Incubator

Host institution: Federal University of Juiz de Fora

Location: Juiz de Fora (MG)

General information: Aims to stimulate and maximize the use of design by small and medium-sized businesses in the Minas Gerais city where it is located. The incubator endeavors to meet demands in the areas of fashion, product, handicraft, packaging, and furniture design. Companies can take advantage of the infrastructure at the Technical College and the Regional Center for Innovation and Technology Transfer (CRITT), as well as refining design management and technical support techniques.

Website: http://www.indesign.jf.ifsudestemg.edu.br/index2.html

Incubator for Design Companies

Host institution: State University of Rio de Janeiro (UERJ)

Location: Rio de Janeiro (RJ)

General information: Aims to encourage and firmly establish innovative companies focused on Industrial Design – Product Design and Graphic Design – as a fundamental element for developing the state of Rio de Janeiro's manufacturing industry.

Website: http://web.esdi.uerj.br/incubadora

4.5.2 DESIGN LABORATORIES

Design Laboratories are facilities duly equipped with proper instruments to conduct various experiments and scientific research. Whether they conduct research or operate on an industrial scale, both are important for the field of design because they provide controlled conditions in which activities may be performed while making sure there are no foreign influences capable of altering the result of the experiment or the solution under development.

In Brazil, there are no official statistics regarding the number of Design Laboratories, just as there is no one single characterization of these structures. When researching the topic, we find laboratories operating on different fronts. Here we present some examples of design laboratories in Brazil: the Design, Innovation and Sustainability Laboratory – LABDIS, at the Fine Arts School of the Federal University of Rio de Janeiro – UFRJ; the Laboratory of Design and Selection of Materials – LDSM, at the Federal University of Rio Grande do Sul – UFRGS; FAB LAB Brasil; the National Institute of Technology – INT; various laboratories in the different state chapters of the National Service for Industrial Learning – SENAI, Industrial Design Division of the Technology Network – Redetec. For the most part, these institutions are set up at universities and linked to their Design programs, which makes mapping these assets difficult.

4.5.3 INDUSTRIAL DESIGN RESEARCH GROUPS IN HIGHER EDUCATION INSTITUTIONS

The National Council for Science and Technology Development – CNPq's Directories of Research Groups lists 42 higher education institutions that had research groups dedicated to the field of Industrial Design in Brazil in 2010.

A research group is a group of people organized around one or more of lines of research into an area of knowledge, with the objective of conducting scientific research.

Research groups in Brazil are concentrated in 76 areas of knowledge, with historic data available through the Ministry of Science and Technology as of 1993. The topic Design is listed in the CNPq's Directories of Research Groups in the area of knowledge entitled Industrial Design.

In the section that follows, we present some topics that characterize Brazilian Industrial Design research groups, as listed by the CNPq. All design-related research groups are listed in the ANNEXES.

Evolution of Industrial Design Research Groups in Brazil

When analyzing the average evolution of research groups in the 76 areas of knowledge listed by the CNPq, we can observe a growth of 323% in the historical data in the period from 1993 to 2010. When evaluating the specific data regarding the area of Industrial Design, in accordance with CHART 9, we can observe a more significant raise in excess of 1,900%. This means Industrial Design groups, which totaled 6 in 1993, increased to 121 in 2010. This analysis indicates that research groups focused on Industrial Design in the country grew exponentially in the past few years – and much above than the evolution in all other knowledge areas. Notwithstanding, the CNPq data from 2010 demonstrate that Industrial Design research groups represented approximately 0.5% of all Brazilian research groups, a percentage still noticeably lower than ones found in other knowledge areas.[101]

CHART 9: EVOLUTION OF INDUSTRIAL DESIGN
RESEARCH GROUPS IN BRAZIL – 1993-2010

SOURCE: The authors, based on data in Brazil (2011)

### Geographic Distribution of Brazilian Industrial Design Research Groups

Industrial Design research groups can also be evaluated regarding their geographic distribution by Brazilian region. The CNPq data indicates that, in 2010, 79% of research groups were set up in the Southeast and South. Only 21% of the research groups were located in the North, Northeast, and Central West. When analyzing the percentage of research groups in each one of the Brazilian regions, we can observe the following concentration: 42% in the Southeast, 37% in the South, 14% in the

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[101] BRAZIL: CNPQ (2011)

Northeast, 4% in the North, and 3% in the Central West. Based on the aforementioned analysis, it is possible to infer there is a need to stimulate scientific-technological design production in the North, Northeast and Central West.[102]

The analysis previously conducted can be amplified by state in the Brazilian federation. According to MAP 3, all the states in the South and Southeast had Industrial Design research groups, with the largest concentrations in São Paulo (20), Rio de Janeiro (17), and Paraná (14). In the Central West, research groups were found only in the Federal District (3). The North and Northeast had smaller numbers, with the exception of the state of Pernambuco, with 12 research groups.

MAP 3: DISTRIBUTION OF BRAZILIAN INDUSTRIAL DESIGN RESEARCH GROUPS BY STATE – 2010
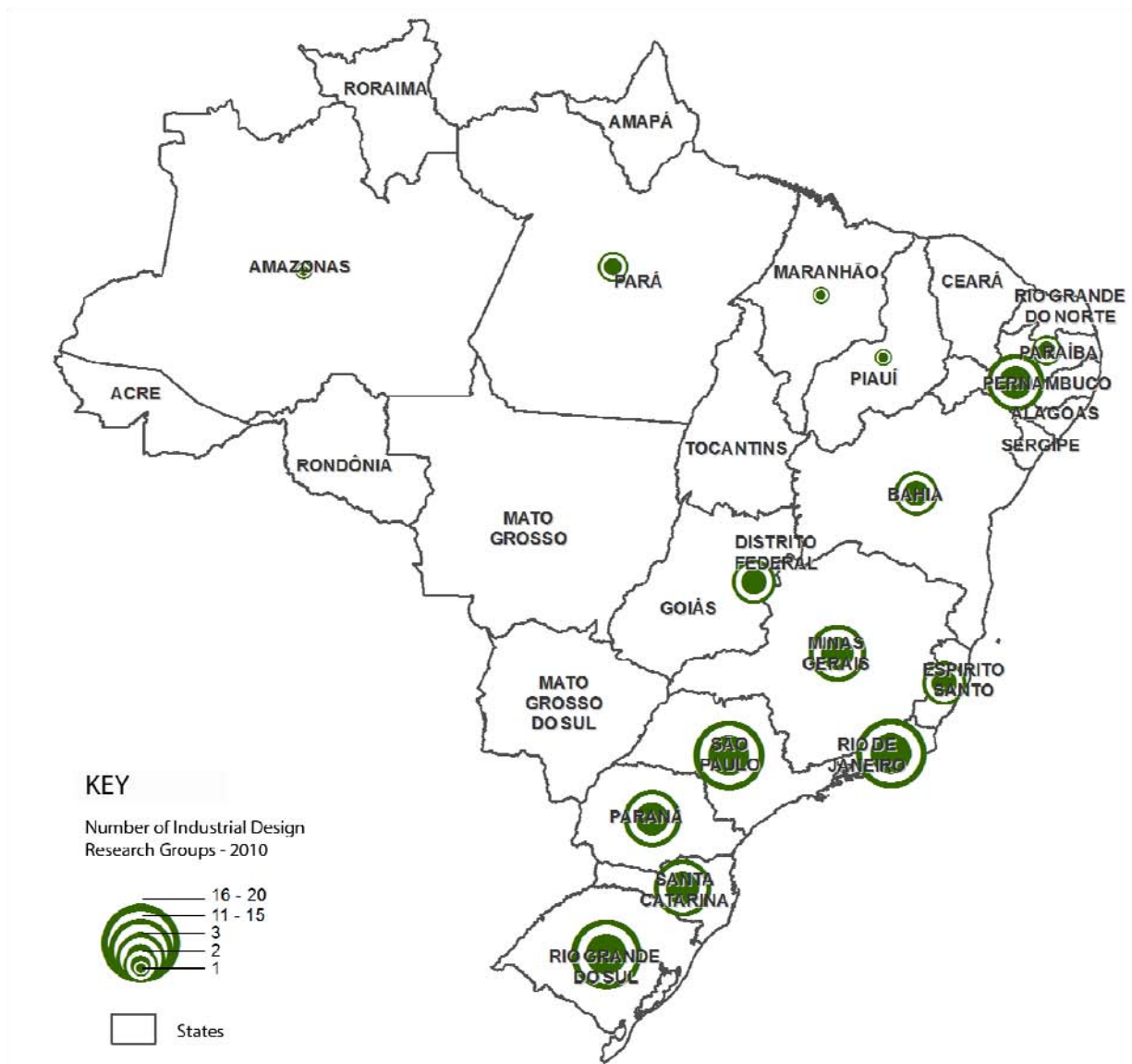
SOURCE: The authors, based on the data in Brazil (2011)

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[102] BRAZIL: CNPQ (2011)

Main Subject Areas Studied by Brazilian Industrial Design Research Groups

It is also possible to classify Brazilian Industrial Design research groups considering their main research subject area. In this analysis, we can observe that among the 121 groups catalogued by the CNPq, in 2010 40% focused their research on the area of "Life Project/Practice"; 36% on the area of "Technology"; 7% on the area of "Globalization/Market"; 7% on the area of "History"; 6% on the area of "Media"; 4% on the area of "Structure/Form". Therefore, it can be concluded that scientific production related to design in Brazil is restricted to two main areas, and new research groups dedicated to other areas should be set up so that such production may be diversified.[103]

CHART 10: CLASSIFICATION OF BRAZILIAN INDUSTRIAL DESIGN RESEARCH
GROUPS ACCORDING TO THE MAIN SUBJECT OF THEIR PUBLICATIONS – 2010
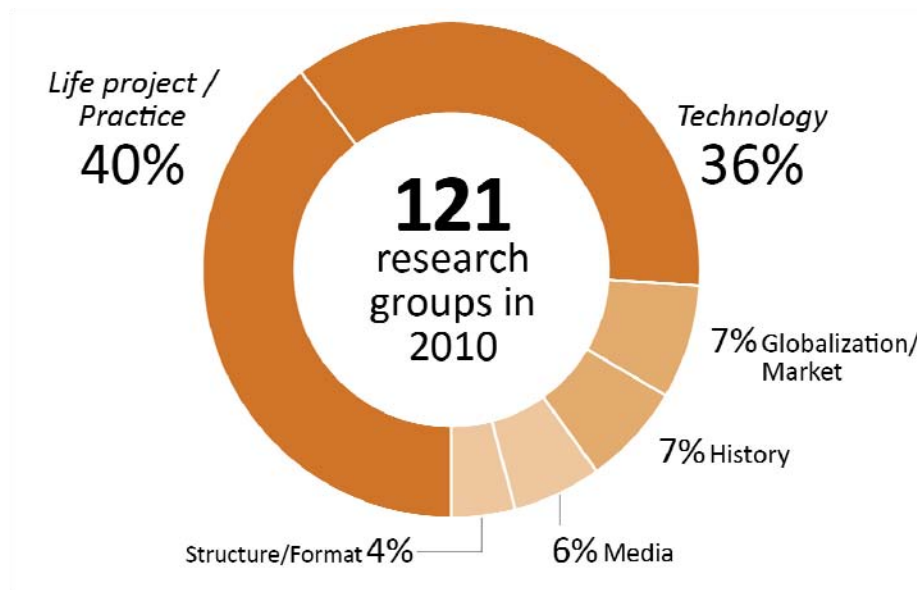
NOTE: Data analyzed based on Bonsiepe's research classification scale (2011)

SOURCE: The authors, based on the data in Brazil (2011)

4.5.4   BRAZILIAN CONFERENCE ON DESIGN RESEARCH AND DEVELOPMENT (R&D DESIGN)

The main scientific conference on design in Latin America is also one of the most important and traditional in Brazil. The R&D Design takes place every two years in October in different Brazilian cities. It is held by the Association of Education and Research and University-Level Design in Brazil (AEND-Brasil). The event aims to contribute to the scientific advancement and dissemination of design in the country.

Considered strategic for understanding the role of design in the development of national competitiveness, the conference offers different types of participation, whether by presenting entire papers or introduction to scientific research abstracts. Presentations may be oral or by poster. Six categories are encompassed: design theory and critique, history of design, design methodologies,

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[103] BRAZIL: CNPQ (2011)

design education, design projects, and design and technology. The categories were defined on the basis of the document "Review of the Knowledge Areas Table from a Design Perspective," organized by the Advisory Committee of the CNPq Industrial Design department. The conference still includes parallel activities such as workshops, courses, round tables, and exhibitions.

The event is held to cement the importance of design research in the country by promoting and facilitating cooperation between professionals, teachers and researchers, encouraging students' interest in the area, and therefore contributing to their professional and intellectual education. The event encompasses all areas of design and addresses the advance of knowledge in the area, whether via applied or scientific research.

The first conference was held in São Paulo in 1994, organized by UNIP in conjunction with AEND BR and magazine *Estudos em Design* (Studies in Design). In the first edition, 24 design institutions with researchers in eight Brazilian states participated.

The subsequent editions took place in 1996 (Belo Horizonte / UEMG), 1998 (Rio de Janeiro / PUC-Rio), 2000 (Novo Hamburgo / Feevale), 2002 (Brasília / UnB), 2004 (São Paulo / FAAP), 2006 (Curitiba / Unicenp), 2008 (SENAC/SP) 2010 (São Paulo / Anhembi Morumbi), 2012 (São Luis / UFMA). In 2014, the 11th edition of the event will is being held in Gramado (RS).

Every conference edition featured internationally renowned speakers, such as Victor Margolin, Charles Owen, Silvia Pizzocaro, Bernard Darras, Carlo Vezzoli, Catherine Dixon, and Ananthapuram G. Rao. The 2008 edition, for example, was attended by 853 participants from 15 states and 8 different countries.

Also in the 2008 conference, 548 papers, of which 240 full papers, 236 short papers, and 72 scientific initiation papers submitted by authors from 10 different countries were presented. To reach those numbers, 166 doctors evaluated 2,694 submissions.[104]

In 2010, 529 papers were presented at the conference. The paper Evaluation Committee was staffed by 174 doctors and 56 masters.[105]

4.5.5 INDICATORS OF INDUSTRIAL DESIGN SCIENTIFIC-TECHNOLOGICAL PRODUCTION IN BRAZIL

The production of scientific-technological knowledge in design in Brazil is monitored by the CNPq in the Industrial Design area of knowledge, following the same logic explained about research groups.

Based on the CNPq data from 2000-2010 regarding the production of Industrial Design science and technology, it is possible to describe the following panorama:[106]

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[104] TORI; PFUTZENREUTER; FARIAS (2008)
[105] SILVA; ZUANON (2010)
[106] BRASIL: CNPQ (2011)

- Regarding the total number of authors publishing on design, we can observe that the total of 22 in 2000 and 563 in 2010 presented a growth rate of 2,459%.
- When analyzing the full papers published in specialized publications circulating nationwide,[107] 42 papers were published in 2000 and 1,072 in 2010 – a 2,452% increase in a decade.
- When analyzing the full papers published in specialized publications circulating abroad,[108] 16 articles were published in 2000 and 203 in 2010 – a 1,438.4% increase in the period under analysis.
- Regarding papers published in event annals: in 2000, they numbered 114, and in 2010, 4,258; thus, there was a 3,635% increase in publications in the period.
- Regarding books published on design: in 2000, 10 were published, and in 2010, 200, a 1,900% increase in the decade under analysis.
- Regarding book chapters on design: in 2000, 22 were published, and in 2010, 789, representing a 3,486.3% increase in publications.
- Analyzing other bibliographic publications[109] on design, we find they numbered 34 in 2000 and 1,487 in 2010, which represents a 4,273.5% increase.
- Abstracts of design papers published in event annals[110] reached 32 in 2000 and 953 in 2010, representing an increase of 2,875% in publications during the period under analysis.

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[107] Published in Portuguese in technical and scientific magazines and specialized journals (including those without information on language).
[108] Published in a language other than Portuguese in technical and scientific magazines and specialized journals
[109] Text in newspapers and magazines and other types of bibliographical production (music sheets, translation etc.)
[110] Abstracts published in event annals do not include extended abstracts.

4.5.6 CALENDAR OF NATIONAL DESIGN EVENTS

SUMMARY TABLE 17: CALENDAR OF NATIONAL DESIGN EVENTS

	Annual	Biennial	Twice a year
January			Inspira Mais
February	Paralela Móvel		ABUP Show
March	Paralela Gift Craft Design		Brazilian International Gift Fair
April	Dragão Fashion		
May	Ergodesign USIHC	Bienal Brasileira de Design (Brazilian Design Biennale)	
June	Simpósio Nac. De Moda e Tecnologia (National Symposium on Fashion and Technology) Design na Brasa	Bienal Brasileira de Design Gráfico (Brazilian Graphic Design Biennnale)	
July	NDesign	Conad	
August	Design Weekend		Inspira Mais ABUP Show Brazilian International Gift Fair
September	MOB Design abc | x Jovens Profissionals (Young Professionals) Boom Design	CIDI Fórum Internacional de Criatividade e Inovação (International Forum on Creativity and Innovation)	
October	Semana D Gampi Pixel Show	Design Fórum P&D Design	
November	Infolide Interaction South America Brasil Design Week	Simpósio Brasileiro de Design Sustentável (Brazilian Symposium on International Design)	
December			

SOURCE: The authors, based on research data

4.5.7 PUBLICATIONS, PUBLISHING HOUSES AND ACADEMIC JOURNALS

Another way of disseminating the knowledge produced in the field of design is via dedicated publications. In accordance with specialized information portals searched between November and December 2013, there are 12 magazines published on design in general in Brazil; 8 online magazines

specializing in design; 10 electronic newsletters sent out periodically and 15 publishing houses that publish books on design in Portuguese, namely: Ateliê Editorial, Bookman, Cosac-Naify, Edições Rosari, 2AB, Blücher, Rio Books, Ed. Gustavo Gili (GG), Infolio, Insight, Martins Fontes, MBooks, Taschen, Thames and Hudson e Viana & Mosley Editora (VM).

FIGURE 17: DESIGN MAGAZINES AND NEWSLETTERS

NOTE: Print and online magazines, publishing houses and electronic newsletters currently sent out, with national readership and dedicated to the design sector, as of December 2013.

