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DIAGNOSTIC TOOLS FOR DESIGN POLICY RESEARCH

Darragh Murphy DUCO, Curitiba, Brazil darragh@ducontact.com

Gisele Raulik-Murphy DUCO, Curitiba, Brazil gisele@ducontact.com

ABSTRACT

The practice of design policy requires research in order to base decisions and strategies upon. This is vital in order to build a credible and diligent design policy process. However, there is very limited reference material about the use of research methods to inform policy making in the design field. This paper presents a tool and methodology, called Design Diagnostics, which has been used to provide quantitative data to inform policy. In conclusion the paper addresses two main difficulties in the collection and analysis of data to inform public policies on design: encouraging businesses to participate in a survey, and having a reference against which to assess the amassed data.

Keywords: research tools, benchmark, diagnostic, design policy

1 INTRODUCTION

The design profession distinguishes itself by the application of research techniques in order to develop assertive ideas to meet a given brief. Equally, the practice of design policy requires research techniques in order to base decisions and strategies upon. This is vital in order to build a credible and diligent design policy process. However, there is limited reference material about the use of research methods to inform policy making in the field of design.

The issue of developing research for informing policy making has been discussed before mainly with a focus on comparative analysis (CHOI 2009; HOLLANDER & VAN CRUYSEN 2009; MOULTRIE & LIVESEY 2009; RAULIK-MURPHY 2010) and on evaluating the return on investment in design (HIETAMÄKI et al. 2005; WHICHER at al. 2011). Furthermore, in 2011 it was called to attention the need for measuring the impact of design intervention: "Evaluation is a vital part of the evidence to support decision-making, and in the context of government cuts—a searing current issue in Europe—needs to be able to stand up to rigorous scrutiny" (WHICHER at al. 2011).

The Design Diagnostics tool was developed by the authors in response to this need and has been practised in several design policy research and design support programmes in South America. It utilises statistical analysis and benchmark techniques to provide design support agencies, associations and government agencies with detailed information in order to plan services to companies on an individual and collective basis. A unique aspect of the Design Diagnostics tool is the feedback report each company receives in return for their participation to the survey.

This paper outlines how the Design Diagnostic addresses two main difficulties in the collection and analysis of data to inform public policies on design: encouraging businesses to participate in a survey, and having a reference against which to assess the amassed data.

2 THE DESIGN DIAGNOSTIC TOOL

Design Diagnostics tool comes in two parts: first collecting data using the design diagnostic tool, and second, analysing the amassed data using benchmarking.

The Design Diagnostic is a tangible report prepared specifically for each participate company based on the data they provided to the online survey about design in their organisation. By offering companies the report as an incentive it makes it easier to promote the survey and encourage companies to participate. The report performs several functions: to encourage companies to participate in a design survey, to provide companies with helpful insights about design in their business, to promote the survey and research positively, and to promote the objectives of the host organisation.

The Design Diagnostic report is based on the design management staircase model (Kootstra 2010), which determines the capability of a company to manage design on one of four levels:

— DM1 No design management,
— DM2 Managing design on a project to project basis,
— DM3 Design as an functional part of the business,
— DM4 Design as a core part of the business and its culture.

The level for a company is determined on their collective performance across five design management factors: awareness, planning, resources, expertise and process. The company conducts the analysis through the completion of the online questionnaire, their responses are analysed through several different metrics in order to build a profile of the use and management of design in the company.

Figure 1: An example of a Design Diagnostic report for the design innovation programme, Parana, Brazil.

The Design Diagnostic report is prepared specifically for each participate company and includes: Design Management Staircase assessment, the five-design management factors, new product development success attributes (HESSELMANN et al, 2011), and new product performance review (measured by the percentage of sales from new products less than three years old). These metrics cover, in broad terms, the ability of a company to design and develop new products to market. Other metrics can be added if requested by the host organisation. A national or sector/size specific benchmark performance is also added to each of the metrics in the Design Diagnostic report to provide some context on how the company is performing.

One of the challenges in developing the Design Diagnostic report was to translate data into a format for the managers of the participant companies to understand. Infographics was used to translate difficult concepts and hard data into an easy to read and understandable format. To all of the participant companies to date, the Design Diagnostic report has proved to be enlightening and extremely helpful in clarifying how design should be practiced and managed in their companies. In one of the projects the design diagnostic tool was applied, the report was followed up with one to one consultation by the host organisation and cue cards were used to show examples of good practice specific to the items highlighted in the Design Diagnostic report.

For the host organization – be it a design support centre, government agency, industry association or co-operative – they are able to provide a service to their participant companies while collecting data. These have included and could include: monitoring the performance of a design programme, addressing the needs of companies designing their own products, profiling the characteristics of a specific sector, informing policy planning.

