

CIBO85

Challenges and opportunities for design firms in the Brazilian building industry

Leonardo Melhorato Grilo
Silvio Burrattino Melhado
Sérgio Alfredo Rosa Silva
Marcio Minto Fabricio

ABSTRACT

The Brazilian building industry carried out many efforts to reduce material wastage and to improve its quality, productivity and safety in recent years. Despite the actions that were put in place, building construction remains labor intensive and traditional compared to industries of similar importance. Concurrently, factors such as quantitative selection procedures, increasing competition and reduced profit margins posed a lot of difficulties for the market positioning of the design offices. In addition, clients and contractors have cast doubts on the architect's leadership in the design team so that activities typically assigned to them have been transferred to other project players. This paper discusses some challenges for Brazilian design offices in the coming years. It also analyzes recent initiatives to improve professional services, such as the implementation of quality management systems, the emergence of innovative roles in the building design and the proposal of joint programmes to integrate architectural and engineering education. Finally, the paper analyses some opportunities for Brazilian design offices in the near future.

Keywords: design management, building construction, competition, quality, innovation.

1. INTRODUCTION

The increasing complexity of construction projects has encouraged the emergence of innovative organizational and functional arrangements in different countries. Traditional delivery systems, considered lengthy, expensive and potentially adversarial, have been gradually replaced by alternative procurement methods, such as construction management and design-build. The typical roles of project players were redefined, new professions emerged and activities usually assigned to the designers were transferred to other members of the project team. Despite their qualifications, the designer's responsibilities have been gradually assigned to other project players in Germany, especially to contractors (SYBEN, 2000). In England,

where architects play the role of the design and project manager, contractors have commonly integrated project and construction activities. The fact that the architects have been replaced as project leaders may be explained by a deficient communication with the clients, aspect in which other professionals have a better prospectus (Howell; Hardcastle, 1996). The architects have been accused of abandoning their responsibilities with the project team in the United States, where clients no longer assign the designers as team leaders (Weingardt, 1996). The short involvement of architects in technical definitions and construction-related activities has been criticized in France, where some designers believe that their role in the project concerns just creativity (Melhado; Henry, 2001).

In the United Kingdom, Gray; Hughes (2001) also identified changes in designer's roles due to: emergence of new professions; redefinition of traditional roles; loss of architect authority to project managers and specialized consultants; complex and restrictive fee agreements; and a wide variety of sophisticated procurement techniques to integrate design and construction. The designers became generalists with less control over design details.

Although the above studies were carried out in developed countries, some of the issues discussed arguably provide a theoretical basis for the analysis of trends for building design offices in developing countries, such as Brazil.

2. TRENDS FOR DESIGN AND PROJECT MANAGEMENT IN BRAZIL

In the last years, economical, social and political factors reshaped the relationships between the project players and modified the intensity of competition in the Brazilian building industry. Market shortage, entry of foreign competitors, clients' bargaining power, rivalry among competitors and declining profit margins compromised the performance of construction companies and design offices. The following items highlight some trends for design and project management in Brazil:

- Project complexity: complex requirements, short delivery times, price certainty and sophisticated briefs will require tailor-made solutions from the project players. The client's organization may encompass stakeholders with different expectations and conflicting requisites. Despite the complex and fragmented nature of construction contracts, contractors and designers are rarely covered by insurance and many projects are launched without a signed agreement;
- Design complexity: the design became a complex process with responsibilities assigned to various specialists, who respond for certain elements of the whole package. The architects reinforce their primary role in the design, but reckon the need to establish new working practices and approaches within the design team. Focused on aesthetic and functional issues, architects lost their systemic view of the project. Consequently, integration functions, such as the design coordination, became essential to capture the client's value system and to conciliate the divergent views of the

project players;