SOURCE: The authors, based on research data

Regarding academic publications in the country, 22 print and online design-related journals were found in Brazil. Such publications are registered with and periodically evaluated through the Qualis set of procedures used by CAPES to stratify the quality of the intellectual production by graduate programs in the country.

Strata*	Academic Journal	Published by
B1	Estudos em Design | *Studies in Design*	PUC-Rio
	Educação Gráfica | *Graphic Education*	UNESP Bauru
	Cultura Visual | *Visual Culture*	EBA/UFBA
	Ambiente Construído | *Constructed Environment*	ANTAC
B2	Infodesign	SBDI
	Desígnio	FAU/USP
B3	Design, Inovação e Gestão Estratégica *Design, Innovation and Management*	SENAI/CETIQT
	Design & Tecnologia | *Design & Technology*	UFRGS
	Strategic Design Research Journal	Unisinos
	Ação Ergonômica | *Ergonomic Action*	Abergo
	ABCDesign	Ed. Infolio
B4	Design em Foco | *Design in Focus*	Uneb
	Iara: Revista de Moda, Cultura e Arte *Iara: Magazine for Fashion, Culture and Art*	Senac-SP
	DAPesquisa | *DAResearch*	UDESC
	Tríades em Revista | *Magazine Triads*	PUC-Rio
B5	Arcos Design	ESDI/UERJ
	Design Gráfico | *Graphic Design*	Ed. Market Press
	Mig: Revista Científica de Design *Mig: Scientific Design Review*	Univali
	Projética	UEL
	Revista D | *D Magazine*	UniRitter
C	Arcos: design, cult. material e visualidade *Arcos: design, material culture and visuality*	ESDI/UERJ
	Graphica	ABEG

*Academic journals are rated per evaluation areas, and rates are updated annually by CAPES. These outlets are classified in strata indicating quality in decreasing order: A1 (highest); A2; B1; B2; B3; B4; B5; and C (lowest).

NOTE: Online and print versions of academic journals published in Brazil in the fields of Architecture and Urban Planning and Interdisciplinary areas – in which design is inserted as a subarea, according to CAPES.

SOURCE: The authors, based on the research data

4.5.8 FINAL CONSIDERATIONS

The intensity and fast pace of the scientific-technological progress prevalent in the current global context essentially require the field of design to organize, analyze, and update its diverse information.

Incubators, laboratories, research groups in higher education institutions, and the Brazilian Conference on Design Research and Development (R&D) stand out as important sources of support for the scientific and technological development of design in Brazil.

Design Laboratories are facilities duly equipped with proper instruments to conduct various experiments and scientific research, under controlled conditions capable of guaranteeing the dependability of results. In Brazil, there are no official statistics regarding these structures, just as there are no descriptions of their characteristics.

Research groups are composed of people working on one or more lines of research into a particular area of knowledge, with the objective of conducting scientific research. The topic Design is listed in the CNPq's Research Group Directories in the area of Industrial Design. On this subject, we see that:

Design research groups in the country soared from 6 in 1993 to 121 in 2010 – a growth rate of 1,900%:

- In 2010, Industrial Design groups represented 0.5% of all Brazilian research groups, a percentage much lower than ones found in other areas of knowledge.
- In 2010, 79% of design research groups were found in the South and Southeast. The states with the highest concentration of groups were São Paulo (20), Rio de Janeiro (17) and Paraná (14).
- The Brazilian Conference on Design Research and Development is another important reference for the subject of design. It has been held since 1994 and shows a growing number of participating researchers. Scientific and evaluation committees are staffed by a significant number of doctors.

Science and technology production in the field of design in Brazil, which falls under the category of Industrial Design according to the CNPq, shows a significant increase in the production of knowledge in the past decade. When analyzing the evolution of different indicators on the subject, we can observe that the number of books published on the topic grew approximately 1,900% during the period analyzed and the number of authors publishing on the topic increased 2,459% in the past ten years, directly impacting the content generated on the subject.

Overall, we can observe that the production of design knowledge in Brazil has had significant progress in the past years. However, some needs still have to be addressed.

- Mapping and characterization of incubators and design laboratories.
- Creation of research groups in the North, Northeast and Central West.
- Diversification of the research focus of groups working on design.
- Incentives to the continued expansion of science and technology production related to design in Brazil.
- Organization of other scientific events dedicated to design.

4.6 POLITICAL AND INSTITUTIONAL ENVIRONMENT

The political and institutional environment that we will address refers to the national political structures and initiatives that support the sector, including fiscal instruments, regulations, and promotion of design. The political and institutional environment, especially in a country like Brazil, constantly undergoes substantial changes that affect the operation of markets and impact upon businesses, institutions, and players.

In the context of the federation, states and cities, legislative and executive institutions exist to guide and set the rules that define the relationships between social players. These relationships are evaluated and defined within the national political and economic context.

The meaning of policy is very broad and usually related to that which refers to public matters. It refers to the ways in which a government acts regarding issues of public interest, for example policies on education, security, salaries, housing, the environment, and others.[111]

A political system is a form of government that encompasses political institutions to govern a Nation. In the context of design, this chapter examines the Brazilian Design System, its institutions and stakeholders, as well as the policies to promote Brazilian design.

Design policies are "strategies which define the vision and direction to be adopted to advance design in a country". Design policies are meant to guide the initiatives that support design. They contain objectives and justifications, and list the groups involved, as well as the means for their implementation. A national design system can be divided into the following categories: Funding, Promotion, Education and Policies, in according with their scope, purpose, and audience.[112]

In that regard, promotion initiatives are directed at the general public and companies and aim to support design through exhibitions, awards, conferences, seminars, and publications, among others. The purpose of funding is to supply the needs of businesses, particularly those which are small and medium-sized and lack the resources to integrate design in their activities. Education refers to formal education and professional training. Strategic plans and government policies are responsible for coordinating the various activities. Together, these elements represent a country's design system, as per FIGURE 18.

FIGURE 18: DESIGN SYSTEM
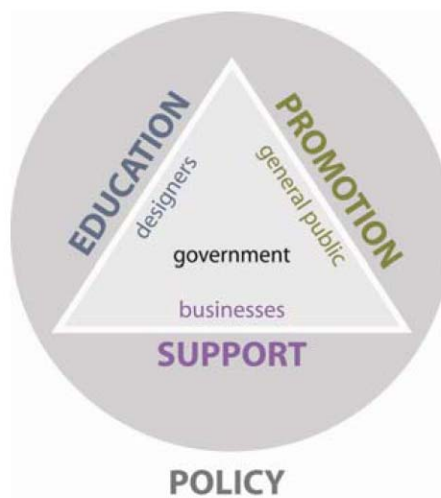
SOURCE: RAULIK et al. (2008)

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[111] GUARESCHI et al. (2004)
[112] RAULIK et al. (2008)

This chapter provides inputs for discussions about the political and institutional environment of Brazilian design by looking into the Brazilian Design System, its institutions and public policies. The regulations governing the Design Profession are also examined here.

4.6.1   THE BRAZILIAN DESIGN SYSTEM

The Brazilian Design System comprises various entities that represent the industry and several design initiatives.

The Brazilian Design System presented here shows the different agents operating in the country and their relationships, as well as what they do to advance Brazilian design:

- Regulatory bodies: Entities that supervise and direct the actions of institutions with which they are linked.
- Design policies: Agents which participate in or promote the creation of design policies in the country
- Trade associations: National or regional organizations, either general or specific.
- Design education: Public or private higher education institutions offering design training/ programs.
- Funding agencies: Organizations which provide financial resources for the development of design in Brazil
- Design Promotion: Organizations that disseminate and promote design through regional and national initiatives.
- Service supply: Institutions which provide design services
- Assistance to companies: Organizations that make services and/or programs available that indirectly assist the development of design.

In 2014, the aforementioned system is depicted in FIGURE 19:

FIGURE 19: BRAZILIAN DESIGN SYSTEM – 2014
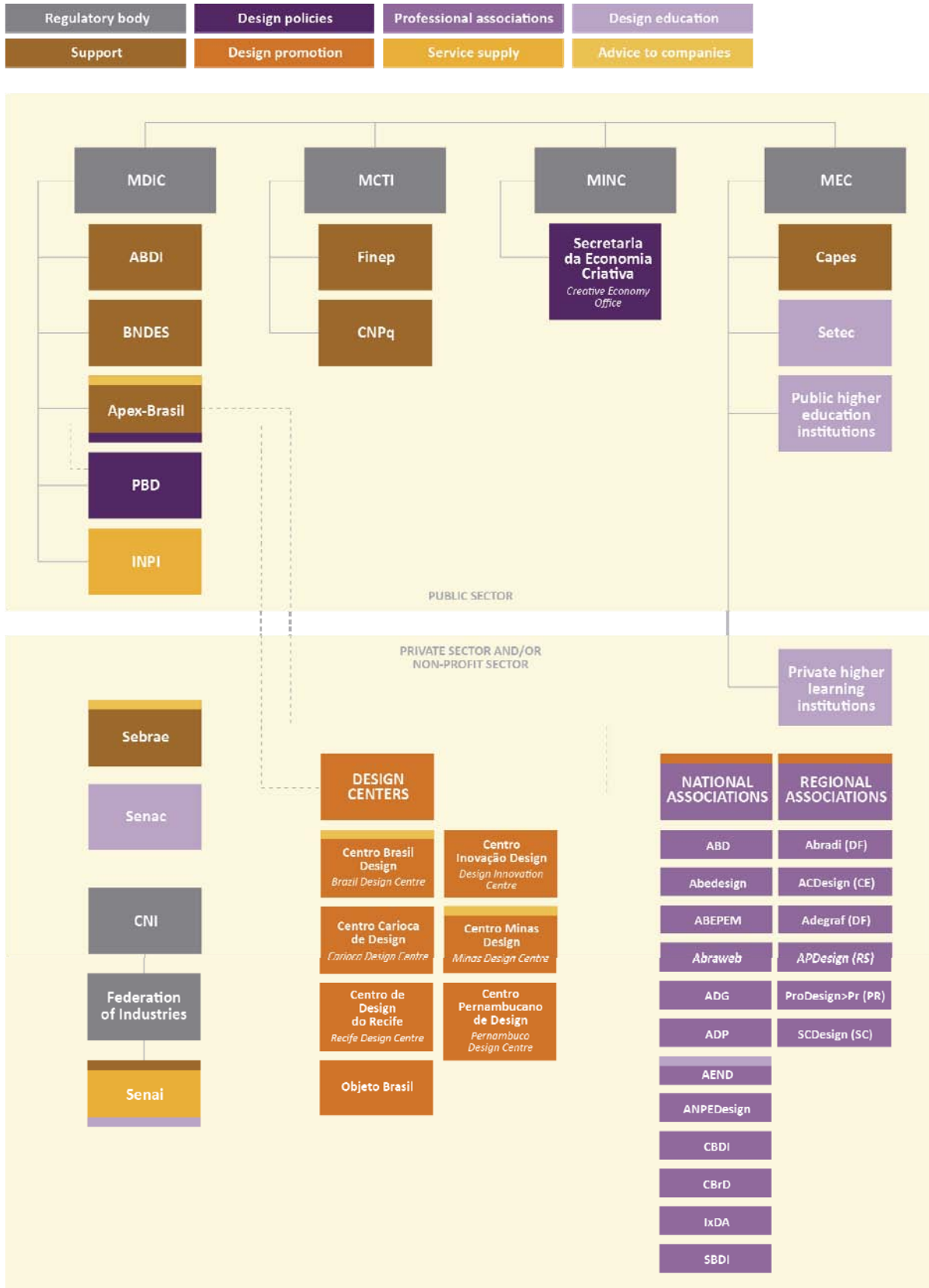
SOURCE: The authors, based on research data

Next, Brazilian Design System agents operating in the public and private sectors are described. First, we look at the Ministries that regulate their main activities, and then examine design-related structures and entities.

PUBLIC SECTOR

MINISTRY OF DEVELOPMENT, INDUSTRY AND FOREIGN TRADE (MDIC)

The Ministry of Development, Industry and Foreign Trade (MDIC) has jurisdiction over:

- Development of policies for industry, trade and services.
- Intellectual property and technology transfers.
- Metrology, standardization and industrial quality.
- Foreign trade policies.
- Regulation and execution of programs and activities related to foreign trade.
- Enforcement of trade defense mechanisms.
- Participation in international negotiations relative to foreign trade.

Various agencies are linked to the MDIC, among which figure the Brazilian Agency for Industrial Development (ABDI), the Brazilian Trade and Investment Promotion Agency (Apex-Brasil), and the National Bank for Economic and Social Development (BNDES).

Brazilian Agency for Industrial Development (ABDI)

The ABDI serves as a link between the public and private sectors to advance the institutional, regulatory, and innovation environments in Brazil.

The ABDI aims to increase the competitiveness of the country's industry and foster sustainable development by making sure industrial policies are carried out in compliance with science, technology, innovation and foreign trade policies (Law 11080). The agency also conducts studies to support the creation of these policies.

National Bank for Economic and Social Development (BNDES)

The BNDES is a federal government-run company created in 1952 to fund the national economic development and thus contribute to the country's social, cultural and technological advancement. Today it is one of the main long-term funding instruments operating in a range of economic sectors, pursuant to a policy that includes social, regional and environmental aspects. The bank finances investment projects, equipment purchases, and exports of goods and services for companies of all sizes.

The Bank operates many funding lines and mechanisms that support innovation and design. Among them, the BNDES Card and BNDES Prodesign stand out, as they are both dedicated exclusively to supporting industrial activities in the field of design.

Brazilian Trade and Investment Promotion Agency (Apex-Brasil)

The mission of the Brazilian Trade and Investment Promotion Agency (Apex-Brasil) is to make Brazilian companies more competitive by helping them go international and attracting direct foreign investments.

Apex-Brasil currently supports more than 12,000 companies in 84 Brazilian economic sectors which export to over 200 markets. In partnership with sector-specific entities, the Agency organizes trade-fostering actions such as market prospection and trade missions, business rounds, support to the participation of Brazilian companies in large international fairs, and visits for foreign buyers and opinion leaders to learn about the Brazilian production infrastructure. Apex-Brasil also conducts studies on trade and competitive intelligence to inform Brazilian companies' decisions about going international.

Apex-Brasil sees design, innovation, and sustainability as fundamental tools for Brazilian companies' competitiveness. The agency carries out a range of initiatives to advance these topics in over 80 economic sectors. Together, they run export-fostering projects. From the beginning, Apex-Brasil has supported a range of initiatives promoting Brazilian design, such as the Brazilian Design Biennale. Additionally, the agency has helped Brazilian companies enter products in the Hannover iF Awards, the IDEA Awards, and more recently, Design Embala[113], Design Export[114] and Design Brasil.[115]

Brazilian Design Program (PBD)

In 1995, the first nationwide design program was launched: the Brazilian Design Program. Aime at organizing the design agenda in the country, the program brought together institutions like the National Confederation of Industries (CNI), the National Service for Industrial Learning (SENAI), the National Council for Science and Technology Development (CNPq) and the Financing Body for Studies and Projects (FINEP), among others.

The Brazilian Design Program was created to foster the development of design throughout the country via support mechanisms and instruments, funding, and financing. The program is coordinated by the Ministry of Development, Industry and Foreign Trade (MDIC) in partnership with economic and social agents in the public and private sectors. Its activities include the manufacturing, trade, and service industries, the network of technical and higher education institutions, and technology institutes, as well as their representation bodies.[116]

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[113] *Design Embala* is organized in partnership with the Brazilian Association of Packaging (ABRE) to add value to Brazilian products through packaging design. The project carries out education and training activities with participating companies.
[114] Carried out in collaboration with the *Centro Brasil Design*, *Design Export* has selected 100 companies showing export potential and good innovation projects to provide them with consulting and financial support services so they may hire design firms to develop innovative products and services.
[115] *Design Brasil* is organized in partnership with the Brazilian Association of Design Companies (Abedesign). This industry-specific project was created to foster exports of design services. The main activities of *Brasil Design* include participating in the Cannes Lions International Festival of Creativity and running buyer and image projects (which bring foreign importers and opinion leaders to Brazil).
[116] BRAZIL: MDIC (2014b)

In a strategic alignment document from 2002,[117] the PBD established action lines for: education, promotion and dissemination; information, standardization and legal protection; training and human resources; design infrastructure integration and strengthening; coordination and support.

At the PBD's Participatory Planning Conference held in 2006 with design sector representatives, the Brazilian Design Program defined its strategic plan for the 2007/2012 period. That plan continues to guide governmental initiatives pertaining to design in Brazil. The activities are divided into coordination, promotion, education, and support.[118]

National Institute of Industrial Property (INPI)

The National Institute of Industrial Property (INPI) is a federal agency linked to the Ministry of Development, Industry and Foreign Trade (MDIC). Created in 1970, the INPI's mission is to disseminate and manage the Brazilian system that grants and protects the industry's intellectual property rights.

The INPI is responsible for issuing trademark, industrial design, geographical indication, software, and circuit topography registrations, granting patents, and approving franchise and technology transfer agreements.[119]

MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION (MCTI)

Created in 1985 to advance the country' scientific development, the MCTI has jurisdiction over:

- National science, technology, and innovation research policies.
- Planning, coordination, supervision and monitoring of science and technology activities; IT and automation development policies.
- National biosafety policy.
- Aerospace policy
- Nuclear policy and control over the exports of sensitive goods and services.

Two important national support agencies are linked to the MCTI: the Financing Body for Studies and Projects (FINEP) and the National Council for Science and Technology Development (CNPq).

The MCTI coordinates programs and activities included in the National Science, Technology and Innovation Policy. "The objective of this policy is to turn the sector into a strategic component for economic and social development in Brazil, thus contributing to the fair distribution of its benefits for all of society."[120]

Studies and Projects Funding Agency (FINEP)

FINEP is a government-run company linked to the MCTI that has been funding the development of national science and technology since 1967. Its current objective is to transform Brazil through

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[117] BRAZIL: PBD (2002)
[118] BRAZIL: PBD (2006)
[119] BRAZIL: INPI (2012)
[120] BRAZIL: MCTI (2014)

innovation. To do that, the agency supports companies, universities, technology institutes, and public and private institutions. The main goal is to finance the entire ST&I system through grants and loans, among other instruments capable of making companies more competitive. There is no specific funding line for design, but some innovation-oriented calls for proposals include design.[121]

National Council for Science and Technology Development (CNPq)

The CNPq is an agency run by the Ministry of Science, Technology and Innovation aimed at supporting science and technology research and training human resources for research throughout the country.[122] The CNPq stimulates researchers to join companies through grant programs dedicated to a range of areas, including design. The objective is to expand the transfer of knowledge from the academia to Brazilian businesses. In 2012, 932 grants were awarded.