3 ANALYSING THE DATA

The online questionnaire consists of forty questions covering a wide range of aspects about the performance of the company and their design and management practices. Key topics covered by the questionnaire are:

- Company demographics (Size, age, design experience)
- Company performance (3 year turnover, export rates)
- Market & product positioning (Likert scales)
- New product performance e.g. number of new products, sales
- Use of IPR
- Inclusion of design in business strategy
- Resources for design
- Managing and co-ordinating design
- Design research
- Design process
- Design capabilities (in-house, consultancy, freelance, colleges)
- Design activities
- Contribution of design to business
- Barriers to design management
- Design planning

From this data other metrics can be determined:

- Performance in growth and productivity
- Design management staircase level
- Design management factors performances
- New product development success attributes

In total there are around 192 individual design and performance metrics that can profile a single company. When rolled out over an extensive survey, a significant volume of data in various forms (nominal, ordinal, interval and ratio) is generated.

3.1 BENCHMARKING

Interpreting the collected data requires the use of a benchmark in order to draw comparisons against and to identify the relative strengths and weaknesses of the collected sample. The benchmark is compiled from data collected from previous surveys in South America and Europe that used the same questionnaire. Each time the questionnaire is used for a design initiative or research exercise the database grows bigger and benchmarks become more significant.

For a benchmark comparison to be meaningful the demographics of the two samples (collected sample and benchmark sample) needs to be homogenised as much as possible while maintaining significant sample sizes. For example, if a survey collected responses from manufacturing and service companies that range in size from self employed to multinational then the sample as a whole is too diverse to draw any meaningful conclusions. The sample needs to be divided into homogeneous groups, each with a significant numbers of entries. This could be micro to small manufacturing companies, SME service providers or/and large manufacturers. In this exercise some of the entries collected would be removed from the sample, as there is no point giving an analysis of a manufacturing sample consisting of SMEs along with two or three multinationals.

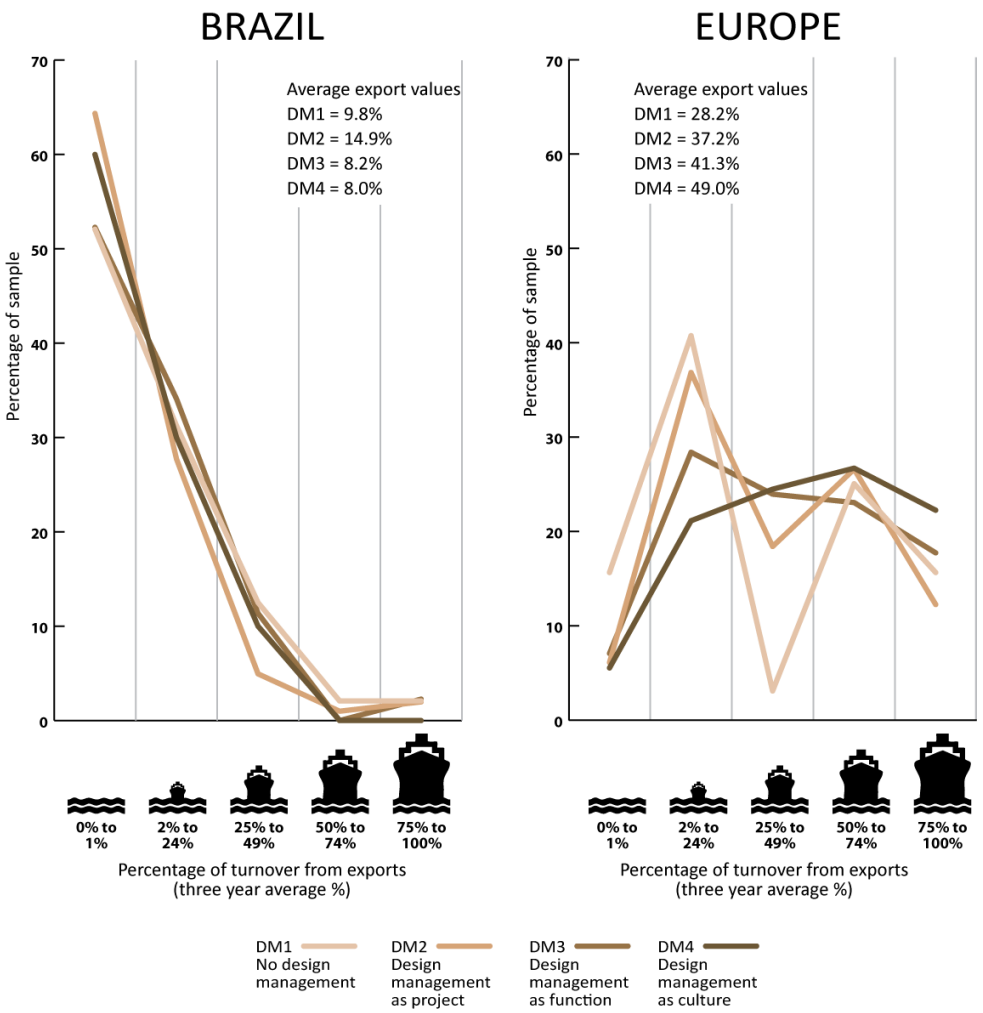
Concurrent with preparing the sample for analysing, the benchmark is carefully compiled from the database to assimilate the composition of the survey sample and to represent an objective of the research programme e.g. regional sample v national sample, specific sector v national manufacturing sector, high performers, high investors in design.