- Selection methods for designers: designers have pointed out the price-based selection as an obstacle to the design quality. The competitive bids are prevalent in the public sector, although procurement law (Law n. 8.666/93) enables the adoption of qualitative criteria. The designers argue that competitive bids rarely offer the best value, since the design services may not be accurately priced prior to the work scope definition. Qualitative procedures have been often used in private projects combined with a quantitative criteria;
- Selection methods for contractors: price-based selection is compulsory in public projects, except where a very sophisticated technology is required. In the private sector, quantitative procedures may be combined with qualitative criteria, such as: construction company size, portfolio, commitment and financial capacity, personnel availability and experience with the programme. Progresses in the supply chain may be identified and some clients are aware that value does not necessarily means the lowest price;
- Emergence of alternative procurement methods: clients have encouraged the adoption of alternative delivery options as to transfer risks to other parties. The construction activities have been frequently initiated prior to the design completion as to reduce project timescales and anticipate the revenues. Guaranteed maximum price contracts became widespread in the private sector, even in fast-track schemes. Cost-fixed contracts were gradually replaced by price-fixed contracts in the last decade;
- Changes in project player's roles : the emergence of alternative procurement methods modified the contractual and functional relationships among the project players. Traditional solutions have been replaced by innovative procurement methods and the typical roles of the primary project players have been redefined. Functions usually assigned to architects have been gradually transferred to contractors and construction managers;
- Loss of architect's leadership: the architect's work scope has been reduced due to the lack of compliance with the client's cost and time objectives. The focus on aesthetics and functional issues has not justified their ascendant role in the project team and, as a result, the design coordination has been transferred to other team members. To some extent, the lack of adherence to the client value systems has benefited the entry of international design offices;
- Architect's return to the building site: conversely, intense competition, market shortage and the large number of design schools² are pushing designers back to construction-related activities. Some architects have been hired by contractors to review design documents and supervise construction activities. Architects who work in construction firms may develop a broad understanding of the client's value system, which allows them to balance

² Until November 2002, the Brazilian Architecture Education Association (ABEA) had accounted for 147 architecture schools over the country, of which 43 were placed in the State of São Paulo (<http://www.abea-arq.org.br/>).

aesthetical, technical and economical dimensions of the design. Architects can clearly benefit from incorporating some of the issues emphasized by the engineering education. In this context, the University of Sao Paulo recently launched a joint programme in Architecture and Civil Engineering;

- Popularization of construction management: construction management has become a preferred delivery option for some clients due to the adversarial nature of construction projects, the designer's short involvement in management and cost control, and lack of trust in contractors. Architects or engineers, autonomous or hired by a firm, usually play the construction management role, which has not been addressed in professional education to date. The increasing number of firms providing construction management services resulted in a significant discrepancy in the work scope³;
- Demand for global services: design-build and its variants, such as the *turn-key* or the EPC (*Engineering-Procurement-Construction*), have also become popular. Large clients have dismissed in-house consultants to focus on their core business and do not want to manage multiple construction contracts. Therefore, integrated delivery options became attractive, especially in projects with tight budgets and timescales constraints. However, conflicting interests with construction managers, limitations in the public procurement law (Law n. 8.666/93) and the lack of design competences in construction companies have limited the growth of design-build;
- Project lifecycle integration: some construction companies put measures in place to provide single point of responsibility to the clients, control risks in fixed-price contracts and improve their profitability, such as: strategic alliances with suppliers and designers; development of competences in design and risk management; adoption of a pre-construction stage to review technical solutions and conciliate client's cost, time and quality requirements; and an early involvement in the feasibility studies and in the design process;
- Trust-based relationships: projects often bring together organizations with particular organizational cultures and management systems, which may inhibit the establishment of trust. Frequently, trust-based relationships influence team member's commitment and are more valued than agreements. These aspects can raise difficulties for foreign construction companies, which normally adopt a strict commercial approach, and transfer additional risks to the project team;
- Difficult market positioning for design firms: the competition in the design sector has been intensified due the following factors: entry of foreign offices; market shortage; assignment of designer's roles to other team members; and an excessive number of design schools in some regions. Additionally, competitive bids in the public sector projects, lack of marketing strategies and low profit margins have posed difficulties for its survival;
- Emergence of the design coordination: the *design coordination* has

³ Despite recent efforts of the Project Management Institute (PMI) to encourage the professional accreditation and the certification of project management processes.

emerged as an independent role in the design process, which aims to enhance the communication and to encourage the incorporation of the client value system by the project team. The *design coordination* has been erroneously associated with the physical coordination among design disciplines, for which the *coordinator* responds only partially, since each designer should assure the consistency of the produced information. The architect's *design coordination* has been criticized by other project players due to the lack of adherence to the client objectives. Hence, the role has been frequently assigned to other team members or to the so-called *design coordinators*;