MINISTRY OF CULTURE (MINC)

The Ministry of Culture (MinC) was created in 1985 when the Ministry of Education and Culture was split up. The Ministry carries out activities specifically meant to disseminate the importance of culture for the construction of the national identity.

MinC develops policies to support and encourage activities in the areas of literature, arts, folklore, and the various forms of expression found in the national culture. The Ministry is also dedicated to preserving the historic, archeological, artistic, and national heritage.[123]

The Ministry's current structure comprises six offices: the Office of Cultural Policies, the Office of Citizenship and Cultural Diversity, the Audiovisual Office, the Office for the Creative Economy, the Office for Institutional Coordination, and the Office for Support and Encouragement to Culture.

The Office for the Creative Economy (SEC)

Since 2012, the Office for the Creative Economy (SEC) drives the development of, enforces, and monitors public policies for local and regional development, while giving priority to the support of Brazilian creative professionals and micro and small enterprises. The main purpose of the SEC is to help culture become a strategic focal point in public policies for the country's development.[124] The SEC, through the National Council for Cultural Policies (CNPC), coordinates four sector-specific domains: Arts and Crafts, Architecture, Design, and Fashion.

MINISTRY OF EDUCATION (MEC)

The Ministry of Education has been in existence since 1930. However, only in 1995 was it put in charge of education and improving its quality. MEC guides efforts to consolidate a systemic vision of education via with integrated activities and no disputes for space and funding.[125] That is achieved through actions such as the Plan for Educational Development (PDE) launched in 2007, in which the

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[121] BRAZIL: FINEP (2014a)
[122] BRAZIL: CNPQ (2013a)
[123] BRAZIL: MinC (2014)
[124] BRAZIL: MinC (2012b)
[125] BRAZIL: MEC (2014)

Ministry maintains that investing in basic education means investing in vocational and tertiary education.

Brazilian Federal Agency for the Support and Evaluation of Graduate Education (CAPES)

A foundation run by the Ministry of Education, the Coordination for the Improvement of Higher Education Personnel concentrates its efforts on expanding and consolidating post-graduation *stricto sensu* (Master's and Doctoral programs) in all Brazilian states.

CAPES' activities are carried out via structured programs that may be grouped into the following lines of action:

- Evaluation of *stricto sensu* graduate programs.
- Access to and dissemination of scientific production.
- Investments in high-level human resources training in the country and abroad.
- Promotion of international scientific cooperation.
- Fostering the initial and continued training of basic education teachers for in-class and online learning.

CAPES has also implemented an evaluation system to standardize the academic excellence of national Master's and Doctoral programs. In turn, the evaluation results inform the creation of policies for graduate programs and the magnitude of support initiatives (scholarships, grants, and support).[126]

Office for Vocational and Technological Education (SETEC)

Under Art. 13 of Decree no. 7690 of March 2, 2012, the duties of the Office for Vocational and Technological Education (SETEC) are to plan, guide, coordinate, and supervise processes that create and implement vocational and technological education policies and their permanent funding; technically and financially support the development of vocational and technological education in education systems at the different levels of government; carry out support actions to implement, expand, and improve the quality of vocational and technological education, as well as to enforce compliance with educational legislation related to vocational and technological education in the country.

(Public and Private) Higher Education Institutions

Higher education institutions are schools that provide tertiary education. They are regulated by and operate under Law no. 9934 of 1996.

In charge of education-related matters at the Ministry of Foreign Affairs, the Division of Education Topics (DCE) establishes that Brazilian Higher Education Institutions (HEI) may be public or private. Public schools are run and funded by federal, state, or city governments, and no enrolment fees or tuition are charged from students. Private HEIs are run by individuals of legal entities governed by private law, either for profit or not.

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[126] BRAZIL: CAPES (2014)

Still in accordance with the DCE,[127] the HEIs may operate under different designations according to their academic and administrative characteristics, as follows: University, University Center, College, or Federal Institute:

- **University:** A multidisciplinary academic institution that fosters intellectual production and research. It must also meet the minimum requirements regarding degrees held by faculty (one third must be Master's and Doctors) and said faculty's workload (one third of members working full-time). It may independently set up programs/courses, campuses, and administrative headquarters, issue degrees, set curricula and number of places available, and sign contracts and agreements, among other actions, provided they comply with the laws in force and the Constitution.
- **University Center:** An institution offering various programs in one or more areas of knowledge. It is similar to a University in terms of structure. However, it is neither defined by the Law of Education Directives and Bases nor is it required to conduct research.
- **College:** A college may be a Higher Education Institution that is neither authorized to grant titles and degrees (which must be validated by a University), nor required to offer graduate programs. It may also refer to an organic unit within a University, such as the College of Law of the Federal University of Pernambuco.
- **Federal Institute:** Units dedicated to technical training that offer vocational education in a range of areas. They offer high school education along with technical training, technical courses, higher education programs in technology, undergraduate and graduate programs. Their designation was given by Law 11892/08, which renamed the Federal Centers of Vocational and Technological Education (CEFET) and Technical Schools.

PRIVATE AND/OR NOT-FOR-PROFIT SECTOR

NATIONAL CONFEDERATION OF INDUSTRIES (CNI)

The mission of this entity is to advocate for and represent Brazilian manufacturers. The National Confederation of Industries (CNI) includes 27 federations of industries, more than 1,000 employers' associations, and 196,000 manufacturing companies.

The CNI aims to sign strategic partnerships with the aim of strengthening the national industry and the country's sustained growth. The entity regularly publishes research, studies and indicators to inform business leaders' decision-making processes. The Confederation monitors legislative issues of interest to the manufacturing industry, in addition to political and economic affairs.

The CNI, the National Service for Industrial Learning (SENAI), the Industry Social Service (SESI), and the Euvaldo Lodi Institute (IEL), make up the Industry System, responsible for vocational training activities, technological innovation, social responsibility, entrepreneurial training, and international business.[128]

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[127] BRAZIL: MRE (2014)
[128] CNI (2014)

BRAZILIAN SERVICE OF SUPPORT TO MICRO AND SMALL BUSINESSES (SEBRAE)

The Brazilian Service of Support to Micro and Small Businesses (SEBRAE) was created in 1972 to support the growth of small businesses and advance entrepreneurship in Brazil.

The institution disseminates information about lines of credit from partner financial institutions, offers consulting on project design, and helps companies obtain sureties FAMPE – the Micro and Small Business Surety Fund, a SEBRAE product that aims to promote access to financial services.[129]

Design-wise, small businesses have support from SEBRAE via programs like Sebraetec and Local Innovation Agents (ALI), as well as technology solutions, such as workshops and diagnoses available to entrepreneurs.

In 2002, a landmark in SEBRAE's efforts in this field was *Via Design*, the major support program ever created for the sector up until then. Until 2007, via calls for proposals, the program encouraged the creation of 100 design units organized in a network that served micro and small businesses and craftspeople to make them more active and competitive in Brazil's domestic market and exports.

THE NATIONAL COMMERCIAL APPRENTICESHIP SERVICE (SENAC)

The National Commercial Apprenticeship Service (SENAC) was created in 1946 and has since become one of the main agents dedicated to vocational education for the retail, service, and tourist industries.

Over 68 years, more than 55 million people have attended in-class and distance education programs and courses across Brazil. The agency further offers a range of programs dedicated to workers' education, such as: the *Programa Senac de Gratuidade* (SENAC No-Tuition Program) and the National Program for Access to Technical Training and Employment (PRONATEC), funded by the federal government.

Technical, undergraduate, and graduate programs offered by SENAC include courses on design and fashion. The characteristics of each course vary from state to state.

DESIGN CENTERS

The Design Centers are private, non-profit institutions for design promotion, education and support that focus on its insertion in the Brazilian industry. In general, they operate by advising entrepreneurs and directing them to service providers in the market. They also carry out design dissemination initiatives through events, seminars, exhibitions and awards. There are currently two institutions operating nationally, the *Centro Brasil Design* (Brazil Design Centre) and *Objeto Brasil*, and five operating locally or statewide: the *Centro Carioca de Design* (Rio de Janeiro Design Center), the *Centro de Design Recife* (Recife Design Centre), the *Centro Inovação* (Innovation Centre) – Paraná State, the *Centro Minas Design* (Minas Design Centre) and the *Centro Pernambucano de Design* (Pernambuco Design Centre).

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[129] SEBRAE (2013)

NATIONAL AND STATE ASSOCIATIONS

There are professional associations dedicated exclusively to design operating nationally or statewide, and representing the industry as a whole or specific domains. These entities provide assistance to designers and support and advance design through courses, seminars, exhibitions, awards, documents, and other initiatives to develop the sector.

There are 18 organizations operating in the domains examined in this research project, and they are divided here according to whether their scope is regional or national:

National
- ABD – Associação Brasileira de Designers de Interiores (Brazilian Association of Interior Designers)
- Abedesign – Associação Brasileira de Empresas de Design (Brazilian Association of Design Firms)
- Abepem – Associação Brasileira de Estudos e Pesquisas em Moda (Brazilian Association for Fashion Studies and Research)
- Abraweb – Associação Brasileira de Webdesigners e Webmasters (Brazilian Association of Web Designers and Webmasters)
- ADG – Associação de Designers Gráficos do Brasil (Association of Brazilian Graphic Designers)
- ADP – Associação de Designers de Produto (Association of Product Designers)
- Aend – Associação de Ensino de Design do Brasil (Brazilian Association for Design Education)
- ANPEDesign – Associação Nacional de Pesquisa em Design (National Association for Design Research)
- CBDI – Centro Brasileiro de Desenho Industrial (Brazilian Center for Industrial Design)
- CBrD – Coletivo Brasil Design (Brazilian Design Collective)
- IxDA – Associação de Design de Interação (Interaction Design Association)
- ProDesign>Pr – Associação para o Design do Paraná (Paraná Design Association)
- SBDI – Sociedade Brasileira de Design da Informação (Brazilian Society for Information Design)

Regional
- *Abradi – Associação Brasiliense de Designers de Interiores* (Association of Interior Designers in the City of Brasilia)
- *ACDesign – Associação Ceará Design* (Ceará Design Association)
- *Adegraf – Associação dos Designers Gráficos do Distrito Federal* (Association of Graphic Designers in the Federal District)
- *APDesign – Associação de Profissionais de Design do Rio Grande do Sul* (Association of Rio Grande do Sul Designers)
- *SCDesign – Associação Catarinense de Design* (Santa Catarina Design Association)

4.6.2   POLICIES FOR PROMOTING DESIGN IN BRAZIL

Although design was incorporated into the country's political and economic debate in the 1950s, only in the past fifteen years have design policies been set up in a more consistent manner in Brazil. "The insertion of these policies in a broader, more systemic vision, however, is even more recent and still under construction."[130]

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[130] CASTRO; BRAGA (2012)

Even though design programs oftentimes have no connection with public authorities, design policies need their support. "The government's role is vital and centralizes the interaction between the parties."[131]

In the past decade, public policies including design in their agendas have originated primarily from the Ministry of Industry and Trade and the Ministry of Culture. They are described in the topics that follow, which also analyze the scenario related to design policies in Brazil.

INDUSTRIAL POLICIES IN BRAZIL IN RECENT YEARS

Over the past ten years, three versions for a Brazilian industrial policy were issued. In March 2004, the Industrial, Technology and Foreign Trade Policy (PITCE) was launched. That was followed by the Production Development Policy (PDP) in May 2008 (Lula's second term). The current *Plano Maior Brasil* (Broader Brazil Plan – PBM) was announced in August 2011 and expanded in April 2012 (Dilma's administration). While these policies are not directly related to design, the subject is implicitly addressed by their strategies.

INDUSTRIAL, TECHNOLOGY AND FOREIGN TRADE POLICY (PITCE)

In 2004, the Brazilian government launched the Industrial, Technology and Foreign Trade Policy (PITCE) to strengthen and expand the country's industrial base by advancing innovation and adding value to the industry's processes, products and services. The PITCE was created to support programs to build and improve RD&E (research, development and engineering) infrastructure and facilitate the relationship between research centers, companies and the trade system, quality, logistics and distribution processes, trademark registration, environmental conservation etc.

The lines of action established by the PITCE were: Innovation and technology development; Going international; Plant retrofitting; Production capability and scale, and Strategic options.[132]

PRODUCTION DEVELOPMENT POLICY (PDP)

Following the PITCE, the Production Development Policy (PDP)[133] was implemented in 2008 under the coordination of the MDIC in collaboration with the Ministry of Finance, Ministry of Science and Technology, and institutions like the BNDES. The PDP aimed to accelerate fixed asset investments, stimulate innovation, expand Brazil's share in the international market, and increase the number of micro and small businesses engaged in exports.

The objective of that new policy was to promote the long-term competitiveness of the Brazilian economy. Its strategic objectives were:

- World leadership: Positioning the Brazilian production system or company among the top five world players.
- Seize markets: Positioning the Brazilian production system among the top five world exporters.

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[131] RAULIK (2006)
[132] ABDI (2014)
[133] BRAZIL: MDIC (2014a)

- Focus: Building and cementing competitiveness in strategic, high-technology areas.
- Differentiation: Positioning Brazilian companies and trademarks among the top five players in their markets.
- Access expansion: Expand the population's access to basic goods and services to improve their quality of life.

The 24 specific industry domains emphasized in the Production Development Policy were: aeronautics, agro-industry, capital goods, bioethanol, biotechnology, meat, pulp and paper, automotive, defense, service, health, construction, leather, footwear and manufactured goods, nuclear energy, hygiene, perfume and cosmetics, shipbuilding and coastal navigation, lumber and furniture, mining, nanotechnology, oil, gas and petrochemicals, plastics, steelmaking, textile and clothing, and information and communication technology.

PLANO BRASIL MAIOR (BROADER BRAZIL PLAN)

The current Brazilian policy for industry, technology, services, and foreign trade was enacted in 2011 by the *Plano Maior Brasil*. Its series of measures are to be complemented via talks with the production industry in the period from 2011 to 2014, focusing on technological innovation and production increase to boost the industry's competitiveness in the domestic and foreign markets.[134]

Under the *Plano Brasil Maior*, entities such as the Brazilian Agency for Industrial Development (ABDI) provide regular technical support to agencies that coordinate and manage the industrial policy. By conducting situational, strategic, and technology studies, these institutions help improve the institutional, regulatory, and innovation-related environment in Brazil.

Its priorities are to: create and strengthen the national economy's critical skills; increase the production rate of and technology use in value chains; expand Brazilian companies' domestic and foreign markets, and guarantee socially inclusive and environmentally sustainable growth.

The *Plano Brasil Maior* guidelines and priority topics fall under two categories: structure-related, containing guidelines for sector-specific programs, and system-related, containing priority topics for cross-sector measures, especially innovation incentives.

Action plans have been created based on the Plano Brasil Maior guidelines, and the implementation of such plans will be systematically overseen by the National Council for Industrial Development (CNDI).

BRAZILIAN CULTURAL POLICIES ENACTED IN RECENT YEARS

Upon recognizing the important role played by Creative Economy in the global scene, the Ministry of Culture (MinC) has been treating the issue as strategic in two policies: the National Cultural Plan and the National Creative Economy Plan.

These plans contain initiatives and strategies for all Creative Economy domains and include design in their agendas. Both are presented in the section that follows.

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[134] BRAZIL: MDIC (2013)

THE OFFICE FOR THE CREATIVE ECONOMY PLAN – 2011-2004

The Office for the Creative Economy (SEC) Plan was developed in 2001 to implement public policies reaching various branches of the public and private sectors and the civil society.[135] Design is one of the Creative Economy domains and included in the plan in the area of Functional Creations.

To work out the plan, the SEC engaged experts and partner institutions such as support and development agencies, state-run companies, S System organizations, international bilateral and multilateral organisms, and cultural offices and foundations, in addition to 16 ministries and other federal government bodies, along with offices and bodies specifically linked to the MinC system.[136]

Most of the plan's initiatives and strategies operate across all Creative Economy domains and implicitly include design. The plan is built around five main challenges:

- Collecting information and data regarding the Creative Economy.
- Coordinating and fostering the development of creative enterprises.
- Building creative skills.
- Supporting the creative goods and services production, circulation/distribution, and use/enjoyment infrastructure.
- Creating and adapting legal frameworks for the creative industry.

The plan also contains some specific strategies dedicated to the field of design, which are presented in SUMMARY TABLE 19:

SUMMARY TABLE 19: SPECIFIC STRATEGIES FOR DESIGN IN THE CREATIVE ECONOMY PLAN

Initiative/Strategy	*Entity in charge*
Training and educating people working in fashion, design, and handicraft enterprises and companies.	Ministry of Development, Industry and Foreign Trade (MDIC)
Collaborating to organize and hold the Brazilian Design Biennale	
Setting up international fashion, design, architecture, and arts and crafts trade fairs.	*Criativas Birô Internacionais*

SOURCE: BRAZIL (2012a)

NATIONAL CULTURE PLAN (PNC)

The National Culture Plan (PNC) was originally created by Constitutional Amendment no. 48 of August 2005, and subsequently implemented by Law 12343 of December 2010. Devised to be carried out over a number of years, it is directed towards the country's cultural development and the integration of government initiatives that work towards: (i) the defense and appreciation of the Brazilian cultural heritage; (ii) the production, promotion and dissemination of cultural goods; (iii) training skilled

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[135] BRAZIL (2012a)
[136] BRAZIL (2012a)

personnel to manage various cultural efforts, (iv) expanding the access to cultural goods; (v) appreciation of ethnic and regional diversity.[137]

In partnership with the Ministry of Culture (MinC), the National Council for Cultural Policy (CNPC), and the Office for Cultural Policies (SPC), in 2012 a document was launched setting out the PNC's goals for the coming years. Approved in December 2011, these goals must be achieved by 2020 and cater to the Brazilian cultural scene based on demands itemized in 275 initiatives.