One of the methods of analysing the two samples is the Chi-square test (VOGT & JOHNSON 2011). It determines if there is a significant difference between the observed frequencies and expected frequencies between the two samples of data across multiple-choice responses. The resultant value is a measure of the probability (ρ) that a factor other than chance is determining the difference, or deviation, between the two samples. The Chi-square test is applied to 89 design practice and management multiple-choice data sets which measure the distribution of responses across a range of ordinal choices or descriptions for a single question. By using the ρ values it is possible to statistically identify where the most significant difference in design practice and management occurs between the two samples and where they share common practices.

3.2 EXAMPLES OF THE ANALYSIS

In 2014 the Brazilian Ministry of Development, Industry and Foreign Trade (MDIC) through the Brazilian Trade and Investment Promotion Agency (APEX-Brazil) commissioned research for a "Diagnosis of Brazilian Design". The purpose of the research was to create a reference for the development of industry and provide support for the preparation of a design public policy in the country. The Design Diagnostic technique was chosen for it's benchmarking capabilities to identify how Brazilian companies practice and manage design compared with European companies. A total of 268 completed entries were collected for the analysis.

Figure 2: The export performance of manufacturing companies in Brazil and Europe according to their design management staircase level.



APEX Brazil is responsible for encouraging Brazilian companies to export and identified design as one of the key factors in this objective. To address the topic of design for export a hypothesis was tested: companies who export more have a higher capability to manage design. To test this hypothesis the export performance for companies categorised by their design management staircase level was measured for both the Brazil sample and a benchmark European sample. The graphs in figure 2 illustrate a striking difference between the two

samples. The Brazil sample shows an almost exact negative trend for export performance for each of the four design management staircase (DMS) levels. The pattern for the Europe sample showed four distinct 'M' patterns for each DMS level, with frequency in the 25% to 49% export category increasing with each level. The average export rates for each level further demonstrate a stark contrast between the Europe and Brazil sample. With the European sample, as the DMS level increases, so to does the average annual export rate. However with the Brazil sample, the average export rate remains low across all of the levels. With this evidence the hypothesis was true for the Europe sample but not the Brazil sample.

To further understand the stark difference in export between the two samples one of the 'benefits of design' multiple-choice questions was reviewed. In figure 3 the response to the question 'To what extent has design contributed towards export in your business in the last five years?' are illustrated. It shows a completely opposite distribution in response frequencies across the four options between the two samples.

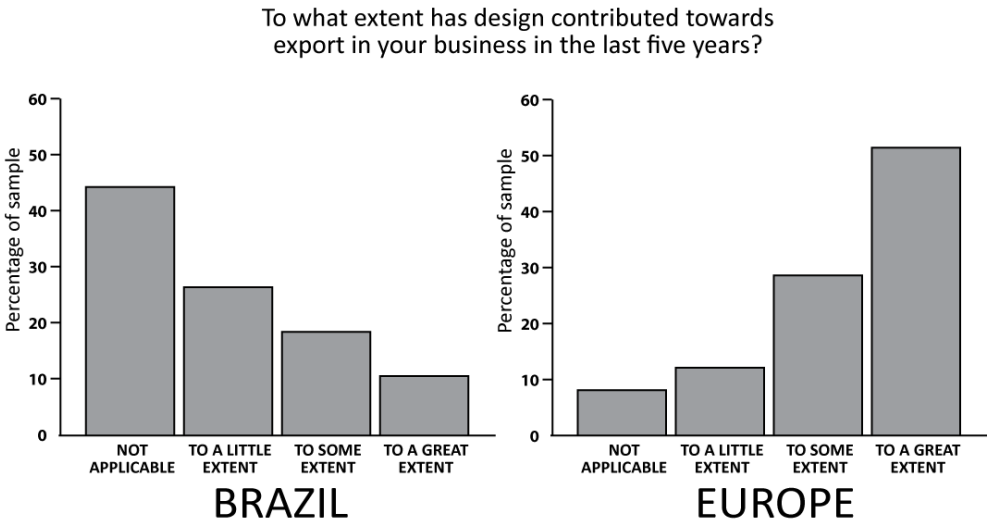


Figure 3: The frequency of responses for the contribution of design towards export for the Brazil and Europe samples.