- *Production process design*: the *production process design* refers to the detailment of building subsystems, such as formwork, masonry, dry wall, rendering and façade ceramic tiles, in order to improve the quality and efficiency in the production process. The *production process design* includes relevant data about the production process that is traditionally unavailable in the design documents. Some design offices specialized in the development of *production process designs* for different subsystems and enhanced their integration with contractors, subcontractors and suppliers. Nevertheless, the *production process design* requires an adequate training of human resources as to assure that it will be properly implemented on site;
- *Collaborative systems*: the adoption of collaborative systems in the design process has been lower than originally expected by the *Application Service Providers* (ASPs) due mainly to: the designer's reluctance; lack of adequate broadband infrastructure; difficulty to analyze costs and benefits; and to the assignment of professionals, other than those who involved the design, to manage the system. The use of collaborative systems by SMEs is still limited, although their adoption in large projects is currently widespread. Large construction firms initially developed in-house systems, but soon opted to outsource them. Some designers consider the collaborative systems lengthy, bureaucratic and difficult to use, but a widespread use of the tool in building design is expected in the near future;
- *Quality management systems*: quality management systems have been seen as an alternative to attain competitive advantages. Government-driven policies, such as the *Brazilian Quality and Productivity Program* (PBQP-Habitat), enforced the gradual implementation of quality management systems as a requirement for construction and design firms that take part in public bids. About 280 construction firms and 160 design and project management offices have implemented quality management systems up to February 2003 and close to 1550 contractors were compliant with the PBQP-Habitat's requirements in the four levels of exigency (D, C, B and A).

3. COMPETITIVE SCENARIO IN BUILDING DESIGN SECTOR

The competitive analysis of the building design sector points out some of the managerial, technological, organizational and strategic issues that will challenge the design offices in the coming years:

- Competitors: factors such as the lack of barriers to entry, price-based selection in public bids and the development of free of charge studies to prospective clients have compromised the office's profitability in recent years. 'Brazilian design offices will be exposed to most efficient competitors, including foreign ones, if they do not invest in quality, technology and business capabilities' (PIMENTA, 2000). The *Associação Brasileira de Escritórios de Arquitetura* (ASBEA, 2000) criticized the development of free of charge studies for prospective clients as a marketing policy as an estimate indicated that offices were engaged in only 6 to 9% of the projects for which they developed free of charge studies;
- Buyers: construction clients have a remarkable advantage in negotiations and designers rarely take part in the strategic decision-making. Clients became more demanding and their interference in the design process has often resulted in extensive rework and losses for the offices. As they perceived the influence of the design in the project performance, clients started to evaluate the office in terms of technical quality, compliance with delivery schedule, presentation, technical assistance and involvement in coordination meetings;
- Suppliers: the design offices present a reduced bargaining power, especially with software and hardware suppliers, although new entrants may enhance the competition shortly. Architecture offices usually outsource design deliverables, such as construction documents, drawings, printing services and 3D models, to smaller offices, despite this having a detrimental effect on the quality of the service, especially if the design quality control is lax;
- Substitute products: the *design coordination* and the *production process design* have emerged as new products. Client-driven and responsive services, adherence to client's value system and adequacy to different delivery options could reasonably contribute for the market positioning of design offices;
- Entrants: the entry of foreign offices exposed the technical and commercial weaknesses of the local firms. Additionally, the lack of mutual agreements to regulate the trade of building design services between countries has enhanced these limitations. Musa (1996) listed weaknesses of local architectural offices in comparison with foreign ones, such as lack of responsiveness and flexibility, difficult relationship with technical designers and reduced involvement of clients in design decision-making.

The evidence above suggests a complex strategic positioning for design offices due to: intense competition; profit margins decline; competitive bids in the public projects; pricing methods based on hourly rates; and entry of foreign competitors. The following item discusses some challenges for Brazilian design offices in the coming years.