In the document, design is included in initiatives dedicated to the national Creative Economy (mapping the chains of production, recognizing creative territories), the development of projects that support the economic sustainability of local cultural production, and financing the production and circulation of shows and regional artistic and cultural activities.[138] Design also features in initiatives set up by the PNC's areas or guidelines, as per SUMMARY TABLE 20:

SUMMARY TABLE 20: PNC AREAS AND GUIDELINES FEATURING DESIGN-RELATED INITIATIVES

Area	*Design-related initiatives*
Diversity	"Encourage and foster the quality of contemporary design production, architecture, and urban planning, improve the material environment, esthetic aspects and cities' livability conditions, while protecting preexisting heritage and allowing the creation of material heritage for the future.
	Carry out and encourage initiatives that preserve the history of fashion, apparel and design in Brazil to help increase the appreciation for rural and urban handicraft and manufacturing practices.
Access	Guarantee the implementation and maintenance of libraries as fundamental spaces for information, literary, language and graphic design history, training and education, leisure and cultural enjoyment.
	Establish partnerships between public authorities, architecture and design firms, technicians and experts, artists, critics and curators, producers and entrepreneurs for the maintenance of cultural equipment that houses contemporary production.
	Create networks and finance programs which incorporate design, building and materials technologies, innovation and sustainability to improve Brazilian cultural equipment and set up reference venues that showcase objects made by historic Brazilian creators. Improve the quality of all bookshops and cafés operating at these venues to deepen the relationship between the public and the ergonomic and technical solutions developed by the field of design in the country.
Sustainable Development	Develop strategies and initiatives to encourage sustainable development models that reduce regional inequality without hindering diversity, where the culture of Eco design and entrepreneurship is promoted by stimulating the reuse and recycling of organic and industrial refuse.
	Develop initiatives to stimulate and foster the technical and professional development of designers (as well as architects, managers etc.), and train agents to finish off cultural products, packaging design and the presentation of goods, and cultural contents and services.
	Implement training initiatives and advance the use of digital recording, production, post-production, design, and cultural dissemination media.
	Improve tourist spots using urban furniture and public space design that showcase symbolic local elements in a way that is competitive with international standards, while emphasizing the creative potential of the locations visited.

SOURCE: BRAZIL (2012a)

4.6.3 PROFESSIONAL DESIGN REGULATIONS

Even though designers have been working in Brazil for over 40 years, their profession is yet to be formally recognized by law. The first attempt at regulating the profession was Bill no. 2946 brought forwardby Congressman Athie Coury in 1980. The Bill was shelved by the House of Representatives' Steering Committee in 1983. In the following years, another two bills were proposed by Congressmen Murílio Ferreira Lima (1989) and Chico Amaral (1993), both thrown out in 1995. In 1996, it was Congressman Hugo Lagranha's turn to submit his bill, but similarly without success: the document was shelved in 1998. Congressmen José Carlos Coutinho and Eduardo Paes also introduced bills, in 2002 and 2003 respectively, which were in turn soon shelved by the House of Representatives.

The great step forward was Bill no. 1391 of May 2011, by Congressman José Luiz Penna. "The bill was the product of discussions by a committee that included the main professional associations in the country, as well as professors and student organizations.[139]

Approved by the Committee for Work, Administration and Public Service (CTASP) in 2012, Bill no. 1391 was referred to the Constitution, Justice and Citizenship Committee (CCJ) of the House of Representatives, which approved it on March 20, 2013, as amended by reporting Representative Alessandro Molon. As it is conclusive, the bill advanced by José Luiz Penna is currently awaiting approval by the Federal Senate.[140]

In accordance with Bill no. 1391/2011, designers' scope of work includes the following:

- Planning and designing systems, products or visual messages connected to their respective manufacturing processes to ensure their ergonomic functionality, proper use, technical and esthetic quality, and the structural rationale linked to their production process.
- Designing, improving, formulating, reformulating, and preparing industrial designs and visual systems in the form of drawings, diagrams, specifications, scale models, digital artwork, prototypes, and other forms of 2D and 3D representation.
- Studies, projects, analyses, evaluations, inspections, technical reviews, opinions, and technical-scientific or cultural disclosures within the scope of their professional training.
- Research and tests, experiments in their field of activity and related fields, when operating in multidisciplinary teams.
- Fulfilling roles and functions in public and private entities whose activities involve development and/or management in the field of design.
- Coordinating, directing, controlling, advising, consulting, assisting, and performing services or matters in their field of activity.
- Teaching courses for which the professional is properly certified.
- Fulfilling roles and functions, and appointments in state-run, quasi-public agencies, independent government agencies, state-controlled companies, or businesses.

In case it passes, Law no. 1391/2011 will bring many benefits, responsibilities and recognition to the field of design. Once their profession is regulated, designers will be entitled to a minimum starting

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[139] ADG BRASIL (2013)
[140] DESIGN BRASIL (2013)

salary, career plan, and trade organizations, participate in government tenders, sign off on and be technically responsible for projects, open businesses given by tax benefits etc.

The bill is available and its progress may be tracked via the House of Representatives website.

4.6.4 FINAL CONSIDERATIONS

Upon analyzing the current industrial policy, i.e. the *Plano Brasil Maior*, we see that design is mentioned only twice among the objectives of the 19 Strategic Sector-Specific Agendas. A more in-depth reading may look at the fact as a restriction to the field by failing to mention it in areas to which it has historically added a huge value, such as the design of capital goods, health equipment, personal hygiene products, vehicles etc. Design is considered only in the leather, footwear, textile, clothing, jewelry ("increase the investment in innovation and design, aiming to create new competitive attributes"), and furniture ("foster training in management and production methods, innovation and design") industries. This can also reveal a misguided view of design as esthetics or styling.

In the descriptions found in the Strategic Sector-Specific Agendas set by the *Plano Brasil Maior*, design is dissociated from innovation in various topics, which goes against theories that intimately connect the two concepts and prove arguments stating that the interaction between design, innovation and technology is still very weak in Brazil.

When we investigate Brazilian cultural policies, we can observe that design is inserted in both the National Culture Plan and Office for the Creative Economy Plan. These plans set general strategies and actions for all Creative Economy domains, therefore including design. There are also actions and strategies directed specifically at design.

However, the current dissociation between the performance of design and the Brazilian industry, the questionable systemic coherence of initiatives, and methodologies still under construction are hurdles about to be overcome. "The pressure of competitiveness, however, has placed great political weight on the issue, and in spite of all the difficulties faced up until now, the prospects seem promising. With design definitely included in governments' and companies' agendas, the phase of bringing the problem to the forefront seems very advanced."[141]

The consolidation of a national design system requires a clear public policy setting the guidelines of national design so that bodies, agencies, and institutions may work in concert and join efforts to relentlessly strive for an economy based on innovative, high added-value products.

The success of a national design system largely depends also on the commitment of and coordination between players, courses of action set by each one, cohesive interests, and the proper use of available resources. "Plans only succeed when the players involved in them are actually willing to carry them out. More than some idea on paper, a strategic plan is a major act of commitment toward the community and requires political power, resources, and legitimacy in order to succeed."[142]

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[141] CASTRO; BRAGA (2012)
[142] CASTRO; BRAGA (2012)

5. INTERNATIONAL REFERENCES, METRICS AND INDICATORS

Design has been featuring more prominently in the worldwide political agenda as a tool for innovation and sustainability of the industry, society, and the public sector, and consequently weaving its way into policy making.

However, in order for governments to actually integrate design into public policy, some basic questions need to be addressed: what are the challenges and obstacles associated with the evaluation of design? How does design contribute to a company's competitiveness? Have governmental investments in design programs and policies paid off? How can the national design industry benefit? In what way does design contribute to the development of a nation?[143]

In order to further clarify the role of design in a nation, we present the following SUMMARY TABLE 21, which demonstrates the importance of the activity in each sector: the industry, society, public sector, and policy making.

SUMMARY TABLE 21: THE ROLE OF DESIGN

The role of design				
	In industry	**In Communities**	**In the Public Sector**	**In Policy-making**
Process	Creative techniques that engage stakeholders in transforming ideas into tangible results, aligning economic, social and environmental considerations.			
Resultado/ Impacto	More desirable, user-oriented products, processes, systems and services.	Social innovation initiatives that can better add value to all aspects of society.	Public services that better respond to the needs of the population.	More inclusive, innovative policy-making and public administration.

SOURCE: SEE (2010)

However, design is still a relatively new activity. The above results/impacts are yet to be become widely understood. Therefore, in most countries, some governmental intervention is necessary. In this scenario, the need for design support programs arises. The cases below are examples of support programs in the two most relevant spheres for this project: the industry and policymaking. The international reference case studies are described with the objective of providing information about other countries' practices, and in each case, the activities undertaken and the results achieved.

5.1 INDUSTRY SUPPORT PROGRAMS

5.1.1 DESIGN WALES, UNITED KINGDOM[144]

Design Wales was established in 1994 by the Welsh Assembly Government (Wales/UK) to provide a free and independent design advisory service for Welsh industry, in particular SMEs. Since then, Design

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[143] SEE (2014)
[144] SEE (2014)

Wales has made more than 5000 advisory visits to companies and delivered more than 200 seminars and workshops. Design Wales is entirely funded by the Welsh Assembly Government.

Design Wales employ a team of specialist design advisors who can work with Welsh companies to help address their design related issues in one-to-one meetings. The design advisors help companies understand how design can support their business development and/or address specific issues and then facilitate them in achieving these objectives. The focus is on providing practical support, particularly for first time users of design.

Design Wales offers four levels of advice to its clients: a general advice line via telephone/email; regular, regional workshops for start-up companies entitled Brand Essentials workshops (featured in a separate case study); a program of specific activities for the food, product development and fashion and textiles sectors; and a one-to-one advisory service to help companies address specific issues. All advice (including participation at workshops and seminars) is provided free of charge, in line with the objective of ensuring that every company based in Wales has access to design advice.

Design Wales employs eight design advisors covering the following areas: product design, website design, fashion and textiles, graphics, ecodesign, food and branding. Almost all of the design advisors employed since the launch of the initiative have been experienced designers who are seeking to understand and influence the wider business context of design.

Companies complete a 'first enquiry' form, providing information about their current position and their objectives, which enables Design Wales to assess the level of support that they require (as outlined above) and, if appropriate, the most suitable design advisor to help them. The design advisor will then meet with the company to discuss their objectives and requirements. Advice given to companies usually falls into the categories of support for design management (such as project planning, creativity facilitation, sourcing external expertise) and help in resolving specific technical issues (such as material selection). Design Wales aims to act as an independent advisor to the company, to raise awareness of their options and to then facilitate them through their chosen route – whether this is to find an external consultant, develop their own external expertise or recruit experienced designers. Design Wales does not undertake any design work.

All Design Wales clients, whether attending an event or receiving one-to-one advice, are asked to complete client satisfaction forms. For one-to-one support this process is being developed to include measures of change within a client company in the time between the start and six months after the intervention. In delivering the Design Wales initiative on behalf of the regional government the effectiveness of the service is regularly assessed by independent external consultants.

As a result, the three greatest benefits experienced by client companies through support from a design advisor are shown to be industrial experience in how to manage a particular issue; an independent perspective in understanding the options available and the context in relation to their business ambitions; and confidence in working with external consultants and making appropriate decisions.

From the Design Wales perspective, the success factors for the program are linked to the consistency of funding from the regional government and the recruitment of experienced designers as advisors. Focus is also an important consideration – design is a broad subject area but small and medium sized

businesses only usually respond to specific issues they might be aware of or are actually facing during a particular period. As with any service that offers such intense and individual support for clients there must always be a balance between promotion and the ability to provide an effective service – too much promotion can raise expectation beyond the capacity of the available resources.

5.1.2   DESIGN MANAGEMENT EUROPE AWARD – DME[145]

The Design Management Europe (DME) Award was established to highlight and reward the contribution of management towards the success of design projects and strategies.

The DME Award was a key output of the ADMIRE program under the PRO-INNO Europe initiative formed by the European Commission Directorate General for Industry and Enterprise. The over-arching objective of PRO-INNO Europe was to improve the conditions for an innovative Europe through policy development. Design, being one of Europe's greatest creative resources, is recognized by the European Commission as a key element of innovative and successful businesses.

The objective of the DME Award is to promote a more strategic and sophisticated use of design among businesses and to champion winning practices. It is not a design competition; it is a management award recognizing the skills and leadership of management to implement successful design projects and strategies.

Companies and organizations across Europe are challenged to apply for the DME Award by demonstrating how design is integrated in their strategy, management, and what processes they employ to achieve their strategic plans. Entries present their case by submitting a poster for the jury to review. Winners and honorable mentions are selected by a jury of design management and business experts.

The €6.4m ADMIRE program, which ran from January 2007, partly addressed the Innovation Management agenda of PRO-INNO Europe. Since its completion in February 2009 the partners have been participating on a voluntary basis and host cities have covered the costs of the jury day, promotion and award ceremony. To date the DME Award ceremony has been held in Essen, Germany (2007); Cardiff, United Kingdom (2008); Eindhoven, The Netherlands (2009); Lisbon, Portugal (2010); Tallin, Estonia (2011); Portugal (2012), and Katowice, Poland (2013). In return, the host cities have the opportunity to host a prestigious business award that will promote them as a business destination to senior executives of the most innovative and successful companies, national government organizations and European councils.

The DME Award is delivered through a network of partners and agents across Europe. The network is largely comprised of design support agencies and universities with a specific focus on design management. Their role is to promote the award and facilitate entries. Since the completion of the ADMIRE program the partners of the DME Award has been managed by an elected board of five organizations; Agence pour la Promotion de la Création Industrielle (APCI), Design Zentrum Nordrhein Westfalen (DZNW), European Design Centre (EDC), City of Eindhoven and the University of Wales Institute Cardiff (UWIC).

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[145] SEE (2014)

Design Management is considered by the European Commission as a facet of Innovation Management, a key subject of PRO-INNO Europe. While under the ADMIRE program, the DME Award and the partner network compiled data and research for the European Commission on design management practices and the capabilities of European companies. In addition the promotion of design management by European design and business support services was also researched.

The entry poster format afforded the unique opportunity to review how companies from all over Europe integrate design into their business strategy. The majority of which can be grouped into the following categories:

- Design for radical innovation
- Design for improved product performance
- Design for product identity
- Branding
- Service design
- Design publishing
- Design as an added value activity
- Open source designing

Awards generally attract entries through their reputation. In order to build a reputation each edition of the award is reviewed and improvements recommended for the next. In the absence of other design management awards the DME Award has to determine for itself how to maintain a standard for top class design management e.g. entry requirements, categories, rules, criteria, judging process, research data.

5.1.3   KNOWLEDGE TRANSFER PARTNERSHIPS IN DESIGN (KTP)[146]

Knowledge Transfer Partnerships (KTPs) are collaborative programs that enable companies to access the vast knowledge and expertise available within the National Centre for Product Design and Development Research (PDR), based in Cardiff, Wales/UK.

KTPs were introduced by the UK government in 2003 as the successor to the Teaching Company Scheme (TCS), which began in 1975. PDR have been running first the TCS and then KTPs since 1997, and the scheme is still ongoing. The main objective of the scheme is to enable companies (SMEs, charities and large organizations) to benefit from the knowledge, expertise and capabilities found within PDR. Each project has an associate (graduate student), who plays the leading role in the project execution, and a coordinator and supervisors, who are based at PDR. KTPs are part funded by the UK Department of Trade and Industry and the Welsh Assembly Government. Depending on the size of the organization working with PDR, the total annual value of a project can be around £51,000, of which 67% is grant funded. Across the scheme as a whole, more than 1,000 KTPs have been completed to date, across all sectors. PDR has completed 21 KTPs and a further 14 are in progress.

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[146] SEE (2014)

KTPs are established between companies and higher education institutions, in this case PDR. In each KTP, a team is established to implement agreed changes to the company's future plans. KTPs can run up to a maximum of 3 years. The objectives of every KTP are to:

- Facilitate the transfer of knowledge and technology and the spread of technical and business skills.
- Stimulate and enhance business relevant research and training undertaken by the knowledge base.
- Provide company-based training for associates to enhance their business and expert skills.

The project team (comprising the associate and the supervisors) meet at least monthly to discuss progress, agree targets and identify the resources required. The main control document for each project is the Project Gantt Chart, which is maintained and updated by the associate, in agreement with the project team.

Each KTP brings a number of benefits to the clients involved, such as process design improvements, new product development, embedding of new design technologies and systems, adoption of best practice in design and innovation and development of a sound intellectual property portfolio. Companies report a range of tangible outcomes – an increase in overall turnover and sales performance, increased profitability, new product launches, new market penetration, improved competitiveness, enhancement of design and manufacturing processes. As far as the associates are concerned, the KTP can help to boost their career prospects, with a significant number finding employment in the companies concerned once the KTP has finished. For PDR, the KTPs have a practical use in forming the basis for the case studies and the publication of academic papers.

The key factor for the success of a KTP is the quality of the associate selected, and the communication and relationship established between the associate, company and PDR. The application lead-times can become an issue for the companies involved, as the process of establishing a KTP can take between 3 to 4 months. Within the application form, quantifiable measurements are included for each of the three parties; company, knowledge base and associate. These are revised and reviewed within the context of the final report. Each partnership is graded according to performance in line with the deliverables.

This national program has proven to be very successful in helping companies achieve competitive advantage. Possible opportunities typically include developing a new idea into production; improving margins and reducing lead-times; integrating new design tools; investigating new materials and applications; and implementing rapid product development, testing and manufacturing technologies.

5.1.4 SERVICE DESIGN PROGRAMME[147]

The Service Design Programme is delivered by Design Wales on behalf of the Welsh Assembly Government and uses service design as a tool for economic growth within the advanced materials

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[147] SEE (2014)

and manufacturing sector. The program was launched in 2010 and within a year has generated concrete results.

In 2009, findings from an Engineering Employers' Federation report revealed that services account for between 15% and 20% of total revenue earned by UK manufacturers (compared with 66% across UK industry as a whole). The report also identified that these services tend to focus on fixing products, ongoing maintenance, marketing and sales, for example, rather than a strategic move towards 'servitisation'.

Intriguingly, a survey conducted in 2010 by the same organization showed that the number of companies introducing or planning to introduce service innovation would jump from 17% to 48%, highlighting the rise in interest in services from manufacturers.

This shift from products to services provides clear opportunities for service designers who can support manufacturers in realizing their aims. Design offers a clear path for businesses to add value to their offer, servitise their products or even adopt new service-based business models. The Design Wales support program aims to capitalize on this shift and demonstrate how service design can help companies achieve this, kick-starting a demand for design-led service innovation.