Furthermore, when the Brazil sample was divided into industrial sectors e.g. medical products, agricultural equipment, cosmetics, the sectors that performed worst in terms of design management capability actually had the highest exports rates, while the sectors with the most capability design management skills performed poorly in terms of export.

Reasons for these results are beyond the scope of this paper but for a government agency responsible for encouraging Brazilian companies to export through design, these findings were new, insightful and compelling.

In a second example of the Design Diagnostic being applied to design policy research, the authors were commissioned to research and prepare design policy recommendations for the Uruguayan Government. The survey was promoted by the host organisation in Uruguay and Design Diagnostic reports were prepared for all participant companies. Although the sample was small (N=24) the results

supported several observations made by other techniques in the research phase of the project.

Data was collected on Uruguay to apply to the International Design Scoreboard (IDS) model (MOULTRIE & LIVESEY, 2009). Two of the metrics of the IDS require data from the World Intellectual Property Office (WIPO); they are number of WIPO design registrations and number of WIPO trademark registrations for Uruguay. Uruguay performs very low in terms of design registrations (111 in 2012) but very high in terms of trademark registrations (10,545 in 2012). For a small nation as Uruguay the number of trademarks per capita ranks it above almost all of the other countries in the original IDS study. This observation is supported further with evidence collected through formal interviews conducted with key people involved with design in Uruguay, who often stated that there is a growing trend among Uruguayan manufacturers to import ready made products from abroad and repackage them for sale in Uruguay and the rest of South America. The results from the Design Diagnostic survey further supported such observations with a review of IPR usage and design resources. In figure 4 the frequency of use of four formal IPR methods by the Uruguay manufacturing sample and benchmarks from Brazil and Europe are presented. It confirms the interview material and WIPO data that there is a relatively high frequency in the use of trademarks by Uruguayan manufacturers, and a relatively low use of design registrations.