4. CHALLENGES FOR ARCHITECTURE AND ENGINEERING FIRMS

Research from the Royal Institute of British Architects (1992) pointed out a poor

Challenges and opportunities for design firms in the Brazilian building industry

performance of British architectural offices: architects have a historically inferior income compared to other similar professions; 30% of architects work alone or with another person; 20% of architects who work alone have a second job; client's satisfaction seems to decrease as the project progresses; and architect's success perception decreases as the work progresses. In recent years, a different range of factors compromised profitability of Brazilian design offices. The following items analyze some issues that will challenge the local design offices in the near future:

- Free of charge studies: the development of free of charge studies to prospective clients has affected the financial performance of design offices. ASBEA (2000) links the current situation with technical, financial and commercial weaknesses of the design offices, such as lack of criteria in establishing marketing policies and the lack of return on investment's appraisal. ASBEA encourage the architectural offices to invest in marketing and networking, demand complete input from the client before developing design studies and to transfer the costs incurred in the studies to the clients;
- Pricing methods: design pricing has been often based in parametric methods, such as percentage of construction fixed-fee plus expenses, multiple of direct personnel expenses and lump-sum fees. However, the CADD increased significantly the productivity in the design process, especially in the drafting activities. In this context, the adoption of pricing methods based on hourly rates, without taking into account the investments in information technology, can ruin the office's profitability;
- Competitive bids: although the procurement law prescribes the selection of the *best price*, the procuring departments usually opt for quantitative methods to simplify bid evaluation and to avoid suspicion. Despite competitive bids being deep-rooted in Brazilian culture, the procurement legislation has been changed in some countries to accommodate the use of qualitative methods in public bids. ASBEA (1999) describes a bid for a 7000 m² building project where three bidders were immediately discarded as their proposals were lower than 50% of the cost estimate prepared by the procuring authority;
- Innovative procurement methods: time, cost and quality requirements have induced the emergence of innovative procurement methods in the private sector. The attainment of better performance requires the selection of procurement methods that balance the project objectives and the risks transferred to the stakeholders. Innovative procurement systems may enable significant improvements in construction performance;
- Changes in professional roles: the aesthetics does not represent the client's primary requirement, even in very sophisticated buildings. Contractors, who play an increasing role in the construction projects, have been assigned by the clients for the design management. Project teams have become more complex, multidisciplinary and often include economists, financial service providers, accountants, lawyers, environmentalists and dozens of consultants. Many clients do not assign the architects to lead the team anymore;
- Integration among architects and engineers: *genuine* partnerships may

encourage the cooperation, productivity and innovation, reduce claims, enhance the attainment of the client objectives and improve the public image of the participants. The partnerships should also induce the return of architects to the building site (Weingardt, 1996);

- Marketing in architecture and engineering firms: the market positioning of architects and engineers is quite reactive. The offices usually emphasize the design quality, despite the fact that clients frequently search for quality services (COTO, 1999). This fault may be associated with an incipient market approach, due to the lack of mechanisms to capture the client's needs, such as opinion polls, post-project evaluations and user satisfaction surveys;
- Design as a service: although design development represents the main activity, there seems to be an increasing demand for complementary services, such as site acquisition, design coordination and construction management. However, a service approach requires further considerations about: design office organizational structure; roles and responsibilities of principals, coordinators and designers; empowerment and autonomy of teams; recruiting, training and retaining human resources; wages policies; pricing methods; marketing efforts; and mechanisms to recover failures. Delivering services demands specific training due to the extensive contact with clients;
- Globalization: foreign companies are present in different sectors of the Brazilian construction industry. The decrease in the construction demand in developed countries and the search for business opportunities overseas tend to intensify the entry of foreign competitors in developing countries, especially by large companies. Local offices may arguably benefit from foreign competition, due to the knowledge transfer. However, designer's institutions should implement initiatives to reduce barriers to entry in other countries, such as designer's diploma accreditation, excessive taxation and the need to set up a branch or ally with a foreign partner;
- Information technology and CADD: The AIA Firm Survey 2000-2002 indicated that high-tech offices were awarded a large number of large projects, generated an upper income per employee and registered most stable earnings (Jacknain, 2001). Despite its importance for the design firms, the software acquisition does not always take into account a wide range of factors such as cost, availability, training, upgrade and impacts in work presentation, collaboration and productivity. The adoption of collaborative systems among designers is reduced and these systems are often operated by employees who are not involved in design-related activities, such as trainees and assistants;
- Sustainability and life-cycle costs: generally, life-cycle costs are optimized after construction, although initial phases determine 80% of environmental pollution and operational costs, which sometimes surpass even the construction costs. Poor design may increase cleaning costs up to 74%. Alternatives for the development of sustainable buildings involve intelligent design, low technology installed, flexibility and achievement of ecological

objectives through creative solutions (BOGGENSTÄTTER, 2000). Seeing that Brazil faced a serious energy shortage in 2001, a reduction in building's energy consumption would lead to significant savings in national energy consumption.