The Service Design Program began in July 2010 and ran until May 2013. The program was set up to address both supply and demand by creating demand among Welsh manufacturers and expertise in service design among Welsh designers. Design Wales is set to work at a strategic level with 90 companies or 'The90'. The program's key performance indicators are made up of a balance of delivery indicators (number of seminars and diagnostic interviews) and impact indicators (new services launched, R&D investment induced and jobs created). Combined, these indicators have a significant impact on both behavior and practice within a business.

The model of business support developed by Design Wales is based on a four-step process: Events, Telephone Advisory Service, Service Essentials Workshop and the Service Strategy Program. In order to create meaningful impact on a business it is important to engage it over a longer period of time. The shift from products to services is as much about a change in management culture as it is about a change in business practice.

The Service Design Program also works with the design sector in Wales to create a 'supply' of service design expertise, ensuring that once companies have received their funded support from Design Wales, local service design expertise is available to deliver the work.

Although there are some exceptions to the rule, most companies accessing government support for innovation are SMEs or micro-businesses. It is these businesses that lack the critical resources to contract service design expertise or develop an in-house capability that value design support programs the most. As well as being open to support, these SMEs also have a great amount of potential as shifts in mindset, approach and business model are easier to implement within smaller companies.

5.1.5 DESIGNING DEMAND[148]

Designing Demand is a national program developed by the Design Council in England and delivered by the Regional Development Agencies (RDAs) to support businesses in becoming better purchasers and regular users of design through a number of differing business growth services. The main objective of the program is to embed effective processes for the management of design in businesses and technology start-ups in order to help businesses become more competitive, increase their profits and boost their performance through the strategic, effective use of design.

Pilot programs ran from 2002 to 2005 and the program started to roll out nationally in 2006. More than 900 companies have participated within the program which covers all industry sectors. The program budget is approximately £20m and is funded by the RDAs, some of whom use EU grant funding.

The program deals with both the demand and supply areas of design. It also helps to embed design understanding, design management skills and design processes within the companies involved, which can all provide short and long term benefits.

To meet the demands of different businesses the program consists of four components: Designing Demand workshops, Designing Demand Generate, Designing Demand Innovate and Designing Demand Immerse.

Designing Demand Workshops are fast-paced, practical one-day sessions showing SMEs what design investment could do for them. There are three sets of workshops: for Designers, Business Advisors and businesses. These workshops raise awareness of the value of design and what it can do for business.

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[148] SEE (2014)

Designing Demand Generate is a support service to help both established businesses and start-ups get a design project moving by helping them make strategic design decisions, set up and manage design processes and run successful design projects. Companies get up to five days' free, dedicated, one-to-one support from a Design Associate, an experienced design manager appointed from a Design Council approved roster.

Designing Demand Innovate is a specialist design innovation service offering sustained support to technology businesses, specifically start ups, helping them use design to turn their ideas and technology into products, reduce time to market, create compelling brands and attract investment. A Design Associate provides support across the business helping to embed design thinking and management skills over a 1 year to 18 month period.

Designing Demand Immerse is the most intensive service, aimed at mature businesses with the appetite for strategic change, helping them grow by using design as a business development tool. It gives companies the chance to work with leading designers to investigate how design can tackle core strategic issues and make a lasting impact on performance. Immerse begins with a high-impact Immersion Day, held at the company premises and run by a Design Associate – a Design Council-approved design manager selected for their experience in tackling business issues. The management team works with a group of design experts to examine key aspects of the business in depth, from its strategy, offerings and markets to its objectives, challenges and working culture. The day ends with the design team highlighting a range of opportunities for design to improve the company performance. This is followed up by a formal report on the design team's recommendations and the thinking behind them. In the next stage of Immerse, the company decides which opportunities to take forward. Then, all businesses taking part in Immerse in the region come together to share their plans and objectives. Over the next 12 to 18 months, the companies implement design projects with close support from the Design Associate. During this implementation phase, a series of NetWorkshops™ cover key design themes such as brand, new product development and customer focus. In all, the companies receive eight days of face-to-face support from the Design Associate.

Some results of the Innovate and Immerse programs are described in SUMMARY TABLE 22 and 23:

SUMMARY TABLE 22: RESULTS OF THE DESIGNING DEMAND INNOVATE PROGRAM

Designing Demand Innovate

Investment Finance	50% of participating companies increased their ability to raise investment finance.
Strategy	80% changed strategic direction – accelerating them towards a customer focus rather than a technology focus.
Capabilities / skills	50% significantly changed the balance and composition of the company's skills.
Return	75% invested significantly in design and are confident of a return on investment. This investment is seen as crucial rather than another cost.
Products and services	35% changed product or service.
Branding and Communication	65% changed branding and communication, giving them stronger market positioning.
Vision and Culture	80% report a changed mindset, culture and vision.
Risk	50% saw better management or a reduction in commercial risks and have a more positive attitude towards the sustainability of the business.

SOURCE: SEE (2014)

SUMMARY TABLE 23: RESULTS OF THE DESIGNING DEMAND IMMERSE PROGRAM

Designing Demand Immerse

Overall impact	The great majority of clients indicate that their involvement with the Immerse yields benefits that more than outweigh the cost of participation
	More than 90% of contributors stated that their participation had had a positive impact on their business, whether that was in respect to confidence, sharper processes or evident success in the market place.
Impact on commercial performance	The commercial benefits of participation in Immerse are reported to be building still , with strategic and product related projects still ongoing in many cases and with high expectations.
	50% of participants reported that Immerse-inspired changes and activity had already been translated into improved financial performance.
	The following excerpts from interviews demonstrate that the scheme has the potential to add value, even where the businesses in question are under severe pressure from international competitors. "The major project we have undertaken has more than paid for itself already." Challis International "Overall, our profitability has tripled since the company started with Immerse. We cannot attribute this all to DIP, but it has had a huge impact on this change". Novar ED&S
Impact on the use of design	There have been wide-ranging impacts on the use of design within client businesses, ranging from rethinking the role of design to expansion of design activity.
	There has been a strong positive impact on design employment, with an average increase of around 25% in the number of design-related staff across the portfolio since the start of the program. This is equivalent to between two and three extra design staff on average, amongst the companies that had recruited. Three companies took on a design specialist for the first time, whilst at the other end of the scale, one company has made ten new appointments.
	The majority of clients reported strongly positive impacts on all aspects of design performance. The most widely reported change was an increased willingness to invest.
	88% told us that they are now investing more in design than they did when they joined Immerse.

SOURCE: SEE (2014)

CASES

Smart Sensor:

Now a credible business proposition with new investment of £200,000.

"*The program put me in a position where I have a usable product, a clearly communicable market need, a story to give investors, and risks that have been mitigated across the board.*" James Jackson, Chief Technology Officer.

Ceres Power:

Investing in design has helped Ceres Power to secure vital funding for a successful AIM flotation.

"*We're a small startup dealing with big corporations and need to be able to punch above our weight. That means establishing a strong brand to keep us ahead of the competition. Design is central to this.*" Peter Bance, Chief Executive.

Oxford Biosensors:

Spin-out invested £200,000 in product design, resulting in winning a development contract with Pfizer in December 2004.

"*The integration of design thinking is simply a part of how we do business, influencing strategy, marketing, brand and of course product development.*" Kevin Lorimer, Managing Director

Synature:

Placing design, prototyping and user needs at the center of their business strategy helped to clarify the value proposition and cut the time taken to attract clients and investment. As a result, the team has created a new company with ANGLE Technology Ventures, following a high-quality pitch which included an eye opening user walkthrough of Synature's visual interface.

Owlstone:

Investing in their brand name and building scenarios that positioned their product in different market contexts helped to secure strategic partnerships earlier:

"*Design has remained core to our business processes, crossing a spectrum of activities from understanding fast changing market landscapes to delivering products to meet the most challenging user demands every time first time. Thanks to our embedded design process, we have secured four new collaborations and have product revenues, all within an 18-month period.*" Billy Boyle, Director, Owlstone

KeCrypt:

Investing in user research helped KeCrypt to release the next generation Biometric Signature product.

"*There has been a cultural change – we are a bunch of engineers so think about solving technical problems. It is about thinking about how to appeal to a particular kind of person. It is a better style of thinking and with our design mentor, we have found new ways of understanding what our target users want.*" John Dale, MD, KeCrypt.

Accuscene:

User research led to a shift in business strategy and new insights to feed into the early product development stages:

"*Our main distributor in Los Angeles... is anticipating this new product with interest and discussions over pricing, margins, exclusive distribution rights, stock levels etc. are hotting up even before they see the product! The design of this product can be attributed to the Design Innovation Service and in particular to our design mentor's valiant efforts to cajole, persuade and push us into bringing certain aspects of our 'design footprint' up to par.*" David Macintosh, MD, Accuscene

5.2 POLICY-MAKING PROGRAMS

5.2.1 DESIGN 2005![149]

The 1990s was a decade of transformation for Finland. The country was experiencing a severe economic recession characterized by a major banking crisis, rising unemployment, escalating government debts and inflation. International market pressures required strategic action at ministerial level. The country then started a process that brought it to the head of the list of competitive countries in the World Economic Forum. A unique aspect of this strategy was investment in measures with long-term impact instead of immediate solutions. One of these measures was the ambitious aim of building a knowledge-based country by investing in R&D. Design policy was also part of this movement.

The work started in 1996, when the Finnish National Fund for Research and Development (SITRA) invited a group of representatives of the design community to discuss how design could contribute to innovation and economic development in Finland. The discussion identified the need for a more formal investigation. As a result, a survey was conducted and in October 1998 a new report (Designed Asset I-II – Design, Industry and International Competitiveness) was published. The establishment of a national system of design to operate alongside the national system for innovation was an important and visionary recommendation in this report.[150] It also included a thorough written 'diagnosis' of the situation of design in Finland, described the history of Finnish design and discussed its future.

The next stage of the initiative was led by the National Council of Crafts and Design when a second report was published in 1999, which served as the basis for the Finnish design policy *Design 2005!* This report was to a large extent the 'vision of what the Finnish design system should be in 2005. It clearly defined what impact the policy should have in quantity and quality of Finnish industrial design.' After a broad consultation, the official policy was agreed by the Council of State and published in June 2000. The three main goals were to improve design quality, to promote the extensive use of opportunities inherent in design with a view to improving competitiveness and employment, and to develop the quality of the living environment and promote a distinctive national culture.

Design 2005! was a response to the opportunities and problems identified in the 'diagnosis', explains Mr Krister Ahlstrom, one of the key coordinators of the policy. The team that developed both publications and also implemented the policy was formed of representatives from government ministries, design organizations, professionals and volunteers. Mr Ahlstrom adds that 'all these individuals contributed to the process with great motivation, and all embraced the same vision: make design (thinking) part of the Finnish Innovation System – not just an outgrowth of art and craft. *Design 2005!*, above all, created a lot of positive excitement and activity in education, in industry, in research and among design consultants.'

A key factor in the success of *Design 2005!* was the setting of clearly defined targets and roles. For example, the document stated that "under the direction of the Ministry of Trade and Industry, regional

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[149] SEE (2014)
[150] VALTONEN (2005)

and national development bodies will jointly launch a project with a view to encouraging 200 enterprises annually to integrate design into their core operations".[151] In this way, Finland was able to make the widespread application design central to business know-how. The document also stated that the Ministry of Education and the University of Art and Design were responsible for setting up the design innovation centre Designium: 'Designium will combine research, education, corporate product development, support for business development and internationalization in the design field, research data services for design firms and business enterprises, a business hatchery and the internationalization of design know-how.' The close interaction between research centers and industry with clear goals made *Design 2005!* one of the most effective design policies at the time.

However, the absence of appraisals to evaluate the success of the policy meant that no further proposals directly succeeded *Design 2005!*. Nevertheless, design has now become a valuable tool for industry where previously the merits of design were not so widely apparent. Also, the close collaboration between key actors, including research centers, private companies and government ministries, has furthered the capacity of design in innovation and national competitiveness.[152]

Thanks to policies such as Design 2005!, Finland left an essentially natural resource-based industry to become a competitive knowledge-based economy with the highest investment rate in R&D in Europe – 3.5% of GDP[153] – and specialized in high-tech industry with important global brands being established in Finland in the 1990s such as Nokia, Suunto, Metsopaper, Ponsse and Polar.

A central component of the policy was that design should be more closely integrated into research, education, corporate product development, support for business development and internationalization. A unique aspect of this strategy was the investment in measures with long-term impact and the inter-connectivity of various stakeholders in Finland. *Design 2005!* contributed to Finland becoming one of the most competitive countries in Europe. As a result, the Finnish example has become a policy reference for potential design policies across the EU.

5.2.2   SOUTH KOREAN DESIGN POLICY[154]

South Korea's design policy is noteworthy for its detailed, objective plan. Throughout history, it has developed alongside the Korean industry's development plans, which can be described according to decade:

- 1960s: light industry
- 1970s: heavy industry
- 1980s: manufacturing and processing industry
- 1990s: technology, computing, information
- 2000s: knowledge industry

In parallel (and for some time with no connection to the industry), design developed over the:

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[151] FINNISH GOVERNMENT (2000)
[152] VALTONEN (2005)
[153] DAHLMAN; ROUTTI; YLA-ANTILLA (2006)
[154] RAULIK (2006)

- 1950s: stimulus to "mass-produced arts and crafts"
- 1960s: stimulus to exports
- 1970s and 1980s: promotion of design and packaging
- 1990s: stimulus to the design industry
- 2000s: globalization of Korean design

In South Korea, the 1990s stood out as the beginning of intense design promotion efforts. In 1993, the first in a series of strategic, five-year plans was launched:

- 1993-1997 First Plan: As a result of activities during this period, the number of designers multiplied, as did investment in small and medium-sized design companies.
- 1998-2001 Second Plan: It had to be worked out as a response to the 1997 crisis in Asia, when the country found itself compelled to focus on quality instead of quantity. The government then adopted a policy to encourage designers to let their creativity soar and improve the quality of their work.

  - Opening of the Korea Design Center
  - Expansion of international activities
  - Implementation of Centers for Design and Innovations in the main universities

- 2003-2007 Third Plan: By taking into consideration the value of design for industry competitiveness, the plan focused on promoting design to make South Korea a reference in Asia. For this plan in particular, the government took the opinion of designers and the population under advisement. The main initiatives:

  - Support to design, research and development
  - Implementation of the Regional Design Centers
  - Investment in the objectives of the "Design Korea" program

Today, South Korea is also dedicated to ensuring the quality of its designers. To that end, a few strategic initiatives have been set up by the Korea Institute of Design Promotion (KDIP) to be implemented along with the Third Plan:

- Expansion of design training programs i for the industry.
- Implementation of education specializing in design.
- Globalization of Korean design.
- Support to Korean design company growth, specialization and business.

In order to effectively implement the Korean design policy, the government has created a dedicated office (Design & Brand Policy Division) at the Ministry of Commerce, Industry and Energy (MOCIE). The team works together with the KDIP to help businesses enhance their use of design and become more competitive.

5.3 ANALYSIS OF THE DESIGN SECTOR AND ITS IMPACT

Efforts to further design must also include mechanisms to gauge and assess the impacts of programs and diagnose the situation and development of design in a given sector or country. With that in mind, several countries have created analysis programs. Some of the methods proposed are academic; others are commissioned by governments or design organizations. Below we present a list of some of the main studies analyzing the design sector and its impact.

5.3.1 INTERNATIONAL DESIGN SCOREBOARD[155]

University of Cambridge and Design Council (United Kingdom, 2008)

DESCRIPTION: Presents findings from a study conducted to measure design internationally. It is organized as a ranking framework based on a series of indicators that collectively enable a picture of a country's design capability. Indicators are used that help to show the relative intensity of design capabilities in country.[156]

METHODOLOGY: Definition of the objective. Proposal of a generic framework to work out a national design system using metrics and different aspects. Selection of indicators. Data collection. Ranking the countries. Selection of countries to feature in the final document.

INDICATORS/CRITERIA: Total public investment in design promotion and support; total number of design graduates; total number of design registrations with the World Intellectual Property Organization (WIPO); total number of trademark registrations granted to the country according to WIPO; total number of design firms; turnover of the design services sector; total number of design service jobs.

CONCLUSIONS: To date, this has been the only project to exclusively measure design, without taking it as part of innovation and/or R&D. The study was useful in that it highlighted the difficulties, strengths, and consequently the unique challenges of using design to advance each country's competitiveness by comparing it against other countries. There was a great degree of difficulty in collecting consistent, evenly available data to enable the initial comparison shown in the document. Nevertheless, the goal of developing a framework allowing the effective measurement of design and future international comparisons was achieved.

5.3.2 HONG KONG DESIGN INDEX[157]

Hong Kong Design Centre (Hong Kong, 2010)

DESCRIPTION: Initiative to develop a measurement framework for examining the landscape of the design sector and its dynamic changes to be used as a reference for policymaking.

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[155] MOULTRIE; LIVESEY (2009)
[156] FERRUZCA; DÍAZ; SANZ (2013)
[157] HONG KONG DESIGN CENTRE (2011)

METHODOLOGY: Definition of the objective. Definition of design domains to be addressed. Reference models. Structure of seven different dimensions to which a range of indicators must be applied. Selection of indicators. Data collection and research. Data consolidation.

INDICATORS/CRITERIA: Overall, there are 40 indicators divided into seven main groups: Human capital; Investment; Industry structure; Market demand; Social and cultural environment; Intellectual property rights environment; General conditions of the business environment.

CONCLUSIONS: By using a quantitative measurement framework a method was created to measure exclusively the design sector and also encourage, if only informally, the various stakeholders to discuss design and the sector's development in greater depth. The study also hit upon some limitations that need to be overcome: need to design terms to be clearly defined; need for research and studies in a range of different areas (design labor market, design industry, use of design by companies, and public perception of design); need for greater collaboration between government-run research bodies; need to set up a "design observatory" to work in partnership with relevant industries and universities.

5.3.3   A SCOREBOARD APPROACH[158]

InnoMetrics (Netherlands, 2009)

DESCRIPTION: Following the European Innovation Scoreboard (EIS), a set of indicators were used to capture the different dimensions of creativity and design.[159]

METHODOLOGY: Definition of creativity and design. Relationship between creativity, design and innovation. Analysis of existing indicators. Adaptation and creation of the set of indicators. Data collection. Information analysis. Ranking of countries.