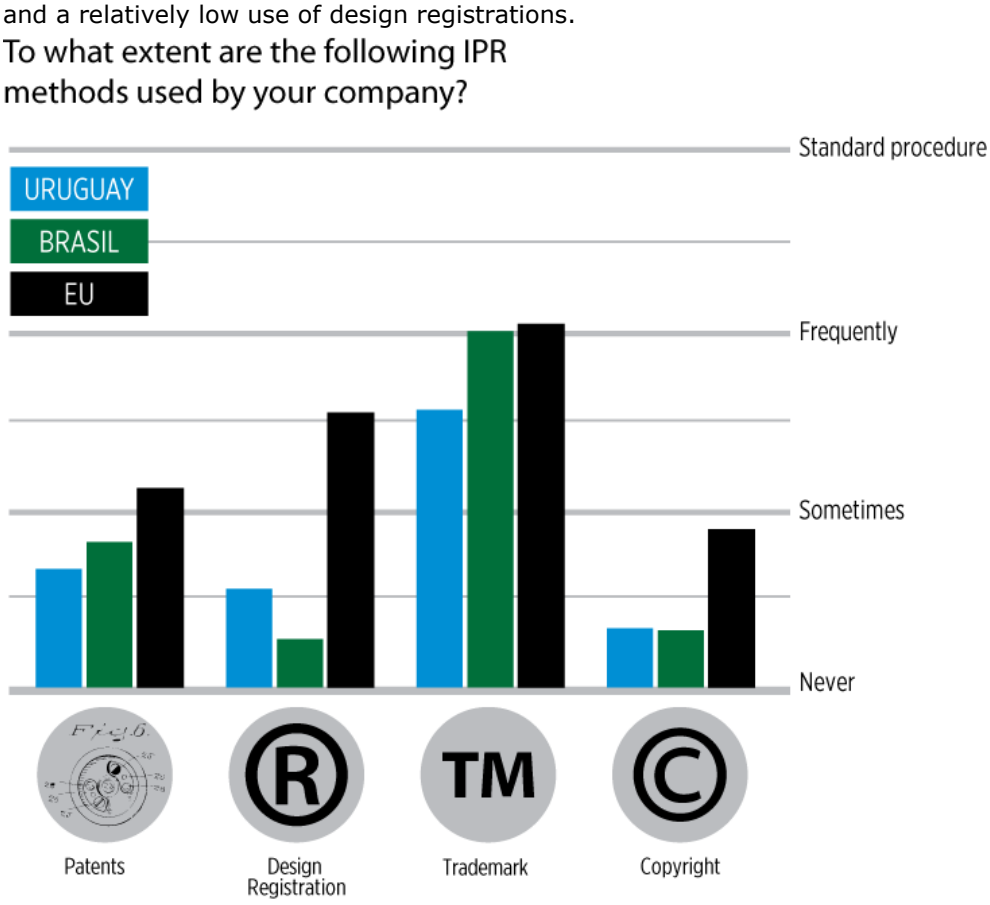
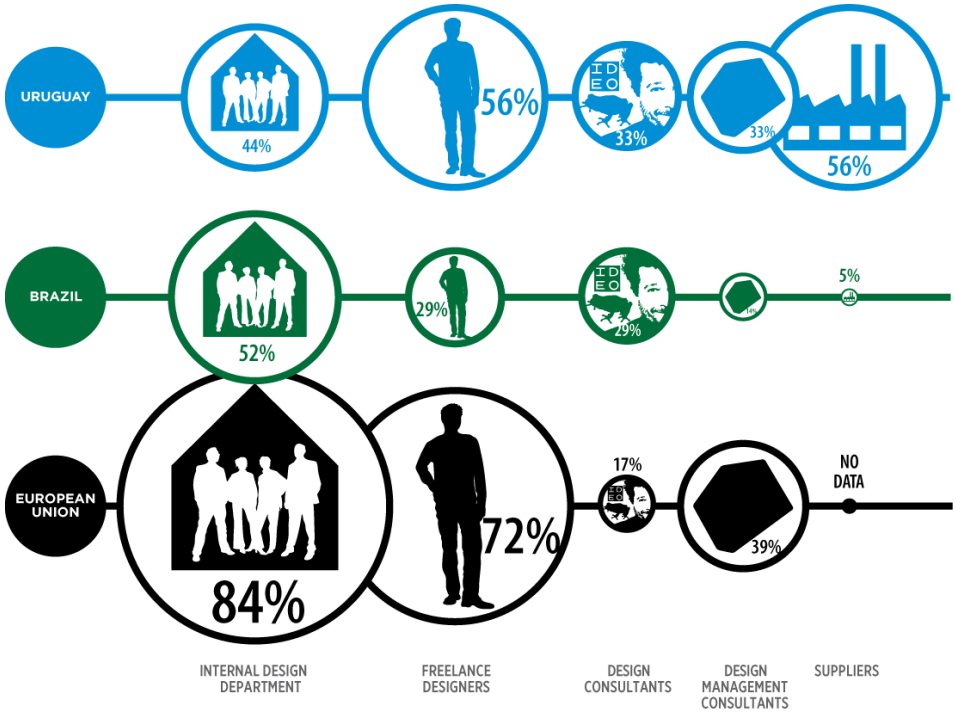


Figure 4: The frequency of use of formal IPR methods by manufacturing companies in Uruguay, Brazil and Europe.

In figure 5 the frequency of use of different design resources by Uruguay manufacturers is reviewed. One noticeable feature of the Uruguay sample is the



high usage of suppliers for design work. This would support the claims made that Uruguayan manufacturers are playing less of a role in product development and more in marketing and distribution.

Figure 5: The utilisation rate of different design resources by manufacturing companies in Uruguay, Brazil and Europe.

4 CONCLUSION

The endorsement of the Design Diagnostic by complimentary research techniques in the example above is an encouraging development for the methodology. Providing companies with their own Design Diagnostic report in return for participating in a survey may appear excessive but there are many benefits to be gained in adopting such a reciprocity approach to design research. Not only in attracting numbers to the survey but it also allows the researchers to gain a better understanding of the design players in the survey sample before they start analysing cold numbers. It can also engage multiple partners in an extensive survey and provide tangible benefits to all participates and stakeholders.

The selection of specific benchmarks from which to draw comparisons from provides valuable and objective insights based on hard data. With a growing database of responses to the same questionnaire the options for benchmarking

become wider and more sophisticated comparisons can be catered for e.g. specific sectors or with specific design traits.

Like all research techniques the Design Diagnostic tool and benchmarking techniques should be used in conjunction with other techniques in order to build a broad and in depth understanding of the subject. The advantage of this technique is that is provides hard data over a wide range of topics from which to draw new insights and identify issues not previously considered.

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