The Brazilian design offices should probably turn above challenges into business opportunities so as to offer innovative services and provide client-driven solutions. Despite office's technical and financial limitations, their compact structure would enable them to easily adapt to market fast-paced changes so as to provide high technology services and an extensive contact with their demanding clients.

5. OPPORTUNITIES TO ARCHITECTURE AND ENGINEERING OFFICES

A number of managerial, technological, organizational and economical drivers compromised the profitability of Brazilian design offices and make their strategic positioning and market survival more complex in recent years. In this context, the attainment of competitive advantages could reasonably require: establishment of business strategies; positioning of products and services taking into account internal and external competitors; awareness of the potential benefits of market segmentation; development of ongoing relationships with clients and suppliers; focus on project management and cost control; organizational design compliant with the business strategy; autonomous teams to provide client-driven solutions; efficiency in resource allocation; adequacy to different delivery options; and innovative use of CADD, information and communication technologies. Moreover, it demands a more active political approach from designer's institutions so as to inhibit the development of free of charge studies for prospective clients as a marketing strategy and to enforce the use of qualitative selection procedures in public sector bids.

The competitive environment promotes a favorable scenario to firms that manage to foresee trends and adapt quickly to the changes in the economical and productive scenario, irrespective of the nature and size of the business. To lead market segments, improve profitability and develop ongoing relationships with their clients, design offices need to master the following issues: embed the business strategies into the quality management system; focus on market segments; anticipate trends; use successful results to capture opportunities; make an intensive use of the capital and invest in technology; provide innovative, responsive and client-driven solutions to demanding clients; accommodate to different project arrangements; use of the professional agreements as a risk management tool; adopt value pricing methods to recover the investments in technology and human resources; encourage the project managers to actuate under the client direction; and establish genuine partnerships and alliances with clients, contractors and suppliers.

REFERENCES

Associação Brasileira dos Escritórios de Arquitetura (1999). Concorrências de preço para projeto, <http://www.asbea.org.br>, June Jun 2001.

Challenges and opportunities for design firms in the Brazilian building industry

- Associação Brasileira dos Escritórios de Arquitetura (2000), Marketing agressivo: estudos a custo zero, <http://www.asbea.org.br>, June 2001.
- Boggenstätter, U., (2000), Prediction and optimization of life cycle costs in early design. In *Building Research and Information*, n. 28, Apr/Jun, pp. 376-386.
- Coto, A., (1999), Arquitectura, ingeniería y mercadeo. In *Revista Acta Acadêmica*. Curridabat: UACA, n. 25, Nov, pp. 47-55.
- Gray, C.; Hughes, W. (2001), Building design management. Oxford: Butterworth-Heinemann, 177 p.
- Howell, P.; Hardcastle, C. (1996) Integrating and managing the project team: an analysis of design-build contracts. In *Proceedings of the RICS Construction and Research Conference*. The Royal Institution of Chartered Surveyors.
- Jacknain, G. High-tech firms report high productivity, <http://www.e-architect.com/news/aiarchitect/oct00/tech.asp>, July 2001.
- Musa, E. A invasão americana e as possíveis linhas de nossa defesa. <http://www.asbea.org.br>, June 2001.
- Pimenta, F., (2000), A entrada do capital estrangeiro. In *Qualidade na Construção*. São Paulo: SindusCon, p. 29.
- Royal Institute of British Architects, (1992), Strategic study for the profession. Phase 1. Strategic Overview. London: RIBA.
- Schmitt, C. M.; Hinks, A. J., (1998), Estudo comparativo sobre a organização e a aplicação de sistemas computacionais no sub-setor de edificações da construção civil no Brasil e Reino Unido. In *Proceedings of the 8th Encontro Nacional de Tecnologia do Ambiente Construído*. Florianópolis: NPC/ECV/CTC/UFSC, v. 2, pp. 107-116.
- Syben, G., (2000), Contractors take command: from a demand-based towards a producer oriented model in German Construction. In *Building Research & Information*, v. 28, n. 2, pp. 119-130.
- Weingardt, R., (1996), Partnering: building a stronger design team. In *Journal of Architectural Engineering*, v. 2, n. 2, Jun, pp. 49-54.