INDICATORS/CRITERIA: There are 35 indicators divided into seven different dimensions: Creative Education; Self-Expression; Openness & Tolerance; Creative Sector; Creativity in R&D; Design activities; Competitiveness in design.

CONCLUSIONS: Despite finding a well-developed knowledge of the benefits of design, the study was unable to directly measure the degree of creativity and design due to a lack of adequate quantitative indicators. Therefore, in order to obtain better results it would be necessary to integrate creativity, design and innovation and create more specific and precise indicators. These and other factors made this study difficult, such as the fact that creativity and design are multidimensional phenomena that can include various areas. They may also have different meanings, definitions and repercussions, which reveals the need for clear definitions. On top of that, the research on design applied to this study does not fully capture the importance of design.

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[158] HOLLANDERS; CRUYSEN (2009)
[159] FERRUZCA; DÍAZ; SANZ (2013)

5.3.4 DESIGN MANAGEMENT AND BUSINESS IN EUROPE[160]

Design Management Institute DMI (2010)

DESCRIPTION: Design Management Europe (DME) investigated the relationship between companies' design management capability and business performance indicators. This study seeks to demonstrate and promote to businesses the commercial benefits of good design management practices.

METHODOLOGY: Creation of four design management levels arranged along a "staircase" using five factors or indicators capable of defining good design management inside a company. Evaluation of the method through small and medium-sized businesses in Europe.

INDICATORS/CRITERIA: Design management levels: 1) No design management; 2) Design management as a project; 3) Design management as a function; 4) Design management as culture. The factors are: knowledge/awareness of the benefits; planning for design; resources for design; design management expertise; design management process.

CONCLUSIONS: The European SME survey results revealed a correlation between increasing design management capability and positive business growth, as well as the growth rate. The study also pointed out the companies' export capabilities, a relationship between innovation and design management, and the correlation between design management level and with business performance. On the other hand, the study found that the main obstacle standing in the way of companies implementing design management is cost. Education issues were also addressed, such as the lack of design management training in universities.

5.3.5 DESIGN LADDER[161]

Danish Design Center (Denmark, 2003)

DESCRIPTION: The Design Ladder is a tool created to measure the level of design activity in Danish companies. The Ladder, used as a framework for a survey, was the first step in developing a method to assess the economic benefits of design in Denmark and serve as input for drafting a new national design policy. The tool has also been subsequently adopted in other European countries, such as Austria, Switzerland and Sweden.

METHODOLOGY: Tool creation. Data collection from 1,000 companies, divided into categories according to their size. Ranking companies according to four levels of use/maturity of design. Development of courses and training programs to help companies climb the design ladder.

INDICATORS/CRITERIA: Stage 1 of the design ladder: No design – design plays no role in the development of products or services. Stage 2: Design as style – design is relevant only in terms of style. Stage 3: Design as process – design is a permanent feature of development processes. Stage 4: Design as strategy – design is a strategic mechanism and a driving force for innovation.

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[160] BEST; KOOTSTRA; MURPHY (2010)
[161] SEE (2014)

CONCLUSIONS: The results showed how much Danish companies were investing in design and how much more revenue those that purchased design raked in compared to those who did not, which revealed a correlation between design purchase and economic growth. The data from this study was used by the Danish government as input for implementing a new national design policy as one of five new strategic initiatives to promote the country's economic development. In 2007, the survey was repeated and demonstrated how many companies had moved up on the ladder and how much they had grown in four years.

5.3.6   THE MUSA RESEARCH PROJECT[162]

Aalto University School of Art and Design, Designium Innovation Centre &Western Finland Design Centre (MUOVA) (Finland, 2005)

DESCRIPTION: This project was part of a technology program launched in 2002 by the Finnish Funding Agency for Innovation (Tekes), and a key measure in the national design policy (Design 2005!). The objective of the national design policy program was to establish a dynamic system of design in Finland to enable the nation to achieve the status of a forerunner in using design, and to improve the competitiveness of Finnish industry through design. The research project focuses on the impacts of design in different types of companies and is aimed at ascertaining the economic benefits of design to businesses. Reliable indicators were used to show the impacts of design.

METHODOLOGY: Case studies of success stories to develop indicators and create an analytical "evaluation model" tool to find causal connections between design usage and its economic results. Interviews with companies. Compilation of data. Analyses of product cases related to previously interviewed companies to validate the evaluation model.

INDICATORS/CRITERIA: The indicators were divided into three main groups: 1) Drivers for design usage, 2) Enablers, and 3) Results.

CONCLUSIONS: This project resulted in a model for evaluating the strategic impact of design on companies. However, testing is still required. Despite the difficulties, some connections were found between the use of design and its results separate from the impacts of other activities that also influence the success of the organizations surveyed. The main conclusion of the study was that companies as a whole, particularly their top management, need to understand the benefits of design in order to make the most of it.

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[162] HIETAMÄKI et al. (2005)

5.3.7 DESIGN EFFECTIVENESS AWARD[163]

Design Business Association (DBA) (United Kingdom, 2008)

DESCRIPTION: The Design Business Association (DBA) was founded in 1986 to champion the integral role that design effectiveness plays in commercial success. The annual Design Effectiveness Awards are measured in terms of commercial benefits achieved for the client and customer.

METHODOLOGY: Design awards open to companies and design consulting firms. Entrants must be capable of providing the necessary information about design projects and their impact on companies. A panel of judges following pre-established criteria conducts the evaluation. Award granting.

INDICATORS/CRITERIA: Six criteria are used for evaluation: 1) Explanation and proof of effect: a project's success must be linked to a outcome using factual research to substantiate claims. 2) Other influencing factors: these must be identified because design rarely acts alone. 3) Clarity of the presentation. 4) Cause and effect: proof of a cause and effect between the design solution and the results. 5) Clarity of the results. 6) Scale of the results: competitors must demonstrate the significance of the outcome in the relevant commercial or company context.

CONCLUSIONS: The awards substantiate and highlight the positive impact design has on businesses. A positive, encouraging message for design companies and consulting firms to invest in objective project evaluation as well.

5.3.8 DESIGN INDUSTRY INSIGHTS[164]

Design Council (United Kingdom, 2010)

DESCRIPTION: Design Industry Insights was a national survey on the performance of the UK design industry, conducted in 2005 and repeated in 2010 for comparative purposes.

METHODOLOGY: Firstly, interviews were conducted with design agencies and firms, company design departments, and freelance designers. Data compilation. Analyses.

INDICATORS/CRITERIA: Interviewees were asked about the profile and size of their businesses, their clients and the competition they faced, their business practices, and the education, training, and skills of their employees.

CONCLUSIONS: The research project supplied numbers on the UK design industry, such as its size and estimated income sector. Some characteristics of the sector were also identified. By conducting the same survey in 2005 and 2010, the project was capable to compare the sector's growth and changes. All results were used by the Design Council to understand the current state of the UK design community and identify ways in which it can be supported or developed. Other bodies used the findings to understand the economic contribution that the design industry makes within the UK. The

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[163] SEE (2014)
[164] SEE (2014)

study also examined the design sector profile as an important component in the national industry and how design adds value to the industry as a whole.

5.4 OBSTACLES AND OPPORTUNITIES IN EVALUATING DESIGN

Despite various studies and investments to create metrics and indicators and examine the impact of design, clear hurdles are still found when conducting such research. At the same time, the need for evaluation is a pressing matter. SUMMARY TABLE 24 below presents the obstacles and opportunities detected by a European cooperation group (SEE Project Program) in 2010, during the thematic workshop Evaluating Design and Innovation Policies. "If you can't measure it, you can't improve it" (Lord Kelvin, in Global Governance Indicators) was the challenge posed for the work group.[165]

SUMMARY TABLE 24: EXAMINING OBSTACLES AND OPPORTUNITIES IN DESIGN EVALUATION

Obstacles	Opportunities	Proposals
Lack of common understanding, definitions and parameters for the design discipline	Adopt definitions and parameters that can be shared at EU level with common understanding.	Encourage a consensus on a common definition, either by developing a manual that investigates the definitions across Europe or by adopting the definition proposed by the European Commission in "Design as a driver of user-centered innovation."
Absence of commonly available statistics across the EU and common agreement on core metrics that can be compared internationally.	Create a platform/infrastructure to gather information centrally and establish indicators/frameworks that are comparable and can be shared with other policy contexts. Make raw data available for better understanding of statistical findings in order to increase credibility, provoke further analysis and encourage new perspectives.	Conduct a European study with the same measures to get pan-European annual report on the understanding and application of design. A starting may be including a question on design in the Community Innovation Survey, which is already being considered.
Unclear criteria for success when program/policy objectives are not well defined at the start of the implementation.	See it as imperative to link activities with achievable and tangible targets through meaningful measurements such as: • Qualitative and quantitative analysis of a company before and after design support. • Comparing sales of design-led products and services with products and services developed without a design process. • Measuring percentage of tax revenue from new products over the long term.	Set clear targets from the outset, combined with regular monitoring of the performance of programs/policies with long-term measurements. Compare companies benefiting from design support programs with those who are not, and conduct long-term evaluation to ensure that changes endure after the end of the program and that design is integrated into the culture of companies.

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[165] SEE (2010)

Difficulties in isolating the role of design and its impact from the broader context.	Develop measurement tools for macro-and micro-level analysis in both the public and private sectors to link causality between design and socio-economic success.	Implement a complex system of indicators, both qualitative and quantitative, at macro and micro levels in the public and private sectors that combine long-term measurements with short-term goals that are continuously monitored.
Costs of the evaluation	The costs of evaluation must be built into the initial program/policy. Encourage companies to analyze their development trajectory in order to improve their own audit tools, so that when design is introduced the difference is clear.	Draw on a range of evaluation tools that are already available and include these initial proposals. Take advantage of new e-evaluation tools.
Wider repercussions of program/policy implementation are sometimes greater than the targets proposed at the outset.	Although clear targets must be well defined at the beginning, there must be flexibility in assigning value to spin-off effects, including among others: • Analysis of the changing attitudes towards design in companies, the public and private sector. • End-user satisfaction • Network analysis of collaboration clusters and links between companies and academic institutions.	Take into account the unexpected (wider) outputs of the programs/policies beyond the original targets.
Failure to use the evaluation process as a management tool to improve delivery.	Acknowledge failures or shortcomings to be able to improve implementation in the next round.	Use the evaluation as a strategic tool for improving the process, not only for promoting results.

SOURCE: SEE (2010)

6. BRAZILIAN DESIGN SCENARIOS

Several methodologies were looked into for putting together the prospective scenarios. However, the methodology we followed to the greater extent was based on the considerations by author Peter Schwartz, 1996, in his *Global Business Network* (GBN) method. The research problem and the time frame were defined. A questionnaire was drawn up addressing the variable-impacting factors (market, political and institutional environment, technology, talent, investment and lines of financing, and knowledge production). Based on the variables, each factor was identified via a questionnaire containing the answers from various design sector players. Building on the variables defined and factors identified, a workshop was conducted with experts whose purpose was to validate and select the five most important factors to be considered in the scenarios.

The experts also helped develop the three scenarios. A conservative scenario, a moderate scenario, and an optimistic scenario were developed using a typology that takes into account what may happen, rather than the probability of it happening, that is, it is prescriptive instead of exploratory. According to Marcial and Grumbach (2008), "prescriptive scenarios are nothing more than making up desired futures that express the commitment by one or more players towards achieving common goals. These scenarios are built by, first, establishing the desired future, and then tracing the course to get there." Of course, this research project does not describe the path to get to such ideal scenario. Here, moving towards the ideal scenario means monitoring the indicators that impact said scenario and drawing up more detailed plans as we go along.

Therefore, in line with this project's goal of helping make Brazilian manufacturers more competitive, we have built design sector development scenarios from the following standpoints: Conservative, Moderate, and Optimistic. They are meant to establish cause and effect relationships allowing us to understand how the design sector may contribute to the national industry's increased competitiveness. Our scenario analysis focused on two main aspects: the development of design and the competitiveness of the Brazilian industry.

This chapter presents the three prospective scenarios, analyzes the implications and options, and examines indicators.

6.1 CONSERVATIVE SCENARIO – 2022

In 2022, Brazil is going through a severe economic crisis stemming from a large scale shutdown of plants done in by foreign products taking over their share in the domestic market. Manufacturers see Brazil's production future becoming bleaker and bleaker, and have been gearing up to relocate their investments and operations to more economically advantageous countries. As the industry's ability to compete declines, the design sector feels forsaken and robbed of prospects. There is no national design policy, nor are there negotiations to put one in effect. Design-fostering initiatives are one-off, uncoordinated efforts that seem to bring some progress but in fact conceal how acute the problems have become. The profession is not regulated and designers struggle on the fringes, having a hard time dealing with the public sector and the market. Design is seen simply as an esthetic activity and not as a

strategic action for innovation. The profession is left reeling from the onslaught of foreign talent taking over the creative domestic market. Design training is provided solely by higher education institutions. There is an increasing disconnect between the market and the academia that taints design education and leads students to drop out. Disregard for higher education increases the number of amateur designers around. Local talent is a rare, elitist commodity, which further lowers the supply of designers in the market. Designers keep drawing on training they got eight years before, as they only distance themselves even more from the market place. Hardly anyone understands how important design is for industry, and governmental initiatives are few and far between, disconnected. Owing to lack of knowledge and education on the issue, designers go unappreciated and creative companies keep to themselves. No knowledge is exchanged and there is no interaction between universities and companies. Design companies operate in different ways and under different conditions, and fail to set up a specific market sector. The intellectual capital generated is not shared and deemed irrelevant. Science is not applied. There are major hurdles, taxes and legal barriers hindering the acquisition of equipment and materials, both national and international, necessary for research and the development of the country's competitiveness. There are no dedicated design research centers. Methodologies and processes are studied sporadically and tests are done in non-specialized laboratories. Registering intellectual property is an uphill battle. The sector's operations are nearly crippled by the inability to purchase working tools such as equipment and software. There is no specific design support to encourage universities and companies to work together. As a result, knowledge does not flow. Public tenders focus on innovation, and few encompass design. Besides, they associate innovation with technology, which benefits large plants only. Financing agencies fail to see design as an important factor for innovation. Funds for the industry dwindle as the economy takes a turn for the worse. Business leaders are oblivious; awards are more highly regarded by designers than manufacturers. Existing initiatives are held by designers for designers, half-blind to business. The academia supplies to the current market demands with second-rate education while keeping intellectual production all to itself and ideas tucked away. Research efforts are on the rise. However, they are focused on quantity instead of quality, and little knowledge is exchanged with the market. The less than flexible way researchers work takes them farther away from the industry.

6.1.1 MODERATE SCENARIO – 2022

In 2022, Brazil has been leveraging, albeit with some difficulty, the Brazilian industry and its improved production processes. The invasion of products coming from other countries, including China, has encouraged Brazilian manufacturers to invest more in their production processes. Political and institutional sectors are seeking alternatives for industries to be able to work more efficiently and competitively. A greater need for change has been identified and there is a feeling everyone needs to work more efficiently and competitively internally and externally to adding value to Brazilian products. Companies realize they should make better use of creative people, and designers are some of those professionals that have a lot to add to turn deindustrialization scenario around, given their ability to make products and services stand out in the market. There is a movement to bring together the existing institutions and create national design policies. However, there is no specific government agency politically and institutionally capable to coordinate that, and so efforts remain random and scattered. As a consequence, great efforts are put in, but hardly anything is reaped. One fact to be

celebrated is that design was been embedded into the public innovation policy. Industries have been interacting more and becoming more competitive, and the same is true for the design sector. The profession has been officially regulated, leading the sector to operate in a more formal, organized manner. Even though the atmosphere is encouraging production-wise, the heavy tax burden still stands in the way. Groups have been organizing to fight for lower taxes, but so far no clear public policies have been set to do that and allow the design sector and companies to become more competitive. Design promotion efforts are erratic. Brazil lacks an excellence award that disseminates and illustrates Brazilian creativity and production, while there is still an excessive and growing number of design awards and contests devoid of focus or specialization. As a consequence, the awards dilute the value of talent and no longer represent a competitive advantage. The plethora of awards means none of them stands out or has any real significance. Design is treated as something secondary by sector-dedicated magazines, which do little to highlight designers' productive and strategic capabilities. There have been increasing efforts by industry stakeholders towards securing a single design agenda and greater appreciation for the profession. Designers have been carrying out initiatives, but disconnected, uncoordinated ones at that. Although talent is appreciated, the market believes more synergy is required for design's worth to be truly acknowledged. A few firms stand out, but they are not international references and t a brain drain is still going on. There is greater development of and access to training and professional tools, equipment, and software. Knowledge is being transferred more organically from the academia to the market, and mechanisms that support and make academic talent known are being consolidated. Design education included in high school programs makes it possible for people to join the industry earlier in pursuit of their interests. Schools begin focusing more on design management instead of technical education. However, the market still needs technically skilled people who have a system-wide, strategic perspective on the market. Although there are many initiatives dedicated to design, they are scattered and lack the structure to promote design nationwide and educate opinion-leading managers and the public at large. However, the industry is now in closer contact with development and financing agencies to include design among the efforts funded. More programs are in place to encourage universities, companies, and research centers to join efforts. They are not widely implemented, though, and the links between the players weaken as only sporadic activities are carried out in collaboration. There is growing interest in creating government programs that encourage industries to assimilate the culture of design, but funds to do that remain scarce. Regarding the creation of knowledge, applied research is valued and there has been a slight increase in the number of scientific papers and patents, but their application remains limited. Research focus and interest are limited to the market, national strategies, and alignment with R&D institutions. There are efforts pushing for the creation of innovation-conducive environments, but they are sparse and fail to take hold.

6.1.2   OPTIMISTIC SCENARIO – 2022

In 2022, the Brazilian industry is more willing and better equipped to operate and compete in global supply chains. Consequently, there has been a boost to industrial competitiveness and made-in-Brazil products have been reclaiming their share in the domestic market. In a scenario where the conversion business is not so promising, more than creativity is required. It takes technical skills and drive to make the country stand out for its creative services. Designers are among those professionals that have a

great deal to contribute and the ability to impact the growth of the national economy. With this in mind, design companies benefit from a legal environment where innovative, industry-specific, and tax policies and laws encourage the development of the design market. That makes professionals feel appreciated. In turn, the country gets to retain its creative talent and add more value to the Brazilian identity. As design and designers are held in higher regard, an entire chain of value production only stands to achieve significant gains. In this virtuous cycle, greater understanding about design will lead to the inclusion of design contents in grade and high-school curricula. Then, not only will students have the chance to see it as a promising career that plays an important role in the market but the population at large will have a better grasp of what design is about. This educational process gives people an even better understanding of products. Consequently, they become consumers who make more informed purchase decisions and compel the industry to open up to innovation processes. Another important factor in this scenario is the exchange and synergy the market has with the education system. Industries' doors are open and they partner up with universities, a relationship that is mutually beneficial for education and the market. Coordinated activities and knowledge exchange between the market and talent are important when it comes to lines of financial support. The market produces tacit knowledge and the academia takes advantage of such knowledge to generate content and further new models of education that foster applied research in a balanced, efficient manner. Some efficient models for the integration between universities and companies create a wider channel for open innovation by bringing the practical side of industry and the market into the university context. The promotion and visibility of Brazilian products and talent feature prominently in public policies dedicated to innovation and the country's industrial development. That is why lines of support and investment targeted at research production, participation in congresses, exhibitions, commercial fairs and publications have been set up, along with mechanisms that encourage and support technical residencies meant to advance the training of design talent. A positive factor in 2022 is that design policies are well defined, focused and meaningful. A government agency given discretionary power over its funds is charged with coordinating, discussing, studying, and promoting design in governmental and industrial spheres, in addition to aligning and creating synergy between initiatives linked to design and the competitiveness of the national industry. A significant aspect is that the profession is now regulated. There is greater competition between professionals and enhanced synergy between professional associations. Such associations are now better equipped to oversee the designers' practice, make it safer, and secure benefits for the entire industry, including tax-related ones. As a core factor in the national innovation policy, Design is fostered and promoted by development agencies. There are funds earmarked to promote national and international design; there are credit lines and lower taxes for the acquisition of software, equipment, and tools that advance the training of new talent. The technology industry is a major ally of new talent and the industries. New technology hubs have been set up near industrial complexes where different companies working on different technologies are located, creating a favorable environment for creativity and innovation. Universities are strongly linked to innovation clusters. There are no formal barriers to the integration between universities and companies; therefore, new knowledge can be put in practice in companies and universities. Without such barriers, creative companies, laboratories and institutions linked to design and innovation have an easier time buying equipment and materials, either national or international. There are independent or university design centers and laboratories that study design methodologies per se as well as the diverse industry sectors and laboratory

experiments. There is a swift, simple, easily accessible intellectual protection system that is widely used by companies, designers and students. The positive effects enhance the collective intelligence as the market and the design sector activities are in line and operating towards a stronger economy. The quality of Brazilian design is internationally renowned. Design has become one of the most important factors featuring in the National Innovation Policy. The design sector is now such a big deal that the President of the Republic opens the prize-giving ceremony of Brazil's most important design awards.

SUMMARY TABLE 25: PROSPECTIVE SCENARIOS FOR DESIGN SECTOR DEVELOPMENT

Objective: Identify important factors for developing the design sector and making the national industry more competitive.
Time Span: eight years – to 2022
Place: Brazil

Conservative	*Moderate*	*Optimistic*
Erratic, informal market. Unappreciated talent and stagnant career prospects. Large volume of knowledge produced, but low quality. Disorganized and passive political and institutional environment. Investments and support lines with low understanding and low articulation. Technology developed and with great difficulty for acquisition.	Moderately growing market. Talent appreciated to a degree. The knowledge created remains relatively untapped. Political and institutional environments only moderately aligned. Investments and support lines available to some extent. Technology fairly developed, but largely untapped.	Innovation-focused market and highly competitive industry. Talent is highly appreciated and professional. The industry makes the most of the knowledge created. Political and institutional environments in tune with the design sector. Investment and support lines largely available for increasing competitiveness. Rapidly advancing, easily accessible technology.

SOURCE: The authors, based on research data

6.1.3   ANALYSIS OF IMPLICATIONS AND OPTIONS

Drawing on philosopher Deleuze's proposition (1996) that all lines of force in an environment intersect, the scenarios were evaluated and great convergence was observed. The similarity between the scenarios derives from the variables and factors that impact the development of the design sector and, consequently, the increase of the national industry's competitiveness. We suggest that future studies should focus on the moderate scenario for analysis and planning purposes. However, in keeping with Deleuze's concept (1996), we believe it is not possible to work without considering the implications of other scenarios, mainly the conservative one. According to experts, strategic and governance players will have to deal with the elements in both scenarios – conservative and moderate –in order to get to the optimistic scenario. Fittingly, the SWOT analysis conducted here shows convergence between the quadrants analyzed, given that a factor may be characterized either as a weakness or as a strategic opportunity that may become a possible strength at some point, that is, as long as such factors are effectively handled.

In the conservative scenario, SUMMARY TABLE 26, there is a great need for change because almost the entire scenario is characterized in the quadrant of weaknesses, as hardly any strengths and opportunities are found. This is because nothing has been adjusted or implemented to empower the design sector to pursue greater competitiveness. The design sector is stagnant and working in a very sporadic manner, unable to effectively and strategically collaborate with the industry.

SUMMARY TABLE 26: ANALYSIS OF CONSERVATIVE SCENARIO FORCES

STRENGTHS	WEAKNESSES
	Design as an esthetic activity;
	Uncoordinated activities;
	Creative talent defection;
	Unregulated profession – informality;
	Dissociation between the market and the academia;
	Absence of design research groups and centers;
	Science not applied or shared;
	Lack of understanding of design;
	Disjointed sector
	Tax barriers;
	Few design-specific support initiatives;
	Innovation and technology focused on large manufacturers;
	Academia caters to market demand
OPPORTUNITIES	**THREATS**
Application of strategic design;	Deindustrialization;
Setting public design policies.	Depletion of industrial production;
	Invasion of foreign talent;
	Low industrial competitiveness.

SOURCE: The authors, based on research and workshop results

In the moderate scenario shown by SUMMARY TABLE 27, some of the required changes have been effected and led to some balance between strengths, weaknesses and opportunities. However, there is a significant error in positioning – issues related to the design sector and everything that might increase the country's industrial competitiveness remain largely disregarded. A lot still has to be done, especially with respect to the governance factor, which needs to be more effective in this moderate scenario.

SUMMARY TABLE 27: ANALYSIS OF MODERATE SCENARIO FORCES

STRENGTHS	WEAKNESSES
Design included in public innovation policies.	Economic and productivity downturn
More concerted stakeholder effort to advance design;	Lack of governance
Sector subject to laws and regulations;	Sporadic, scattered design initiatives
More support for equipment and software;	Major efforts, poor results;
Regulated profession;	Absence of tax policies
More robust channels for disseminating academic production;	Large number of irrelevant design awards;
Knowledge transfer from the academia to the market;	Design is not discussed by economic news outlets;
Design taught in high school;	Shortage of technically skilled people in the market.
More funds secured for design.	No design firms are international references.
	One-off, disjointed initiatives
OPPORTUNITIES	**THREATS**
Pushing for public design policies;	More foreign products in the market.
Incentive programs for the integration between universities and companies.	Creative talent defection;
More value added to national products.	Vocational training is unappreciated.
Appreciation of creative talent.	
Made-in-Brazil product sales rising in response to the onslaught of foreign products;	
Increasingly better conditions for design-led innovation.	

SOURCE: The authors, based on research and workshop results

In the optimistic scenario shown by SUMMARY TABLE 28, the strengths quadrant is much more in evidence because efforts have been put in over time to improve conditions and management in the design sector. The role and benefits of design are now firmly understood by all those involved in and in charge of the country's economic and social growth. In this scenario, the involvement of all players and the governance existing in the sector are clear.

SUMMARY TABLE 28: ANALYSIS OF OPTIMISTIC SCENARIO FORCES

STRENGTHS	FRAQUEZAS
Public design policies in place Governmental agency dedicated to design management; Brazilian design quality internationally appreciated; Innovative, industry-specific, and tax-related public policies; Design widely understood and highly appreciated by the industrial and political communities; Sophisticated, market-savvy consumers; More robust national production; Affordable equipment, software and materials; Efficient, swift intellectual protection system; Design-related laws that foster innovation; Technology hubs are allies; Design support and development mechanisms; Synergy between the market and academia; Financing and investments for the production of knowledge and the promotion of design; Creation and appropriation of design knowledge; Design centers and laboratories; Regulated profession; Talent retention; Design taught in grade and high school; Open innovation consolidated.	
OPPORTUNITIES Brazilian industry in global supply chains; Development of creative talent.	**AMEAÇAS**

SOURCE: The authors, based on research and workshop results

6.1.4 MAIN INDICATORS

Some indicators have been developed to allow people in the industry to permanently monitor the strategies drawn up and make sure they are fully and properly implemented in a timely fashion.

Based on variables related to the market, the political and institutional environment, knowledge production, lines of investment and support, talent, and technology environment, the goals were set with the aid of experts at a workshop. Then, some indicators were defined, along with their reference index and source, as shown in SUMMARY TABLE 29:

Indicators should be reviewed based on the goals set by the governance body in strategic plans.

SUMMARY TABLE 29: MAIN INDICATORS

INDICATORS			
Objective	*Indicator*	*Reference Index*	*Source*
Creation of a Public Design Policy.	Public policy created and implemented.	There is no reference index	Regulatory and governance agencies.
Creation of a governance agency for the design sector.	Agency created.	There is no reference index	Ministry of Industry and Foreign Trade.
Availability of investment and support lines for design	Design-specific funding lines and calls for proposals	Three calls released	FINEP, BNDES, CNPq and SEBRAE.
	Design included in innovation funding mechanisms	No reference.	
Development of the design market.	Professionals legally employed in the market.	296 designers legally employed.	Diagnostic Research on Design in Brazil.
	Formal job opportunities	4200 job opportunities	
	Formal companies (CNPJ)	683 formal companies.	
	Design sector revenue.	No reference.	Regulatory agency (survey of design companies).
Design talent	Design education	38% Graphic design, 16% Product, 22% Digital design and multimedia, 14% Services, 7 % Interior design, and 2% Fashion.	MEC.
	International award-winning designers	25 iF awards in 2014. 5 Cannes awards in 2013. 1 Pentawards winner in 2013	Centro Brasil Design and Abedesign.
	Award-winning students	2 iF Design Award winners in 2012.	
	Brazilian products shown in international fairs and exhibitions	No reference.	Create indicator.
Technology environment.	Creation of design laboratories and technology centers.	No reference.	Create indicator.
	Acquisition of new technologies	**No** reference.	Create indicator.
	Patents and registrations.	In 2012, 4,334 industrial designs were registered.	INPI.
Knowledge production	Design-related papers published	1,072 papers in 2010. 203 papers published internationally.	CNPq.
	Design incubators, research groups and laboratories.	6 design incubators; 121 research groups, 8 laboratories. (2010/2011).	
	Published books	200 registered in 2010.	
	Conferences attended and held	1 conference	

NOTE: Reference index related to the current scenario, that is, whether there is already an initiative reported for the sector.

SOURCE: The authors, based on research and workshop results

7. RECOMMENDATIONS

This study was presented to a group of design experts who then pointed out a few topics to be considered in future studies:

Interior Design Sector

They suggested that, when looking at the number of firms in each field (FIGURE 11), it should be taken into consideration the field of interior design might be underrepresented because many interior designers define themselves more as architects than designers. As such, in future studies, it would be important to consider a more specific approach for surveying interior design firms, perhaps by working in collaboration with dedicated associations.

Number of design firms in the country

For the maps representing design firms (FIGURE 11), graduate programs (MAPS 1 and 2) and research groups (MAP 3), they suggested that a future study should cross-reference this information against population data to get a real notion of those numbers *versus* inhabitants.

Patents

The study shows that in 2012 Brazil filed 33,395 patent applications but only 3,130 registrations were granted. The experts suggested a more in-depth future analysis should be conducted to investigate why 90.6% of the requests were denied. Detailed information on pages 81 and 82 of this study.

They also said more in-depth discussions are needed with respect to relevant topics such as the existing interface between Design, Industry Design, and Utility Model Patents. These topics should be given proper, accurate definitions to be shared by universities, companies and research centers alike so these entities could further their debate and clearly mark off their fields of operation, considering such boundaries are quite hazy today.

Another relevant topic to be considered in a future study on design is the protection of products via Utility Models, as they are used simply for a new form of or adaptation to existing devices, or a part thereof, and meant to improve said devices' operation or manufacturing.

New studies

We suggest that a document be created containing recommendations and actions for Brazilian design and setting guidelines, suggesting paths, and outlining strategic partnerships for its development.

Considering this is one of the first studies conducted on Brazilian design, it should be regularly updated and expanded.

8. FINAL CONSIDERATIONS

Design plays a fundamental role as a link bringing the industry and the market together. As such, it is imperative to include it as a potential competitiveness factor in the strategic agenda of the national economy. Design also helps increase export rates by developing products that offer levels of quality and performance perceived as superior.

Design is further described as a business performance asset that may be used to seize and retain market share, set products and services apart from the competition, find new market niches and potential consumers, cut production costs, and foster environmental conservation, among other aspects related to sustainability and innovation.

This study presents a diagnosis of Brazilian design which resulted from a survey and data analysis project carried out between October 2013 and May 2014. The study comprised the collection of primary data from Brazilian companies and research of secondary data on variables that impact the design sector in Brazil. In addition, prospective scenarios were developed that explore paths for Brazilian design.

The survey of primary data focused on studying the demand for design in the country. This part required extensive work and effort by a network of partners that mostly included Brazilian sector-specific associations. Collaborative work was crucial for data collection. Without it, this diagnosis would never have been this extensive. Overall, 350 responses from Brazilian companies were processed, giving us a specific diagnosis of nine sectors in Brazilian industry and insight into some aspects of the Brazilian demand in comparison with other markets, such as the European and Uruguayan markets. Certainly this study presents some limitations stemming from the size of some samples in relation to the universe of industry sectors. Even so, this first survey provided data that may steer efforts to advance design in the Brazilian industry. We have learned which sectors have been investing the most in design management and achieving greater maturity. At the same time, we have determined which sectors could benefit the most from a consolidated management of the development of new products and services.

The primary data collected showed that in 2013 there were 686 formally-registered design firms in Brazil, whose 4,200 jobs were divided into graphic and Communication (38%); Digital design/multimedia (22%); Product design (16%); Service design (14%); Interior design (7%); and Fashion design (2%). According to RAIS data onCNAE 7410-2, i.e. the occupation code for interior design and decorating, there were 3,101 jobs across the country in 2012.

The circumstances that translate into the low official number of people registered in the field of design include people who do not hold a formal job or are not registered; the CNAE 7410-2 code for interior design and decoration does not include all designers currently working in Brazil's different market sectors, and the fact that most Brazilian designers are registered under other occupations listed by the Brazilian Classification of Occupations (CBO).

This study also analyzed the Brazilian design market from the perspective of technology. We find that people involved in design activities should constantly strive to map and monitor the key technologies

for the area. New design technologies keep cropping up in the market. However, many of these tools are imported and expensive, and therefore used only by a small number of Brazilian designers. The technologies available can be grouped into four main macro trends: Competitive Manufacturing, which optimizes design activities and makes organizations more competitive; Information and Communication Technology, which intervenes in and mediates information and communication processes; Production Process Innovations, which boost company productivity, and New Materials, which play an important role in the development of innovative solutions.

Another aspect looked at was Industrial Property applications, which are essential to provide companies with the protection they need to pursue innovation. For Brazil, the main IP-related numbers found included: the country ranked 28th among the countries filing the most product patent applications in 2012; São Paulo was the state with the highest number of patent deposits in Brazil that year, totaling 3,287; Mechanical Engineering and Chemistry were the sectors granted the highest number of patents in Brazil from 2010 to 2012.

Regarding design talent, we have found that undergraduate design training in Brazil is predominantly generalist, given that 50% of enrolments and 46% of graduations have to do with Design programs. A mere 24% of those enrolled in selection processes are accepted into Bachelor of Design programs, while only 60% of first-term places are filled. We believe the reason for such a low number of successful applicants merits further investigation in future studies. In turn, there was an exponential increase in the number of design graduates in 2010-2012, with a relatively even split between those graduating from public (53%) and private universities (46%). In general, the number of graduates grew 47% in the period. Regarding graduate design programs, we found that in 2013, 75% of *lato sensu* programs were concentrated in the South and Southeast. In 2013, only 10 Brazilian states had *stricto sensu* graduate design programs, and 78% of those programs were concentrated in the South and Southeast.

It is fair to say that the offer of design programs in the various Brazilian is significant and well distributed, which allows a greater number of people to pursue an education in this field. We also found growing interest in design programs and a significant number of graduates in 2012, totaling 13,616. However, we were unable to gauge the education quality level, or whether it fully meets the market's needs in terms of professional qualification requirements. However, we believe that, as in other areas, there are professionals that stand out for the quality of their work and number of awards received.

There is a growing offer of funds and technical and management support mechanisms available for innovation and design in Brazil. However, specifically for design, such offer is minimal. We believe that in many cases innovation incentives could be tapped into by the field of design. Therefore, it is up to those interested in design support mechanisms and funds to carefully sift through the offers provided by generic innovation-oriented strategies for those they could secure for design. Financial resources for innovation and design in Brazil are provided through the following mechanisms: loans and grants, tax incentives, venture capital, and scholarships. In the field of design, the main ones are the BNDES Card and Prodesign (BNDES), Sebraetec (SEBRAE), and Tecnova (FINEP). There is a clear need to expand design-specific support policies and funding, and to establish policies that transversally include design in the agenda of other sectors and fields.

Some of the most important sources of support for the scientific and technological development of design in Brazil include incubators, laboratories, research groups, higher education institutions, and the Brazilian Conference on Design Research and Development (R&D). Design research groups totaled 6 in 1993 but soared to 121 in 2010 – a 1,900% growth rate of. The number of publications also skyrocketed in the period to reach 2,459%, directly impacting the content generated on the topic. Despite such significant progress, it is clear a few needs still remain: design incubators and laboratories should be mapped and characterized; more research groups should be created in the Brazilian North, Northeast, and Central West; research groups should diversify the focus of their design-related research efforts; the continued growth in Brazilian scientific and technical production related to design should be encouraged, and support should be in place so more scientific events may be held.

Looking at the political and institutional environment, we see that design is disconnected from innovation in several topics included in Strategic Sector-Specific Agendas set by the *Plano Brasil Maior* (Broader Brazil Plan). That is something that goes against theories that intimately connect the two concepts, and substantiates claims that the interaction between design, innovation and technology is still fragile in Brazil. So that a national design system may be consolidated, there needs to be a clear public policy in place setting national design guidelines that enable entities, agencies and institutions to get their efforts in line and join forces to carry out robust initiatives towards building an economy based on innovative, value-added products. The success of a national design system also depends largely on the players' commitment to the cause and coordination with one another, the courses of action set for each one, their pursuit of cohesive interests, and wise use of the available resources.

We believe design is a powerful tool for enhancing the country's competitiveness, quality, and potential. We understand the challenges that need to be overcome so that new approaches to products and services may be developed. We see consumers notice and prize the new products and services designed. Finally, we envision competitive gains that will benefit Brazilian business and companies.

Entrepreneurs, designers, consumers, and government bodies can use the information contained in this report to make their decisions regarding the competitive gains design can bring to the Brazilian scenario.

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10. APPENDIX I

List of the design firms that filled out the registration form in November and December 2013 as part of the research project targeting formally registered Brazilian design firms, meaning those with a corporate registration number (CNPJ).

14B Comunicação
2DA Branding & Design
32Bits Criações Digitais LTDA
4 One Agência de Inovação e Negócios
4FIX Design LTDA
4P Comunicação
A Fábrica Comunicação
A. Borgatti Interiores
A.L. SOUTO DESIGN
A.N Design
Abner Design
Abracadabra
AbsolutaDesign
Actual Design Ltda.
Actual Publicidade
AD Brasil Arquitetura Design
Adalbacom Design Gráfico e Comunicação
Adcomm Brasil
ADD-Agência de Design Digital
Adoro Design e Comunicação
AF Design
Agência Create
Agência DDA
Agência Emporium da Criação
Agência Flui
Agência Gema
Agência IH9
Agência Infinito
Agência Koda
Agência Locomotiva de Ideias Design Estratégico
Agência Motiva Design Estratégico
Agência NAVE Comunicação e Publicidade
Agência Orbis
Agência Peak
Agência Rex
Agência Volle
Agência Wai

Agência WCK
Agentes da Imagem
Agreg Design
Aldabra Sistemas Web e Design Gráfico
Aleph zero
Alink
Alpendre Ateliê de Design
Alt Designstudio
Ampersand Comunicação Gráfica
Ana Camargo Design
Anatomia Design
And Arquitetura
Anderson Horta Emotional Design
André Cruz Design & Ideias
Andrea Zorzeto Design ME
Annova-ag
Anora Campo
APIS Design Integrado
Aquadra Comunicação Elevada
Archetipomais Projetos & Design Comercial Ltda.
Armazém de Projetos
Arquitetando Design
Arte Exata
Arthur Di Braschi – Brand Design
Artwork Desgin Gráfico
Asterisco21
Atelier Marko Brajovic
Atelier Powpowbangbang
Athié Wohnrath
Attico 53 Design Studio
Aurora AG
Aurus estúdio de Design
Azure
B.A Comunicação
B13 comunicação
Badoc
Baíta Studio Design Gráfico – BST! Design

Balaio Design + Estratégia
Banzi Design Studio
Basi Soluções Artísticas ME
BEMD Bureau de Estratégias Marketing e Design
BEND Design
Bendito Design Comercio e Serviço
Bente Altas
Bergamota Essência de Marca
Bertussi Design
Bertussi Design Industrial
BHZ Design
Bizarro Design Ltda.
Blu Design e Comunicação
BlueBossa Design e Comunicação
Bold
Bossa Design e Ideias
BRADDA Design
Brainbox
Brander
Branver – Branding & Design
Brav Design
Braza Gestão de Marcas Ltda
Bria Design
Britto Studio Criativo
Brivia
Buffo Design
By3 comunicação+design
C&M Comunicação e Marketing
Caburé Studio
Cacau Design
Cadsign
Caio Beltrão
Caju Design
Calebe Design
Canoa Comunicação Visual
Caos! vídeo & design
Carla Pig Degn Gráfico
Carpa Design
Cartaz Criações e Projetos Gráficos
Casa Desenho Design
Casa Milton Meira Designweb Estúdio
Casco Objetos
Caso Design Comunicação
Catenzaro
CCR Design

CDM Design e Consultoria Empresarial
CEB+D
Centeno Comunicação
Central
Centro de Design Feevale
Cesar Augusto Vitelli / Vitelli Design
Cesar Habert Paciornik
Charlotte Estúdio
Chelles & Hayashi Design
Cláudia Carminati Design e Diagramação
Clever Pack
Cocada Design Indústria e Comércio Ltda.
Cogito Design
Commgroup Branding
Complô Estúdio
Conceito em Design
Condição básica
Consultoria7
Contexto Comunicação e Design
Conticom Comunicação Integrada
Contraponto Design
Coode Comunicação & Branding
Corisco Design
Cravo Ofício Design
Criamia
Criara
Criativina Soluções em Design Ltda. ME
Criatus Design
Crisálida Design
CrisBils
Cristiano Censoni
Cristo Total
Cubo Comunicação Integrada
D Design Comunicação Ltda.
D56N
DAAZ Propaganda e Design
DABLIUdesign
Dangelo Di
danpC design
DaPinha Studio Design
DAZ Escritório de Design Ltda.
DB Grafics
DCA Ergonomia & Design
Deehouse Design
DEH
Denise Castro Comunicação e Design

Design A2 Escritório de Design
Design A3
Design Absoluto
Design Connection
Design em Folha
Design Impress
Design Inverso SS
Design Miranda
Design Move
Design Único
DesignA3
Designar Publicidade e Design Ltda.
DesignJAck – designer gráfico, web designer e gestão da TI
Designluce
Desin Gesso
Dessau Design e Consultoria
Destaq Visual
DGCOMM Design Gráfico & Comunicação
Di Design Estratégia e Inovação
Dia a Dia Design
Dia Comunicação
Diagramm Design Studio
Dimitri Kawada
Dinamika de Santo André Comunicação
DIV Brandesign
Dois Mais
Doka Design e Web LTDA.
Doma Design
Domus Design
Donato Design
Doppel
Doppio Design
Dose
Dotz Design e Comunicação
Dourado Comunicação
Drive Design
Dual Design
Duas Designers
Duco Driving Design Strategies
Dune Estúdio
Duo Studio Interativo Ltda.
Dupla Design
Dupplamente Design Studio
DW Designer
DW2 Studio

DZ Design
E2A Design & Tecnologia Web
e-DAU
Edesign Studio
EDITORIAL DESIGN
Eduardo Dias Design
Efeito Design
eg.design Ltda.
Eidee Produtos e Projetos
Eita Design
Elementar Marketing Ltda.
Eleva Branding & Design Ltda.
Emphasis Design
Engenho Escritório de Desenho
EnterDesign
Entre Gestão & Design
Entrelinha Design
Epic! Aventuras Criativas
Ergo-D Soluções em Ergonomia e Design
Ergon Projetos
Eshes
Espinafre Comunicadores
Esqiin
Estação Design Gráfico
Estratagema Design
Estúdio Ao Lado
Estúdio Arraiá
Estúdio Auster
Estúdio Colírio
Estúdio Criativo Wonk
Estúdio Design a Série
Estúdio Feira Design
Estúdio Kiwi
Estúdio Lumine
Estúdio Mascavo
Estúdio Nous
Estúdio Objeto
Estúdio Paica
Estúdio Roda Ltda.
Estúdio Sem Dublê
Estúdio Sergio J. Matos
Estúdio Sintonia
Estúdio Triciclo
Estúdio Visu
Estúdio Ybaté
Estúdio Zano

Estúdio Zebra
Estúdio Zenit
Estúdio Zeropixel
Estúdio86
EstúdioCriação
Evolue Design
Evonline Marketing Digital Ltda.
Exato Design
Eye Design
FABK – Indústria Criativa
Fabrica de Imagem Ltda.
Fabricare Design
FACE Design Artes Gráficas
Fancio Design Studio
Farné Design e Comunicação
Faze computação Gráfica Ltda
FCA Creative
FCerutti Marketing Digital
FCG Design
Feijão Preto
Fernando Jaeger
FIB Fabrica de Ideias Brasileiras
Fictícia Lab
Filtra Mídias Interativas
Flamba
Focus Design & Marketing
Folia dos Reis
Fred e Hudson
Frila Publicidade e Propaganda Ltda.
Fronte
Furf Design Studio
Futura Comunicação & Marketing
FW8 Design e Comunicação
G8 Design e Comunicação Ltda.
Gabbo Design
Galo Índia design & branding
Game of Colors – Creative Studio
Garden Estúdio
GeDê – Agência Digital
Gedegato
Genniale Design
GHD Brasil | Graham Hanson Design
Giovane Design
GR Produções
Grafen
Graffiti Com

Granada
Grau Design Gráfico
Greco Design
Grifee Design
Groworks Creative Solutions
Grunge Design Ltda.
Grupo Criativo
Grupo Mudde
Grupo View
Grupodesign
Guepa
Guilherme Gonçalves – Graphic Design
HAL9000 Comunicação e Design
Hiper Design
Hok Inovação
Hoton Ventura – arte | design | fotografia
Hpix Design
Human Design & Comunicação
Humanas
I+D
Id Design
ID Projetos
ID7 Studio
Idea Design
Idealys Brand Design
Ideia Animada
Ideiário Design
Identidade Criativa – Design e Comunicação
Identidade Visual
Ikoni Design
Ilustracom – Ilustrações e Design Ltda.
Ilustrata Design
Imageme&efeito
Imaginária
Imaginatto Design e Marketing
Imma8
Indio da Costa A.U.D.T
Indústria Nacional Design
Indutiva Design e Propaganda
Ingegno Design
Inka Design Lab
Instituto de Tecnologia para o
Desenvolvimento
Interage Design
Intervento Design
INVENTA design

Inventiva Design
Invoke Studio
Locus Estúdio Gráfico
iT Projetos
Ivoire Design
Ivory Design
Izzi Comunicação e Marketing
Ja Desginer
Janaina Marques & Jennyfer Gotardo
Interiores e design
Jandreh™
Jeter Design
Jimmy Leão
JMD Comunicação e Design
JRB Studio
Jsol Soluções Online
Kalulu Comunicação
Karine Chavaré
Karuana Consultoria de Ideias
KTH Designer
Lab Design
Lab300
Labareda Design
Labis Design
Labis Digital
Laboratório Secreto Design Studio
Lacuna
Laske Design Gráfico Ltda.
Leiteria Studio de Design LTDA – ME
Letícia Lampert e Cia Ltda.
Let'S
Lia Penteado Design e Comunicação
LifeBrand
Likewise
Linhares Design
Lisboa Design & Comunicação
Live Design
LM Grupo Design
Logos Comunicações
Lounge Comunicação & Design LTDA
Lucas Benfica Design Studio
Luccaco
Lucéia Projetos de interiores
Ludic Comunicação
Lumidea Design Corporativo
Luq

Luzz Design
M.Quatro Design
Macandesign
Made in Brazil Design
Maena Arquitetura e Design
Mafagafo Studio
Maia Design
Mais Infinito Engenharia e Design
Malkovich Design e comunicação
Mamute Design
Mandacaru Design Gráfico Ltda ME
Mapinguari Design
Maquinário – Laboratório Criativo
Marco Mancen Design
Maria Bernadete Solano Brandão
Maria e o pé de café
Matchbox
Mauricio Campos – Designer Multidisciplinar
MAV Studio de Design
MB Comunicação
MB Studio de Design Ltda. – ME
Megabox Design
Megaidea Design & Comunicação
Mellone Associados
Melt
Mensch Desogm
Mero Comunicação Ltda.
Método Design
Metrik Design
Midia Arte
Mídia Interativa
Miguel Taufik Name Neto – Namex Design
Miríade – Design Coletivo
Miriam Mirna Korolkovas
Miro Soluções em Design
Messemota Arquitetura e Design
Mistura
Moderia Moda e Design
Modolab
Módulo Design & Ilustração Ltda.
Moio
Monnerat
Monodois Design Estratégico
Mooz
Morandini Design Ltda.
Mouv

Multi Comunicação Integrada Ltda.
Multiverso Design
MX Design
Narita Design Ltda.
Nautilus Design
Nave: Design e Assessoria de Comunicação
NC Design
NDTBRAZIL Arquitetura e Design
Nektar Design
Neurona
NewGrowing Design & Branding
Nexmídia – Marketing & Internet
Nexo Design Ltda.
No Alvo Comunicação de Verdade
Nodo
Notus Design Studio
Novo Studio Design
Nucleo i Design e Comunicação
Nutum Branding
Nuve Agência Interativa LTDA
Nuvon
O Tropicalista
O3 Design
Oberx Design
Oblico
Oceano#1 Comunicação
Ócsso – Gestão de Marcas
Of Design
Oficidea Ltda.
Oggi Design
OK Agência Digital
Olho Vivo Comunicação Ltda.
OmDesign
On Art Design & Comunicação
Oni Branding & Design
Opta Design
Orangotango Brand Ideas
Orb Digital Branding
Origem Brasil Design Ltda.
Origem Brasil Design Ltda.
Original Branding + Design
Orlando Facioli Design
Ovelha Negra Comunicação
Overbrand
Ovo Design Ltda.
Oz Estratégia + Design

P1 Design
Pacini Design
PageLab
PageOne Design e Comunicação Visual Ltda.
Pande
Papanapa
Patricia Ivana – Design gráfico
Paulo D1Assumpção Design Ltda.
PauloPR.com
Péck
Perfil Design
Person Design
Pessoas Comunicação de Marcas
Peterson Sitônio Branding
Petraglia Design
Pianofuzz Design Studio
Pick Imagens
Piloti Mobile & Internet
Pipa Estúdio Digital
Pixel Bomb Design Lab
Plano D Interiores
Planobase Lubianca
Platypus Comunicação
Pleno Design
PMStudium Comunicação e Design
Polpa do Design
Ponte Estúdio Criativo
Ponto2design
Pontochave Branding
Pontodesign – agencia de diseño gráfico y comunicación
Pos Imagem Design e Comunicação Corporativa Ltda.
Prata Design
Primata Criativo
Prime Design
Pro Design
Projemec
Projetos & Produtos Arquitetura e Design Ltda.
Pryzant Design
ps.2 arquitetura + design
Pyxs Design
Qi Publicidade
Quadrante Design
Quantum Design

Quantum Design
Quatter Design
Questto|Nó
Quiçá Design
Quiz Design
R6.13S Design e Informática
RAFDESIGN LTDA
RaizesBrazil
Ranal Studio
Reboh Design
RED7 vídeo+design
RedBandana MultiExperiências de Marca
Redmove
Redondo Design Ltda.
Refazenda – Desenvolvimento e Consultoria
Empresarial
Refinaria Design
Renata Meireilles
Renata Rubim Design&Cores
Renon Design Estúdio
Retina78
RG Design Studio
Ricardo Mayer
Ricardo Santos Olszewski
Rio 21 Design
Riocom Design
RL Design Studio
Roda de Design Ltda.
Rosenberg Design
RPM Comunica
Ruth Freihof Serviços de Programação Visual
Ltda. | Passaredo Design
S América Web Marketing
S,M&A Design Gráfico Ltda.
S. Toledo Agência Web
S+Design
S2 Design
SA2 Design e Comunicação
Saad branding+design
Sakada Design e Ideias
Salvego & Salvego Escritório de Arte e Design
Samar Designer
Santo de Casa Design e Estratégia
Santo Expedio Design Gráfico
Santorini Design de Interiores
Sapetti Design Ltda.

Sartto Design
Sceno Consultoria e Projetos de Comunicação
Visual Ltda.
Schendel Design
Sérgio Sombra Design Ltda.
Seventeen Publicidade
Sieben Comunicação
Simbïö Design Comércio e Serviços Ltda.
Simetria
Smile Company™
Sobrado Produtora Digital
Social Design & Co.
Solisluna Design
Soluvel
SOS Design
Spark design & innovation
Spice Design
SS+ Comunicação e Eventos
Start Digital
Steinhauser do Brasil
Step Forward
Straub Design
Strongway Estúdio Ltda.
Studio 2T Design
Studio 55
Studio B Design
Studio Beto Lima Design
Studio Brunner
Studio Caboco
Studio Creamcrackers
Studio Decore
Studio Gaz
Studio Moss – Identidade e Design
Studio Nitrocorpz Design
Studio OWN
Studio Venom
Studio Virtual
StudioBah
StudioMDA
Substância 4 Design Integrado
Supernova
Sýmbolo Marketing Planejamento e
Comunicação Ltda.
Symnetics
Talk Design
Tangerina Design

Taste
Tátil Design
TCI Art Oficina de Imagens
Tec Design Ltda.
Tecttum Design
Terra Verde Comunicação Corporativa e
Design
Thato Design
The Red ((graphic.design.web))
Thiago Lacaz
Thudium Design
Tisi Mousinho Design
Token.ac – Agência Criativa
Torchetti Design
Touchê Estúdio Criativo
Traço D
Trade Mix
Três Design
Três Parcas
Tri Studio Design
Triocom Design Gráfico
Turadinhas
Tutti Design Ltda.
UB House
Um-quarto design
Unas Design
UNT DESIGN
UP Design e Marketing Ltda.
Upside.cc
Urb
US – Agência de Marketing Digital
V Teicher Design Ltda.
Valéria London Branding e Design
Vallent
VanCampDesign

Vaz Design Projetos e embalagens
Verdi Design
Vespeiro Design Ltda.
Vind Creative Studio
Vir-a-ser Design
Vitamina
Vitamina K
VItral Estúdio de Design
Voglio Design
Vozcomunica
VRD Research – Design Estratégico LTDA.
Wake Comunicação Estratégica
Waki Design
Webde Tecnologia
WebmaniaBR
Wee Marketing & Design
Wegon Comunicação e Design
Welab Design e Inovação
Wences Creative Works
WeShape
Whoiz Design + Identidade
Wonka Inc
Ye Industrial Design Ltda.
Yellowbean Design Gáfico Ltda.
Yma Design
Z.diZain
Zapall Design e Comunicação
Zaveo Design Estratégico
Zimya Web Design
Zírkua Estúdio
Zol Design Ltda. EPP
Zoludesign Ltda.
Zoom Grupo Criativo
Zumpp